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Sacred Ecology and Geosocial Conservation: The Case of Kamchanoad Forest, Thailand

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Abstract

This study examines the conservation of Rukkha Naga, or Chanoad trees, in Kamchanoad Forest, Udon Thani Province, Thailand, and its role in sustaining local cultural traditions and community resilience. Grounded in a geosocial framework, the research explores how geographic, social, and spiritual elements intersect in conservation efforts, shaping both land-use practices and cultural identity. Using a mixed-methods approach, data were collected from 200 local residents and 35 key informants across two sub-districts of Kamchanoad. Findings indicate that traditional knowledge holders play a central role in preserving Chanoad trees through a three-stage conservation process: seed collection, ceremonial planting, and long-term maintenance. The study also highlights the influence of demographic factors, including gender, age, occupation, income, education level, and retail store ownership, on community participation in conservation. By integrating local wisdom, this research contributes to broader discussions on geosocial conservation and cultural sustainability.

Keywords: *Geosocial, Community Participation, Cultural Identity, Forest Conservation, Local Wisdom, Spirituality.*

Introduction

Social scientists and geographers have long explored the dynamics of how societies interact with their environments, using various tools to map social phenomena, spatial distributions, and structural transformations. From the late 1960s through the 1980s, the scope of social geography expanded, incorporating the study of relationships, systems, structures, and struggles, all intricately linked to spatial contexts. This shift emphasized the need for a deeper understanding of the mechanisms driving social function, prompting scholars to look beyond surface-level interactions and investigate the "black box" of society (Philo & Söderström, 2014). Therefore, the concept of "geosocial" is more broadly defined as the study of spatial patterns and functional relationships among social groups, their internal structures, external interactions, and channels of communication (Buttimer, 1968).

Kamchanoad, located in the Ban Dung District of Udon Thani, Thailand, is a community marked by diverse landscapes—highlands, lowlands, and swamps—which support both freshwater conservation and agriculture. Established as *Baan Nonmuang* in 1994, the community adheres to the sufficiency economy philosophy, with most residents engaged in farming, cultivating rice, eucalyptus, cassava, and rubber trees (Phukamchanoad et al., 2014). Kamchanoad is also deeply connected to Buddhism, and its cultural landscape is enriched by the myth of the *Srisutto Naga*, a serpent-like deity believed to inhabit the local forest. This cultural connection is celebrated through annual rituals, particularly during Vesak. Therefore, the community places a high value

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on conservation, particularly with regard to the “Chanoad trees” (*Rukkha Naga*), which play a vital role in local ecology and cultural identity. These trees are cultivated through a detailed two-year preparation process, illustrating the community's commitment to maintaining both their natural and cultural heritage (Phukamchanoad, 2023).

Kamchanoad Forest is a floating peat forest located in Non Mueang Village, Ban Muang Subdistrict, Ban Dung District, Udon Thani Province, Thailand. Spanning approximately 20 rai (7.9 acres), it was formed by the accumulation of aquatic plant residues near the Kud Kham Reservoir. The forest is situated 700 kilometers from Bangkok, 100 kilometers from Udon Thani city, and 16 kilometers from Ban Dung District. Surrounding administrative areas include Wang Thong Subdistrict, Dong Yen Subdistrict, Nong Pan Subdistrict, Phon Song Subdistrict, and Ban Chan Subdistrict (Kamchanoad Administrative Committee, 2019; Rukkhachatnaga, 2020).

As a community forest, Kamchanoad is intricately linked to social relationships, cultural beliefs, economic activities, tourism, and political dynamics within Thai society. Comparative studies, such as those on Nepal's community forest model, show how social relationships and cultural practices interact with ecological conservation (Nightingale, 2003), while research in southeastern Spain underscores the importance of social and cultural values in prioritizing ecosystem services (Iniesta-Arandia et al., 2014). These examples highlight how social processes influence ecological responses, emphasizing the importance of sustaining livelihoods and well-being during socio-ecological transitions (Kofinas & Chapin, 2009).

This study aims to explore the role of community participation in geosocial conservation of Chanoad trees and preservation of cultural practices tied to the Kamchanoad tradition. By examining the intersection of demographics, local wisdom, and environmental conservation, the research provides valuable insights into how community involvement can sustain cultural identity and the local ecological environment simultaneously. Ultimately, the findings contribute to a deeper understanding of the role of local communities in shaping sustainable conservation practices that support both cultural and ecological resilience, offering valuable lessons for similar initiatives worldwide.

Literature Reviews

This section examines key themes relevant to the study, including the geosocial framework, community participation, cultural identity, local wisdom, and Kamchanoad forest conservation, offering insights into their roles in shaping cultural and environmental dynamics in the study area.

Conceptualization of “Geosocial” Framework

In social science research, the “geosocial” framework refers to the physical environment, lifestyle, values, and customs specific to a given locality. These factors vary widely depending on the geographical context, meaning that development initiatives must take these diverse elements into account. Therefore, “geosocial” encompasses both tangible and intangible elements, such as land, people, ways of life, values, spirituality, occupations, and community interactions (Phukhamchanod, 2020).

The term “geo” refers to the natural environment—earth, water, wind, and fire—recognizing the distinct characteristics of each region. The “social” component emphasizes the diversity of people, their cultural practices, values, and norms, which can vary greatly between localities. These elements must be respected and a holistic, comprehensive approach to development must

be adopted. This method avoids rigid adherence to academic theories or technological solutions that may not align with the actual living conditions of the people (Office of the National Economic and Social Development Board, 2011).

In a previous study conducted in Kamchanoad, Ban Dung District, Udon Thani Province, researchers defined "geosocial" as the geographical, social, cultural, and traditional context, including the values and way of life of the local people. This understanding is essential for guiding development decisions, fostering greater community engagement, and ensuring sustainable outcomes. The research observed several geosocial aspects, including salt fields, rice paddies, flatlands, waterways, forests, reservoirs, diverse occupations, rural and urban lifestyles, family structures, Buddhist practices, and local traditions and culture (Phukhamchanod, 2020).

The concept of "geosocial" is deeply embedded in the guiding principles of His Majesty King Bhumibol Adulyadej the Great (King Rama IX), who emphasized that development must align with both the geographical characteristics of a region and the sociocultural aspects of its people. In one of his royal speeches, he stated:

"...Development must align with both the geographical and sociological landscapes of the community. This means understanding the nature and mindset of the people. We cannot impose our way of thinking upon others. Instead, we must offer guidance and support in a manner that respects their needs, explaining the principles of development in a way they can understand..." (Bhumibol Adulyadej, King Rama IX, 2009).

This holistic approach has been actively applied through royal initiatives, where King Bhumibol would systematically analyze data to ensure projects met the true needs of the people, reflecting the "geosocial" context.

For example, geosocial mapping is frequently used for water management initiatives, aligning with the royal principles of King Bhumibol Adulyadej. These initiatives emphasize integrated water management across upstream, midstream, and downstream areas, encapsulated by the phrase "from the sky, through the mountains, to the sea" or the belief that "water is life." This approach ensures the sustainability of ecosystems and enhances the quality of life for local populations. It has been further developed into the New Theory of Agriculture and the "Khok Nong Na" model under the guidance of King Vajiralongkorn (King Rama X). These initiatives represent a comprehensive framework that harmonizes geographical and sociological principles into an integrated development model (Department of Public Works and Town & Country Planning, 2024).

Community Participation

The concept of "participation" in development entails the active involvement of all stakeholders, including local community members, leaders, government officials, and foreign workers. This process enables citizens to engage in a range of activities, such as identifying issues, brainstorming, sharing ideas, making decisions, implementing, monitoring, evaluating projects, and benefiting from the outcomes (Cohen & Uphoff, 1980; Mallikaman, 2002). In the context of community development, it is essential to create processes that allow local people to collectively think, analyze, plan, take responsibility, solve problems, implement solutions, and improve their communities under the principles of civic engagement (Phukamchanoad, 2018).

A key aspect of community participation in Thailand is the emphasis on the royal principles of King Rama IX, who is widely regarded as a democratic monarch. His Majesty's concept of

"public involvement" was integral to his governance approach. One notable principle was the introduction of "public hearings" in administrative processes, which provided opportunities for citizens, officials, and community members to collaborate and offer their opinions on matters related to development, conservation, and the enhancement of local communities. This inclusive approach ensures that the needs and views of the people are carefully considered. As His Majesty stated in one of his royal speeches:

"The most important thing is to cultivate a broad and firm heart, to listen to others' opinions, even criticisms, intelligently. Because the ability to listen wisely is, in fact, the gathering of diverse wisdom and experience, which contributes to the successful and complete implementation of administrative work" (Office of the National Economic and Social Development Board, 2008).

The "Stages of Sufficiency: *Sabaidee Isan* (Wellbeing of the Northeastern Region)" participation process is designed for human capital development, with a focus on poverty alleviation. Rooted in the Sufficiency Economy Philosophy, this process is tailored to the needs of the Upper Northeastern Region of Thailand. It consists of several stages: (1) collective thinking, (2) collective design thinking, (3) collective planning, goal-setting, and member selection, (4) collective implementation, (5) collective responsibility, (6) participatory evaluation and benefit-sharing, and (7) collective learning and follow-up (Phukamchanoad, 2019).

Cultural Identity

Cultural identity refers to the shared rituals, values, beliefs, practices, and symbols that define a culture and shape an individual's or group's sense of belonging (Joseph, 2012). Contemporary research on cultural identity often focuses on challenges such as identity confusion, mental health issues, and generational gaps between adolescents and their elders, particularly within the context of evolving cultural dynamics (Jensen, Arnett, & McKenzie, 2011). These challenges highlight the tensions between national identities and the diverse cultural realities individuals experience, such as those shaped by religion, family history, community, career, politics, and language. Such tensions, often accentuated by geographical and social differences, align with social action theory, which explores the role of societal structures in shaping individual identity (Holliday, 2010). The development of cultural identity is particularly pronounced during childhood, when individuals are most influenced by their environment. Exposure to cultural diversity plays a pivotal role in this process, especially in settings like international schools where cultural interaction is particularly visible (Pearce, 1998).

In Thailand, the concept of culture is defined in the National Culture Act B.E. 2553, which emphasizes the distinctive aspects of Thai life. The Act acknowledges culture as encompassing ways of living, thoughts, beliefs, values, traditions, rituals, and wisdom, all of which are cultivated, passed down, and adapted by communities to promote both spiritual and material prosperity. The term "culture" itself is derived from Pali and Sanskrit, with "Vattana" meaning growth or flourishing, and "Dhamma" referring to goodness and beauty (National Culture Act, 2010).

With a rich heritage spanning over a thousand years, Thai culture has evolved into what is known as "Cultural Heritage Wisdom." This refers to knowledge, practices, and cultural expressions that are embodied in individuals, tools, and objects and are collectively cherished by communities. Cultural heritage is passed down through generations, often adapting to the

changing environment. Notable examples of this evolution include traditional Thai cuisine (e.g., *Tom Yum Goong*), Thai massage, traditional attire, the Thai smile, the Thai language, and the Thai Khon dance (Heritage Conservation and Cultural Wisdom Group, Cultural Studies Institute, Department of Cultural Promotion, 2016).

This study focuses on the “rituals” that represent the identity of Kamchanoad’s culture. These rituals are deeply intertwined with local beliefs and have been passed down as forms of folklore for over a century, serving as vital expressions of community identity.

Local Wisdom

Local wisdom refers to the knowledge and practices developed through harmonious interactions between humans, nature, and the built environment within a specific cultural context. While globalization has led to architectural and cultural homogenization, it continues to evolve, integrating modern technologies while preserving regional identity and environmental harmony (Dahlhani, 2010). More than a repository of traditional knowledge, local wisdom is a dynamic process of adaptation and problem-solving, integrating moral values, environmental management, and self-sufficiency. It emphasizes that community development stems from internal traditions rather than external intervention (Nakhornthap, 1996; Mungmachon, 2012).

Indonesia provides an example of this interplay between preservation and adaptation, by which traditional rituals and beliefs shape ways of life. Rooted in philosophical principles governing relationships with God, nature, and society, local wisdom reflects both historical and environmental contexts (Pesurnay, 2018). Similarly, the Buddhist community of North Lombok expresses local wisdom through traditions such as *Pujawali* and *Memareq*, which emphasize respect for nature as a fundamental principle of life (Pranata et al., 2021).

In Thailand, local wisdom is equally vital to natural resource management, ensuring conservation, sustainable development, and cultural continuity (Raekphinit, 2020). The Kamchanoad area demonstrates this through efforts to preserve its natural resources, particularly the Kamchanoad Forest. However, prior research has yet to explore public participation in local development through Kamchanoad’s cultural identity in product design or tourism. Current practices primarily involve producing offerings for worshipping sacred beings, such as the “Great Naga Sri Suttho” and the “Great Nagee Sri Pathumma.”

Kamchanoad Forest Conservation

The practice of “Kamchanoad forest conservation” (locally known as “Naga tree conservation” or “Chanoad tree breeding”) takes place in Ban Non Muang, Moo 11, Ban Muang Subdistrict, Ban Dung District, Udon Thani Province. The area was once called *Ban Chanoad*, named after a large tree that once stood there. By 1986, the area saw an increase in settlement, with approximately 40 households and a small wooden shrine located opposite the village gate (Kamchanoad Administrative Committee, 2019).

The conservation effort for Chanoad trees began in 2011, when Mother Samorn Kanthikul led a group of villagers in organizing the first Chanoad tree planting ritual. The first official tree planting took place on 16 December 2014, when 109 Chanoad trees were planted. For the planting, the soil was mixed with original soil extracted from Kamchanoad Island. The planting method followed a careful layering process. Each planting hole was filled with seven layers (see Figure 1). This ritualistic approach to conservation emphasizes both the physical and spiritual elements of the practice, marking it as a significant cultural and environmental effort in the

Top ↓ Down	Seventh Layer	A final sprinkle of water and the shade of Chaiyapruet (Java Cassia or apple blossom trees)
	Sixth Layer	An invisible mantra chanted over the seeds.
	Fifth Layer	Plantation soil added again.
	Fourth Layer	Chanoad seeds spread evenly.
	Third Layer	Soil mixed from Kamchanoad Island.
	Second Layer	A mixture of loam and plantation soil.
	First Layer	Dry lemongrass or dry grass at the bottom.

Figure 1. Seven Layers of Chanoad Tree Breeding

Source: Khantikul (2014)

Methodology

This study employed a mixed-method research approach, which was reviewed and approved by the Ethics Committee of Suan Sunandha Rajabhat University, Thailand, under study codes 63-090-2-1 and COE. 2-090/2020.

Participants

The study involved a diverse range of participants, including stakeholders in the conservation of the Kamchanoad community forest, preservation of cultural traditions, management of tourist attractions, and development of identity-based products. Participants included community leaders, local entrepreneurs, members of the Kamchanoad tourist attraction management committee, practitioners of local wisdom, civil servants, academics, tourists, and local residents. The sampling process ensured broad representation from various sectors, capturing a comprehensive range of perspectives on the forest's conservation and local cultural practices.

Sampling and Sample Size

A purposive sampling strategy was used to select participants based on their relevance to the research objectives. In-depth interviews were conducted with 14 community leaders from all 14 communities and one tourist attraction manager. Focus groups included 20 participants, comprising community leaders, local entrepreneurs, and representatives from various sectors. The questionnaire survey targeted 200 participants, including members of the general public and non-leader focus group participants. This sample size exceeded the minimum required for data saturation, enhancing the credibility of the findings and ensuring comprehensive insights. In total, 235 individuals participated, with tailored data collection methods employed for each group.

Data Collection and Procedure

Data collection for this study was conducted over one year, utilizing various methods including observation, in-depth interviews, a questionnaire survey, small-focus group discussions, and field experiments.

Observation: The field survey was conducted from Bangkok to the Kamchanoad Community in Udon Thani Province, approximately 700 kilometers away. The researcher employed a participatory observation approach to examine the community's cultural and traditional practices during three key events: (1) the Thai New Year Festival (January 1), (2) the Songkran Festival

(April 13–15), and (3) the Grand Worship Ceremony for the Naga Deities (Great Naga Sri Suttho and Great Nagee Sri Pathumma), held on the full moon day of the sixth lunar month. To support the fieldwork, the researcher hired local research assistants who coordinated activities and monitored socio-environmental and ecological changes across three distinct seasons: winter (November–February), summer (March–April), and the rainy season (May–October).

In-depth Interviews: In-depth interviews were conducted with 14 community leaders from all 14 communities and one tourist attraction manager (15 in total). These semi-structured interviews aimed to explore topics such as leadership roles, conservation strategies for the Kamchanoad community forest, local narratives, the community’s unique cultural identity, and involvement in product development and community-based tourism management. Each interview lasted approximately 60 minutes and took place at a location chosen by the participant within the Kamchanoad community.

Focus Group Discussions: Two focus group discussions were held. The first session included 15 participants, such as local entrepreneurs, members of the Non Muang Village Enterprise Group, Kamchanoad ritual practitioners, monks, and small vendors. The second session involved 5 participants, specifically the organizers of the daily offering ceremonies and dancers who performed the rituals. These discussions explored perspectives on forest conservation, challenges to sustainable practices, and the preservation of cultural identity. Each session lasted approximately 60 minutes and was facilitated by a trained research assistant and a local researcher.

Questionnaire Survey: A structured questionnaire was distributed to 200 community committee members from 14 communities surrounding the Kamchanoad Community Forest. The survey collected both quantitative data and qualitative insights on various topics, including the community’s geography, self-reliance, and the ecological and cultural significance of the Kamchanoad forest and Chanoad trees. Additionally, it examined the symbolic role of the Kamchanoad tree in local traditions. The questionnaire was administered in person to ensure accuracy.

Field Experiments: Two field experiments were conducted to breed Chanoad trees using the five-step plantation process developed by Mother Samorn Kanthikul. The experiment took place in two locations: 1) 45 Moo 11, Ban Muang Subdistrict, Ban Dung District, Udon Thani Province, and 2) Ban Phu Ploy Fah, Phu Kamchanoad, 227, Moo 11, Ban Muang Subdistrict, Ban Dung District, Udon Thani Province.

Data Analysis

This study employed both quantitative and qualitative data analysis, consistent with its mixed-methods approach.

Quantitative Data Analysis

Quantitative data from the questionnaire surveys were analyzed using descriptive statistics, including percentages, means, and standard deviations, to summarize participants' demographic characteristics and responses. Inferential statistical methods, such as independent samples t-tests and one-way ANOVA, were applied to compare group differences and examine factors influencing community participation in the conservation of Kamchanoad forests. The analysis also investigated the influence of the Sufficiency Economy Philosophy, which was geosocially linked to Kamchanoad’s conservation efforts, cultural identity, and the development of “Bai Sri

products,” traditional ceremonial offerings inspired by Naga beliefs.

Descriptive statistics were used to interpret survey responses based on a six-point Likert scale (Likert, 1932; Vagias, 2006; Silpajaru, 2017), as follows:

1.00–1.83 = No participation / Strongly disagree

1.84–2.67 = Lowest participation / Disagree

2.68–3.51 = Low participation / Somewhat disagree

3.52–4.35 = Moderate participation / Neutral

4.36–5.19 = High participation / Agree

5.20–6.00 = Highest participation / Strongly agree

Qualitative Data Analysis

Qualitative data from geosocial surveys (observation), in-depth interviews, focus group discussions, and field experiments were analyzed using thematic analysis. This process involved transcribing interview and discussion recordings, coding data, and identifying recurring themes and patterns. The analysis focused on:

- Leadership roles in conserving Kamchanoad’s unique natural and cultural heritage
- The influence of local storytelling on the preservation of Naga worship rituals

NVivo software was used to systematically organize and analyze qualitative data, ensuring a structured and rigorous approach to theme identification.

Data Integration

Findings from both quantitative and qualitative analyses were integrated to develop a comprehensive understanding of the factors influencing community-based conservation and Kamchanoad’s cultural identity. This integration allowed for triangulation, strengthening the validity and reliability of the results.

Results

This section presents the results and discussion of key factors influencing the forest conservation and community development of Kamchanoad, specifically through a geosocial lens. The findings explore how the local community’s engagement with the forest was shaped by their geographical contexts such as proximity to sacred sites, local ecological systems, and socio-cultural activities that sustained the community’s identity. Additionally, the results highlight how various demographic factors influenced participation in conservation efforts, showing the complex, interconnected nature of the region’s geosocial environment.

Overview of Kamchanoad Forest

Field observations confirmed that Kamchanoad Forest held deep cultural and spiritual significance for the local community. According to local beliefs, the forest was over a thousand years old and was regarded as the sacred dwelling of the Great Nagas, Sri Suttho and Sri Pathumma, who were believed to protect the land. At the center of the forest lied a sacred well, which was considered an important spiritual site.

Community engagement further revealed that the forest had long served as a vital source of

natural resources, supporting livelihoods and traditional practices. It was widely recognized as a prominent geosocial site and a major tourist attraction, particularly for those who followed the Naga belief system in the Mekong Basin. In recent years, increased collaboration among government agencies, private sector organizations, and academic institutions had contributed to efforts in conservation, research, and sustainable tourism development (Niemnapa, 2014).



Figure 2. Kamchanoad Forest

Source: Kamchanoad Administrative Committee (2019)

Offering Ceremony: A Cultural Identity of Kamchanoad

The offering ceremony for Great Naga Sri Suttho was first held in 1971 (B.E. 2514) at the City Pillar Shrine in Ban Dung District, Udon Thani Province, as part of the shrine's ceremonial consecration. Later, research on the tradition of the ritual feast in Ban Non Muang, Ban Muang Subdistrict, Ban Dung District, identified several stages in this Naga King worship ceremony (Kamchanoad Administrative Committee, 2019; Phukamchanoad, 2018; 2023), including Chanoad tree conservation.

Initially, the ritual offerings were conducted in the heart of Kamchanoad Island. However, due to increasing participation, the location was moved to the Naga Court Pavilion, situated outside the island. The offerings include a five-tiered tray (“Khan Ha”), white flowers, marigolds, rice wine, a whole chicken, nine varieties of fruits, Bai Sri (banana leaf and floral arrangements) on both sides, a pair of candles, nine incense sticks, nine types of traditional sweets, plain water, colored drinks (red, green, and orange), ceremonial cosmetic items for the ritual leader, a Bai Sri tray for the Naga deity, grains, black and white sesame seeds, milk, butter, betel nuts, betel leaves (nine pieces each), and nine cigarettes.

Next, the ritual was led by a Brahmin priest (“Jum”) and included a series of sacred rites: paying homage to the Buddha, chanting an invocation, venerating the Triple Gem, reciting an apology prayer, summoning deities (“Sakkayavaca”), reading the sacred proclamation, making solemn

vows, and offering prayers for blessings. The ceremony also incorporated merit-making activities, the acts of generosity and the extension of loving-kindness (“Metta”).

Then, participants brought personal offerings to fulfill their vows, including Khan Ha trays, betel nuts, betel leaves, ceremonial trays (“Khan Mak Beng”), and Bai Sri arrangements, all of which must be paired. Additionally, a traditional dance (“Ram Buang Suang”) was performed in tribute to Great Naga Sri Suttho. In the evening, an outdoor film screening was held to commemorate the legendary “Ghost-Hired Film Screening” event from 1989. A ceremonial fire rocket (“Bang Fai”) was also launched as an offering. Rockets were brought from all 14 villages in Ban Muang Subdistrict, ensuring community-wide participation in the ritual.

Finally, a significant event in 2023 was the ceremonial planting of Chanoad trees, led by Phra Khru Sutthichantraporn, Deputy District Ecclesiastical Leader and Abbot of Wat Siri Suttho Kamchanoad, alongside Phusit Phukamchanoad (Researcher), Pongsak Srichana (Village Chief), and the subdistrict headman of Ban Muang. The event was attended by village leaders and assistants from all 14 villages. The trees, grown from seeds sourced from the heart of Kamchanoad Island, were planted as a sacred offering to Great Naga Sri Suttho and Great Nagee Sri Pathumma, under the guidance of the Kamchanoad Administrative Center.



Figure 3. The Offering Ritual

Chanoad Tree Conservation

The conservation of Chanoad trees (“Rukkha Naga”) involved both local wisdom and modern scientific methods, integrating rituals and formal procedures. This approach was carried out by both the public and private sectors, leading to the development of a three-stage conservation process for the Chanoad trees on Kamchanoad Island, where the trees had an average height of 34.75 meters (Khantikul, 2014; Phukamchanoad, 2023). The stages are described below.

Stage 1 Harvesting

On the 14th day of the waxing moon in the 12th lunar month, a ritual was conducted to harvest

the fully mature Chanoad seeds. The seeds had to be dark indigo, round, bead-sized, and undried. A designated medium performed the ritual, during which she collected fully matured Chanoad seeds for propagation outside Kamchanoad Forest. The medium, dressed in white, collected the seeds while offering prayers to the sacred beings of the forest for protection. During the ritual, the medium chanted at the forest gate and inside the forest, presenting five ritual offerings along with white flowers.

Stage 2 Breeding

The breeding process began on the 1st day of the waning moon in the 12th lunar month, with prayers to Grandfather Sri Suttho and Grandmother Sri Pathumma. The medium chanted a prayer as follows:

"Namo Tassa Bhagavato Arahato Samma Sambuddhassa" (repeated three times) "Kaya Vaja Jittang Ahang Wanta NAGA thibadee Sri Suttho Visuttheva Phaya Nageenee Sri Pathumma Visutthevee Phuchemi" (Kamchanoad Administrative Committee, 2019).

The breeding took place in pots, where the soil from Kamchanoad Island was mixed with plantation soil. The pots were prepared in seven layers: the base was filled with dry lemongrass or dry grass, followed by a layer of loam and plantation soil, then a mixture of Kamchanoad Island soil and plantation soil. The Chanoad seeds were spread evenly over the soil, and another layer of plantation soil was added. An invisible mantra was chanted over the seeds, and a final sprinkle of water was applied. The pots were placed under the shade of Chaiyapruet trees to protect them from direct sunlight. The seeds were watered every two days, and after three months, they began to sprout. Once the seedlings reached three centimeters, they were transplanted into new pots. By two years and seven months, the trees had reached a height of approximately 50 centimeters and were ready for planting.

Stage 3 Planting

The planting of the Chanoad trees was another important ritual honoring Grandfather Sri Suttho and Grandmother Sri Pathumma. Sacred beings were invited to bless the land and the participants. In preparation, ground holes measuring 30 x 30 cm and 20 cm deep were dug. The trees were planted one meter apart, ensuring that the tops were level with the ground. The trees grew naturally, relying on rainfall and the surrounding forest ecosystem. If the top of a tree rotted, it was at risk of dying.



Figure 4. Chanoad Tree Planting Ceremony

Note: This is part of the sacred ritual honoring the Naga King, embodying the cultural identity of Kamchanoad.

Community Participation

The Kamchanoad community demonstrated strong participation in forest conservation ($\bar{x} = 5.38$; $SD = 1.01$). Family involvement in development activities was highest ($\bar{x} = 5.59$; $SD = 0.80$). Ritual worship of Great Naga Sri Suttho and Great Nagee Sri Pathumma was widespread ($\bar{x} = 5.46$; $SD = 0.89$), and community leaders actively contributed to forest conservation ($\bar{x} = 5.45$; $SD = 0.93$).

Table 1. Community Participation in Kamchanoad Forest Conservation

	Items	Mean	Standard Deviation	Level
1	Family members are involved in community development activities.	5.59	0.80	Highest
2	The community possesses local wisdom and knowledgeable elders who provide guidance in times of crisis.	5.24	0.97	Highest
3	The community has partners, networks, and organizations supporting local development.	5.19	1.22	High
4	Community leaders play an active role in conserving	5.4	0.93	High

	Kamchanoad Forest.	5		hest
5	The community actively engages in forest conservation initiatives.	5.3 3	1.01	Hig hest
6	Chanoad trees are cultivated both by the community and at the local temple.	5.3 6	1.11	Hig hest
7	There is strong participation in tree planting activities.	5.3 9	1.14	Hig hest
8	Ritual worship of Great Naga Sri Suttho and Great Nagee Sri Pathumma is widely practiced.	5.4 6	0.89	Hig hest
Overall		5.3 8	1.01	Hig hest

Community Participation of the Five Stakeholder Groups

A survey of the Kamchanoad community revealed five key stakeholder groups that were directly involved in the region's socio-ecological context. These groups included: (1) local residents, (2) local governmental agencies such as village heads, subdistrict chiefs, district officers, subdistrict administrative organizations, schools, temples, and police stations, (3) academic institutions that conducted research and provided services in the Kamchanoad area, (4) civil society organizations, including community enterprises and occupational groups, particularly those engaged in the production of Bai Sri, and (5) the private sector, including local vendors and businesses that were involved in the tourism industry around Kamchanoad.

All five stakeholder groups participated actively in community efforts related to both Kamchanoad Forest conservation and cultural identity preservation. The findings indicated that the highest level of participation occurred in tourism development initiatives within the socio-ecological landscape of Kamchanoad ($\bar{x} = 5.56$). Additionally, cultural and traditional activities, such as annual ritual offerings in Kamchanoad, also showed a high level of engagement ($\bar{x} = 5.46$). Providing information to tourists about cultural activities, rituals, and beliefs was another area of high participation ($\bar{x} = 5.46$), as well as serving as facilitators and officiants during traditional ceremonies ($\bar{x} = 5.44$). Finally, participation in wearing traditional attire reflecting local identity and cultural heritage was notably high ($\bar{x} = 5.43$) (see Table 4).

Interviews with local leaders and residents, as well as participant observation, revealed that a diverse range of individuals, including government officials, businesspeople, tourists, and local residents, visited Kamchanoad daily to take part in ritual offerings and ceremonies. These activities were performed as acts of devotion to Great Naga Sri Suttho and Great Nagee Sri Pathumma, seeking blessings and divine intervention for personal wishes.

Table 4. Community Participation of the Five Stakeholder Groups in Kamchanoad

Items	Mean	Standard Deviation	Level
1 Development of tourist attractions within the socio-ecological landscape of Kamchanoad	5.5 6	0.95	Hig hest
2 Cultural and traditional activities: Annual ritual offerings in Kamchanoad	5.4 6	0.94	Hig hest
3 Participation in traditional festivities, including New Year, Songkran, Ok Phansa, and Loy Krathong	5.2 7	1.21	Hig hest

4	Providing information on cultural activities, rituals, and beliefs for tourists and the general public	5.4 6	0.83	Highest
5	Participation in wearing traditional attire reflecting local identity, group affiliation, and Isan cultural heritage	5.4 3	0.96	Highest
6	Serving as facilitators and officiants in traditional ceremonies of Kamchanoad	5.4 4	0.95	Highest
7	Engagement in cultural conservation efforts through the use of local language and traditional cuisine	5.3 2	1.01	Highest
Overall		5.4 2	0.98	Highest

Community Perception on Rukkha Naga

The survey results indicated that residents strongly agreed with several key beliefs regarding Kamchanoad and Chanoad trees. They expressed pride in the use of the word "Kamchanoad" in Udon Thani Province's slogan ($\bar{x} = 5.46$; $SD = 0.86$), which reads:

"Krom Luang Prachak founded the city, renowned for its spiritual sites, a 5,000-year-old civilization, the land of traditional patterned silk, a natural wonder of the Red Lotus Sea, and the faith of Sri Suttho and Kamchanoad."

Additionally, they strongly agreed that the Naga trees had existed for over 150 years ($\bar{x} = 5.42$; $SD = 0.86$) and that making a wish to the sacred beings in Kamchanoad brings success to individuals and their families ($\bar{x} = 5.42$; $SD = 0.84$). Overall, these findings were consistently rated as "strongly agree" ($\bar{x} = 5.37$; $SD = 0.71$). The detailed findings are shown in Table 3.

Table 3. Community Perception on Rukkha Naga

	Items	Mean	Standard Deviation	Level
1	Chanoad trees resemble the Great Naga, so they are called "Rukkha Naga."	5.1 6	1.03	Agree
2	Naga trees have existed for more than 150 years.	5.4 2	0.86	Strongly Agree
3	Kamchanoad Forest is sacred and must not be disrespected.	5.3 4	0.93	Strongly Agree
4	Great Naga Sri Suttho and Great Nagee Sri Pathum genuinely exist in Kamchanoad Forest.	5.3 8	0.89	Strongly Agree
5	Making a wish to the sacred beings in Kamchanoad brings success to you and your family.	5.4 2	0.84	Strongly Agree
6	It is necessary to preserve, nurture, and breed Chanoad trees every year.	5.3 6	0.96	Strongly Agree
7	Organizing the Chanoad tree plantation ritual every three years is important.	5.3 3	0.95	Strongly Agree
8	The word "Kamchanoad" in Udon Thani Province's slogan should be proud of.	5.4 6	0.86	Strongly Agree
9	Rukkha Naga, the trees of the Great Naga, symbolize Thai-Laos Mekong civilization.	5.3 7	1.10	Strongly Agree

Overall	5.3 7	0.71	Strongly Agree
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Demographics of Kamchanoad's Residents

The demographic data was collected from a sample of 200 participants across 14 villages in the Kamchanoad area, Muang Subdistrict, Ban Dung District, Udon Thani Province, Thailand. The majority of participants (65%) were aged 41 and older, with most engaged in trading (32%), followed by general farming (21.5%). In terms of community involvement, 64.5% of participants were members of social groups, with notable engagement in village occupations (37.5%), village and urban community funds (20%), and community enterprises (16.5%). Social cohesion was strong, with 77% of participants maintaining close relationships with their neighbors, and 63% seeking consultation and assistance within Kamchanoad Village. Women, particularly mothers, were identified as the primary caregivers in their families, accounting for 33% of participants. Regarding land ownership, over half of the participants (51%) owned agricultural land exceeding 15 rai, while 24.5% operated product shops within the Kamchanoad area. Additionally, 21% were tenants. These demographic findings are summarized in Table 1 below.

Table 1. Demographics Data of Kamchanoad's Residents

Manifest data	Latent data	Frequency	Percentage
Gender	Male	78	39.00
	Female	122	61.00
Age	Under 30 years	30	15.00
	31 – 40 years	68	34.00
	41 – 50 years	62	31.00
	51 years and over	40	20.00
Status	Single	26	13.00
	Married	158	79.00
	Widow/Divorced	16	8.00
Education	Primary / Junior High School	98	49.00
	Senior High School / Vocational Cert.	83	41.50
	Diploma	3	1.50
	Bachelor's Degree	16	8.00
Occupation	Farming	30	15.00
	General Farmer	43	21.50
	General Contractor	35	17.50
	Trade	65	32.50
	Civil Servant	17	8.50
	No occupation	10	5.00
Monthly Income (Baht)	≤ 5,000	17	8.50
	5,001 – 10,000	56	28.00
	10,001 – 15,000	66	33.00
	15,001 – 20,000	57	28.50
	≥ 20,001	4	2.00

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Social Group Membership	Social group member	129	64.50
	Not a social group member	71	35.50
Affiliation	Village Occupational Groups	75	37.50
	Members of the Village and Urban Community Fund	40	20.00
	Savings Groups	5	2.50
	Senior Citizens Club	3	1.50
	Public Health Volunteer Group (OSH/MOH)	10	5.00
	Home Police Group	5	2.50
	Village Committee Group	8	4.00
	Cultural Groups	1	0.50
	Village Scout Group	2	1.00
	Community Enterprise Group	33	16.50
	OTOP Group	4	2.00
	Community Bond	Everyone in the village is familiar	154
Only some people are familiar		29	14.50
Only relatives are familiar		15	7.50
No close acquaintances at all		2	1.00
Receiving Community Support	Every day	126	63.00
	Almost every day in 1 week	57	28.50
	Once a week	14	7.00
	Once a month	3	1.50
Family Roles and Duties	Father is the main person responsible	61	30.50
	Mother is the main person responsible	70	35.00
	Grandparents are the main persons responsible	22	11.00
	Other family members are responsible	47	23.50
Homeownership Status	Homeowner	96	48.00
	Residential Tenant	5	2.50
	House Member	99	49.50
Ownership of Arable Land	≤ 5 Rai	28	14.00
	6 – 15 Rai	66	33.00
	> 15 Rai	102	51.00
	Tenant of Arable Land	4	2.00
Ownership of Product Stores in Kamchanoad	Store Owner	49	24.50
	Store Tenant	42	21.00
	No Store	109	54.50
Total		200	100

Demographic Factors Influencing Community Participation in Kamchanoad Forest Conservation

To assess the influence of demographic factors on participation in Kamchanoad Forest

conservation, demographic variables were compared using the Independent-Samples T-Test and One-way Analysis of Variance (ANOVA). The independent variables analyzed included gender, social group membership, age groups, occupations, average monthly income, education level, and retail store ownership.

According to Table 5, the comparison between male and female participants revealed a statistically significant difference ($p = 0.005$), with women showing higher participation ($\bar{x} = 5.48$; $SD = 0.69$) than men ($\bar{x} = 5.18$; $SD = 0.80$) in forest conservation efforts. Meanwhile, those who were members of social groups exhibited significantly higher participation ($\bar{x} = 5.61$; $SD = 0.53$) than non-members ($\bar{x} = 4.90$; $SD = 0.89$), with a p -value of 0.000.

Table 5. Comparison between Two Variables (Independent-Samples T-Test)

Independent Variable	Gender	Descriptive Statistics		t	P-value	
		\bar{x}	S.D.			
Participation in Kamchanoad Forest Conservation	Male	5.18	0.80	2.820	0.005*	
	Female	5.48	0.69			
	Social Group Membership					
	member	5.61	0.53	6.011	0.000*	
	Not a member	4.90	0.89			

*Statistical significance at the 0.05 level

As shown in Table 6, a significant difference in participation was found among participants from different occupations ($p = 0.000$), with an F -value of 9.999 indicating strong variance between the groups. Participation also varied significantly across age groups ($p = 0.000$), with older participants showing higher levels of engagement ($F = 7.879$). Participation differed based on average monthly income ($p = 0.005$), with higher-income groups demonstrating greater involvement in forest conservation ($F = 5.545$). The level of education was also linked to participation ($p = 0.029$), with individuals possessing higher education levels tending to engage more in conservation activities ($F = 3.591$). Finally, retail store owners showed significantly higher participation ($\bar{x} = 5.47$) compared to non-owners ($\bar{x} = 4.89$), with a p -value of 0.001 and an F -value of 6.960.

Table 6. Comparison between Multiple Variables (One-way Analysis of Variance)

Comparison between Multiple Variables	Sum of Squares	SS	df	MS	F	P-value
Occupations	Between Groups.	16.915	4	4.229	9.999	0.000*
	Within Groups.	78.241	185	0.423		
	Total	95.156	189			
Age	Between Groups.	11.923	3	3.974	7.879	0.000*
	Within	98.87	19	0.50		

	Groups.	5	6	4		
	Total	110.7 98	19 9			
Average monthly incomes	Between Groups.	5.904	2	2.95 2	5.54 5	0.005 *
	Within Groups.	104.8 94	19 7	0.53 2		
	Total	110.7 98	19 9			
Level of education	Between Groups.	3.897	2	1.94 9	3.59 1	0.029 *
	Within Groups.	106.9 01	19 7	0.54 3		
	Total	110.7 98	19 9			
Retail store ownership	Between Groups.	7.312	2	3.65 6	6.96 0	0.001 *
	Within Groups.	103.4 86	19 7	0.52 5		
	Total	110.7 98	19 9			

*Statistical significance at the .05 level

The Analysis and Development of Kamchanoad's Identity and Local Products Based on Its Local Wisdom

The rise of key study results from environmental conservation to cultural identity beliefs in the form of producing offerings with Naga known as Bai Sri Naga is also a kind of conservation, however in a different way to society. The main local products developed based on the local wisdom of Kamchanoad, Ban Dung District were the following offerings which could be commonly found in the tourist attractions of Kamchanoad.

The "Grand Lasso of Lack" was invented by Sangkom Khantikul. The local people in Moo 11, Ban Non Muang, said they were the first manufacturers of the lasso. They brought the tray of five offerings to Kamchanoad Forest to ask for the permission from Grandfather Sri Suttho and Grandmother Sri Pathumma to apply their image to their developed charms. The lassos consisted of 7 unique principles as follows. First, there must be three heads of the Great NAGA decorated on each of them, meaning they represent the Great NAGA solely. Second, the Great NAGA's heads should not have warrior fangs but gentle fangs, showing their kindheartedness. Third, they must be casted with a wealth spell to support those who worship them at home to be rich and successful. Fourth, the buyers must pray to ask for permission to take the lassos away with them. Fifth, the lassos must be regularly worshipped with the five offerings (water, fruit, honey, betel, and tobacco). Sixth, the worshippers must sincerely have faith in the lassos and always keep their word. Finally, each lasso must have a radius of 1 meter or more in the form of "the Great NAGA Holding the Gem (Carried by its Tail) in the Mouth"; that is to say, the Great NAGA holds the gem, which is carried by its own tail, in its mouth in a closed circle.

The "Grandfather-Grandmother Bracelets" were invented based on the dream of a prophet who

told a fortune for the local people in Kamchanoad. His father was the owner of the first house built opposite to the gate of Kamchanoad in 1992. Hence, his father was one of the very first people who took care of Kamchanoad Temple and the local areas. When his father passed away, Sangkom Khantikul who was bored of making offerings had a dream about his father. In his dream, his father said, "Let's make Grandfather-Grandmother bracelets, and I will help you to sell them." He followed his father's direction and made the bracelets the next morning. As soon as he started selling them, a tourist told him that there was an old man sitting next to the pillar decorated by the offerings. The old man knocked the pillar and said "Grandfather, here I am." The phenomenon had given rise to the popularity of the bracelets for three years already. Most of the buyers were female and those who ran beauty shops or salons because they believed that the bracelets could bring luck to them.

The "Five Precious Offerings (Fabric Offerings)" were invented by Samorn Kanthikul is local's wisdom, the grandmother of Kamchanoad. The local people who lived in Moo 11, Ban Non Muang, explained that the five offerings ("Beng Offerings") or the ancient E-San-style offerings for the Great NAGA were high-class offerings. The term "Beng" means five, referring to the "five aggregates of clinging" in Buddhism, which include 1) form, 2) sensations, 3) perceptions, 4) mental activity or formations, and 5) consciousness. Worshipping the Great NAGA with the five offerings could bring individuals to heaven. There, they would be surrounded by gods and angels, living together in an enormous castle. Their spirits could visit the Great Pagoda where the secret Buddha's relics are kept. If they had to reincarnate, they would be freed from their past and reborn with their own virtues (Figure 5).

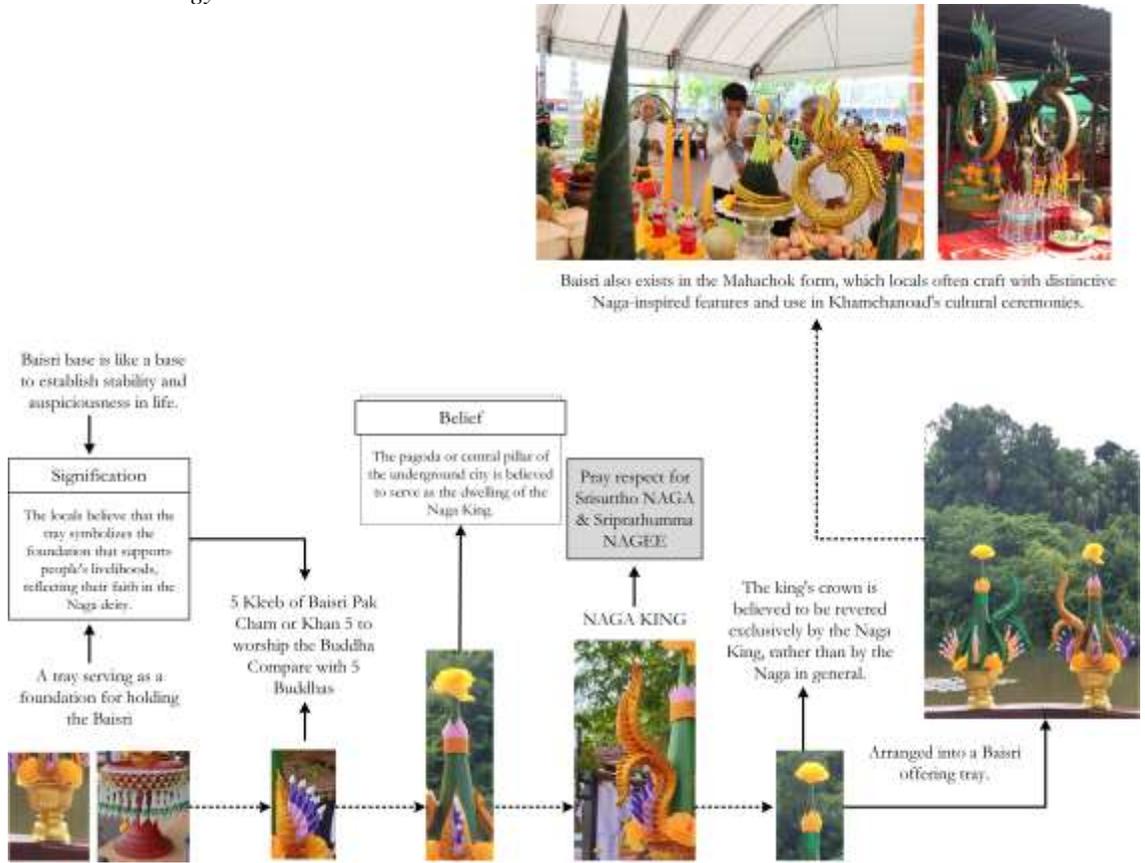


Figure 5. Must-have items in Baisri of Kamchanoad Culture Identity

Discussion and Conclusion

This study explores how geosocial relationships influence community participation in the conservation of Chanoad trees, the preservation of cultural traditions, and the development of identity-based economic activities in Kamchanoad. Conservation efforts are not solely ecological but are deeply intertwined with local beliefs, socio-economic structures, and land-use practices, reinforcing the cultural landscape that defines the region.

The findings underscore the geosocial interconnections between Kamchanoad's physical landscape, cultural traditions, and community participation. Kamchanoad's peat forest, shaped by its proximity to the Kud Kham Reservoir, provides both ecological significance and cultural meaning. The local population's conservation efforts reflect a deep-rooted geosocial relationship, where beliefs in the Naga deity influence land stewardship and tree preservation.

Demographic factors further reveal how social structures within Kamchanoad align with its geographic setting. Residents who engage in agriculture-based livelihoods, guided by the Sufficiency Economy Philosophy, demonstrate sustainable land-use practices linked to the region's natural resources. The presence of key stakeholder groups—from local enterprises to governmental organizations—illustrates how geosocial networks shape conservation efforts.

Additionally, the geosocial dynamics of Kamchanoad extend to cultural tourism. Rituals such

as the Chanoad tree plantation ceremony and the offering ceremony for Great Naga Sri Suttho exemplify how geography, spirituality, and economic activities intersect. The development of identity-based products, including Naga-themed souvenirs, showcases the role of geosocial factors in fostering local economic resilience.

Future research could explore how geosocial factors influence long-term sustainability, particularly in balancing conservation, tourism, and socio-economic development. Understanding the geosocial framework in Kamchanoad can offer broader insights into how communities integrate environmental stewardship with cultural identity in the face of modernization.

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Conflict of Interest

The author declares that there is no conflict of interest.

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