

## NEW HOLISTIC APPROACH TO CREATIVE TOURISM AND SUSTAINABLE TERRITORIES IN CHI RIVER BASIN, NE THAILAND

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**Citation:** Singtuen V., & Galka, E. (2024). NEW HOLISTIC APPROACH TO CREATIVE TOURISM AND SUSTAINABLE TERRITORIES IN CHI RIVER BASIN, NE THAILAND. *Geojournal of Tourism and Geosites*, 55(3), 1090–1101. <https://doi.org/10.30892/gtg.55310-1282>

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**Abstract:** Na Ngam, situated in the Chi River Basin, boasts rich water resources and notable geological features like the Chi River, Yang River, and Chi oxbow lake. These elements significantly influence local cultures, traditions, temples, and agricultural products. The area's identity is encapsulated in its slogan highlighting its agricultural wealth, educational and healthcare development, Buddhism conservation, and traditional festivals. Utilizing Participatory Action Research (PAR), Asset-Based Community Development (ABCD), and SWOT analysis, the Na Ngam 101 project aims to enhance tourism by integrating cultural, geotourism, and gastronomic aspects. This model promotes local culture, community income, and environmental conservation, fostering sustainable regional development.

**Keywords:** Chi River Basin, fluvial geomorphology, geosite, creative tourism, geotourism, sustainable development

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### INTRODUCTION

Tourism development has evolved over the years, transitioning from conventional cultural tourism to the contemporary concept of creative tourism (Richards, 2010; Salman and Uygur, 2010; UNESCO, 2006). This paradigm shift is characterized by tourists actively engaging with the local culture, fostering mutual understanding, cross-cultural learning, and sustainable community development (Wisuttilak, 2013; Canavan, 2016). Additionally, tourists can apply their newfound knowledge to enrich their post-travel lives. Initially, the focus was on recreational activities, emphasizing entertainment before gradually shifting towards a greater interest in cultural exploration. This evolution continued with the emergence of cultural tourism, followed by eco-tourism (also known as sustainable tourism). In recent times, creative tourism has gained prominence, emphasizing active participation and sustainable engagement between tourists and host communities (Wisuttilak, 2013; Richards, 2019; Richards, 2020; Duxbury et al., 2019; Duxbury et al., 2021).

The essence of creative tourism lies in the dynamic relationship between guests and hosts. Sustainable tourism practices, as outlined by the Special Area Development Administration for Sustainable Tourism (2015, 2018, 2019), emphasize the importance of tourists learning about and contributing to the history, culture, and identity of the destination. This approach enhances the visitor experience, creating value by integrating with the community and promoting sustainable cultural, historical, and environmental practices. It allows for increased participation and interaction between tourists and communities, contributing to sustainable development. By facilitating cultural exchange and knowledge transfer, creative tourism holds the potential to elevate communities economically, educationally, and environmentally, paving the way for a sustainable future. Moreover, creative tourism represents an elevated form of experiential travel, offering tourists a spectrum of sensory, perceptual, cognitive, emotional, and social experiences (Schmitt, 1999), alongside opportunities for creative expression (Zhang, 2013). The creation of these experiences lies within the responsibility of the tourist, resulting in varied creative encounters shaped by individual preferences (Richards and Wilson, 2006; Tan et al., 2013; Tan et al., 2014) and cultural backgrounds (Somnuxpong, 2020).

Geotourism, a constituent of creative tourism, involves the integration of geological insights with information pertaining to nature, society, culture, history, and traditions (Dowling, 2011; Dowling and Newsome, 2005; Newsome and Dowling, 2017; Ruban, 2015). This approach seeks to foster tourism within specific societal or networked communities by imparting knowledge, information, arts, and culture through a spectrum of activities (Dowling, 2011, Allan, 2015, Newsome and Dowling, 2017). Consequently, the development of tourism routes is envisaged to function as an efficacious mechanism for promoting tourist engagement, education, and substantiating the conservation of cultural, environmental, and natural heritage in the foreseeable future (Ankomah and Larson, 2000; Singtuen and Phajuy, 2020). Moreover, these initiatives are poised to contribute to the sustainable advancement of the community, driving economic, educational, and environmental progressions (Singtuen and Phajuy, 2020). Geotourism, focusing on the geosites of a river, is often denoted as river tourism. The latter,

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recognized as river-based tourism, encompasses a range of recreational activities and services provided along riverbanks or on the water. This tourism sector is distinguished by its reliance on rivers as principal attractions and travel conduits, affording visitors distinctive encounters within natural, cultural, and historical contexts. Destinations for river tourism typically showcase picturesque landscapes, varied ecosystems, and proximity to historical or cultural landmarks (Figure 1).

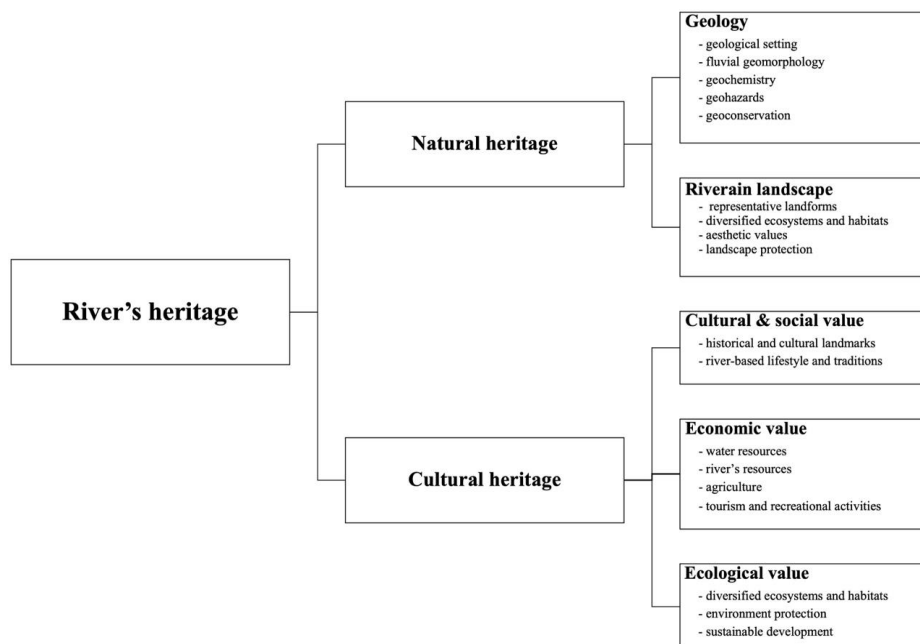


Figure 1. The role of river's natural and cultural heritage in geotourism development

Furthermore, river tourism serves as an economic driver for local communities by generating employment opportunities and fostering the conservation of natural and cultural resources. The expansion of river tourism is frequently accompanied by infrastructure development, including the construction of docks, riverfront promenades, and guided tour services. These enhancements contribute to an enriched tourism experience and lend support to sustainable practices within the river tourism sector (Balen et al., 2014). Numerous studies have explored river-related tourism in diverse countries, including Europe, India, Bangladesh, China, and Nigeria (Steinbach, 1995; Sattar, 2022; Cater, 2000; Akpan and Obang, 2012; Balen et al., 2014). Nevertheless, this investigation represents the inaugural scholarly inquiry into geotourism along the Chi River, aimed at inventorying and characterizing attractions along this pivotal watercourse, which constitutes one of the principal mainstreams in Thailand. Thailand has asserted itself as a pioneer in creative tourism within Asia (Wattanacharoensil and Schuckert, 2016). Since 2011, the Designated Areas for Sustainable Tourism Administration (DASTA) has initiated creative tourism programs (Songserm and Wisansing, 2014), offering immersive experiences to tourists in rural villages. Utilizing appreciative inquiry and participatory learning methods, these programs showcased how local communities could engage in tourism development and collaborate with visitors to co-create meaningful experiences. Local facilitators and community-based organizations played crucial roles in fostering the growth of creative tourism, with researchers acting as observers to distill design principles for potential expansion into new areas (Sofield et al., 2017; Richards, 2020).

In Thailand, creative tourism is seen as an integral aspect of community-based tourism, regarded as an effective strategy for enhancing the quality of life and well-being of local communities (Wisansing and Vongvisitsin, 2019). A fundamental principle of both creative tourism and community-based tourism is the active involvement of multiple stakeholders throughout all stages of development, from conception to implementation, ensuring equitable distribution of benefits (Wisansing and Vongvisitsin, 2019; Lee and Jan, 2019). The findings of the study on Creative Cultural Tourism in Thailand indicate a significant relationship between cultural immersion and perceived enjoyment, mediated by personal expressiveness. This mechanism plays a crucial role in shaping tourists' cultural empathy and attachment to a place (Chiengkul and Kumjorn, 2024). These insights can guide the development of improved services, enhance travel experiences, foster cultural empathy, and strengthen tourists' attachment to destinations (Chiengkul and Kumjorn, 2024).

Thailand is home to several significant rivers, contributing to the country's geography, culture, and economy. Some of the major rivers in Thailand include the Chao Phraya River, Mekong River, Ping River, Nan River, Yom River, Mun River, Chi River and many other small rivers (Figure 2a). These rivers not only contribute to the country's agriculture and transportation but also hold cultural and historical significance for the Thai people.

The Chi River flows through the northeastern region of Thailand, also known as Isan. It passes through multiple provinces, including Chaiyaphum, Nakhon Ratchasima, Khon Kaen, Maha Sarakham, Kalasin, and Roi Et. The Chi River is approximately 765 kilometers long, making it one of the most prominent rivers in the region. The river basin covers an extensive area of about 49,480 square kilometers. The Chi River originates from the eastern plains of the Phetchabun Mountain Range. Its source includes various mountain peaks such as Khao San Pun Nam, Khao Pae Pan Nam, Khao Sliang Ta Trad, Khao Um Nam, Khao Yot Chi, Khao Krok, and Khao Thewada. The Chi River has several main branches, including Lam Nam Phrom, Lam Nam Phong, Lam Nam Son, Lam Nam Pao, and Lam Nam Yang. The Chi River plays a crucial role in

the livelihoods of communities along its course. It is a major water resource for agricultural activities, particularly for rice cultivation. The river is also important for freshwater fishing and supports diverse ecosystems along its basin.

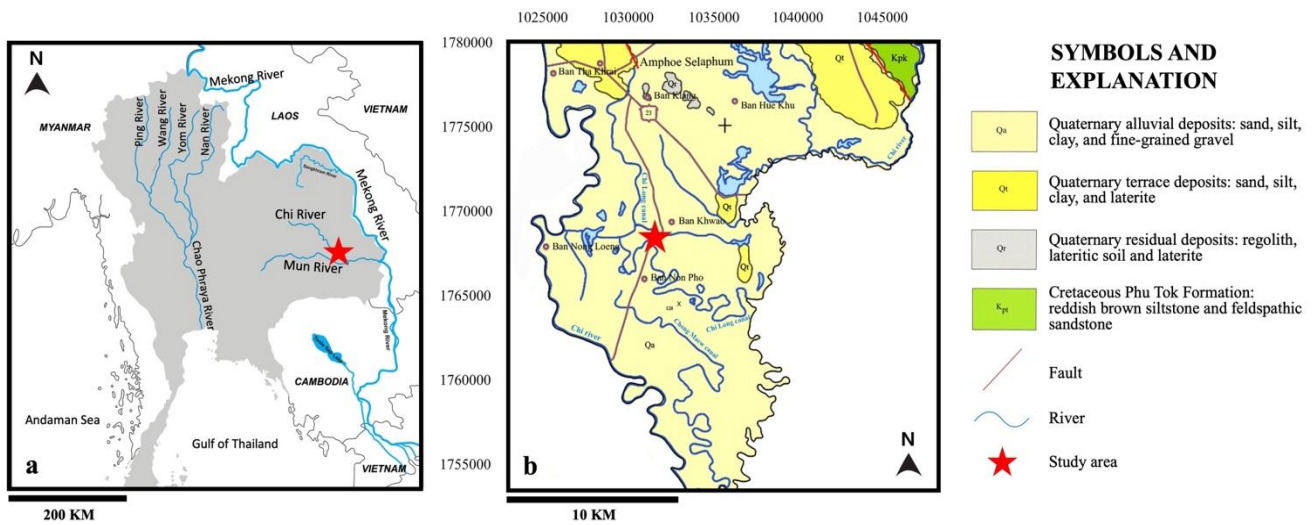


Figure 2. Location of the study area (a) main rivers in Thailand and (b) geological setting of the Na Ngam Area, Roi Et Province (DMR, 2007)

The study is specifically focused on the Na Ngam Area, Selaphum District, Roi Et Province, which is a segment of the Chi River Basin, exhibiting distinct meandering patterns in its watercourses, stands as a testament to the accumulated wisdom passed down through generations, reflecting the amalgamation of insights from diverse local communities spanning historical epochs. The research site is characterized by Quaternary alluvial sediments (sand, silt, clay, and fine-grained gravel) predominantly deposited by the hydrological activities of the Chi River and its tributaries (Figure 2b). The basement of this area is covered by the Maha Sarakham Formation of the Khorat Group, consisting of reddish-brown sandstone and siltstone interbedded with rocksalt and gypsum (DMR, 1985). Consequently, the majority of the region comprises lowland terrain, rendering it conducive to rice cultivation and fishing activities.

This study falls within the purview of the University to Tambon (U2T) project of Khon Kaen University, under project supervision and control. The Thai government implemented proactive measures to address the adverse impacts of the COVID-19 pandemic and to establish sustainable solutions for the post-crisis period. Among these initiatives was the U2T project, which facilitated partnerships between universities and communities to promote sustainable development. A case study utilizing Participatory Action Research (PAR) and Asset-Based Community Development (ABCD) methodologies tackled local income insecurity, showcasing universities' capacity to support community development effectively (Suindramedhi et al., 2024). Furthermore, this paper examines whether sustainable creative development is best achieved through top-down planning or grassroots, endogenous processes (Braun et al., 2013; Richards, 2020). It explores the evolving relationship between tourism and creativity, identifying key design strategies that integrate concepts from creative tourism and emerging creative placemaking practices. Initially, the paper reviews various development models, emphasizing a shift from individual-centric views of creativity to relational approaches highlighting interaction and place. It then delves into creative placemaking as an experiential design method, using tourism-based examples. Finally, the paper outlines strategies for developing creative tourism experiences, contributing to the analysis of attraction characteristics and tourism production, and underlining the crucial role of creativity in value creation.

Additionally, this study investigates the integration of creative tourism within Thailand's 4.0 development policy. It scrutinizes the interconnections between agriculture, cuisine, local arts, and tourism, intrinsic components of local culture. These elements are explored as potential drivers of 'creative tourism,' underscoring their importance in fostering sustainable community development (Berno et al., 2020; Richards, 2020; Suindramedhi et al., 2024; Chiengkul and Kumjorn, 2024). The study aims to unravel the origins of geological formations and captivating tourist sites, documenting cultural diversity and points of interest for tourists, while also assessing the geotourism potential within the designated study area. The analytical process involves conducting geotourism assessments, comprehensive data collection through surveys, and the development of a tourist map. Subsequent phases entail testing designated tourist routes and synthesizing the gathered information. Additionally, a SWOT (Strengths, Weaknesses, Opportunities, Threats) analysis is employed to discern the factors influencing the development of geoheritage and geotourism.

## METHODOLOGY

The materials utilized in this study encompass a range of resources, including topographic and geologic maps, geoinformation software (Google Map<sup>®</sup> and Google Earth Pro<sup>®</sup>), GPS devices, bibliographic documents, and equipment for engaging local stakeholders (e.g., satisfaction questionnaires, mobile devices, cameras, printing media, online connectivity, and local products). Conducted within an interdisciplinary framework spanning humanities, social sciences, and geology, this research employs a diverse array of methodologies during the year 2022. It integrates geomorphological, geographical, cultural, traditional, and historical approaches, alongside Participatory Action Research (PAR) and Asset-Based Community Development (ABCD) methodologies as shown in Figure 3.

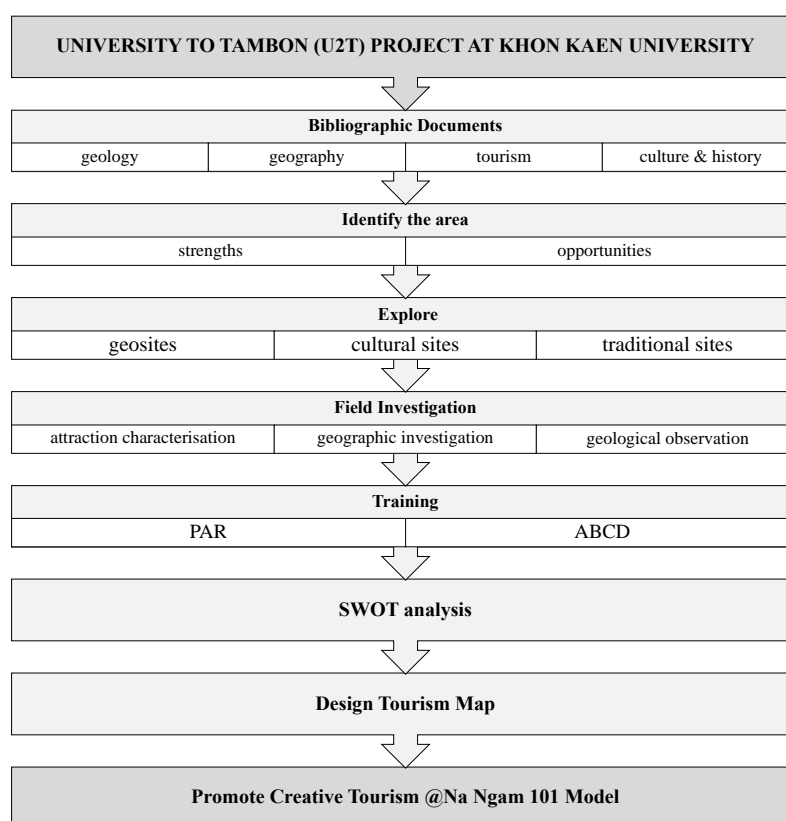


Figure 3. A flow chart illustrates the methodology steps and research framework

This study begins with establishing the University to Tambon (U2T) project at Khon Kaen University. Researchers then identify the area's strengths and opportunities for sustainable development in collaboration with the community and bibliographic documents (Figure 3). The project involves working with local communities to pinpoint key features of the area and develop tourism strategies that maximize the use of local resources. The planning phase includes field visits to explore various tourist attractions, such as natural, cultural, and traditional sites while collecting geographical and geological data. This phase is conducted in partnership with local leaders, project teams, community members, and monks to gather diverse perspectives on future development. These insights are used to design training programs that address gaps in local knowledge regarding tourism development and hospitality or weaknesses and threats. The final step before promoting creative tourism in the Na Ngam community involves training residents using Participatory Action Research (PAR) and Asset-Based Community Development (ABCD) methodologies as well as SWOT analysis. This ensures a shared understanding and fosters the creation of attractive tourist sites and community products to welcome quality tourists in the future.

## RESULTS

Situated within the Chi and Nam Yang River basins, Na Ngam is characterized as an agriculturally prosperous community with a perennially fertile landscape. The residents maintain various water-related lifestyles due to the abundant water sources in the region. The area is predominantly covered with alluvial sediments, encompassing gravel, sand, silt, and clay, which accumulate in channels, embankments, rivers, and floodplains. The geological map (Figure 1b) designates Na Ngam as an area devoid of surface hard rocks, with its topography reflecting that of a river basin. The geotourism analysis and survey of the study area revealed 11 potential tourist attractions within the Na Ngam Subdistrict integrated geosites and cultural sites. These attractions can be categorized into geosites as natural tourism destinations, cultural tourist attractions, and lifestyle tourism points of interest. Notable sites include the Chi River, Yang River, Chi Long River, Wat Khantinivas, Wat Pa Thammaphirom, Wat Pa Pho Chan Somruedi, the Rice Farming Group, Freshwater Fishing Group, Rice Cracker Processing Group, Fish Processing Group, and the textile handicraft group or Mai Mud Mee.

### Geosites as Natural Tourist Attractions

The Chi River, a prominent natural feature in northeastern Thailand, spans 765 kilometers with a basin area of 49,480 square kilometers, making it the longest river in the country. Originating from the Phetchabun Mountain Range (Figure 4a), it consists of five main branches: Lam Nam Phrom, Lam Nam Phong, Lam Nam Son, Lam Nam Pao, and Lam Nam Yang (Figure 4b). The Chi River Basin (CRB) region's geography includes the elevated Phu Phan Mountain ranges in the east and north, which are composed of sandstone formations from the Phu Phan Formation within the Khorat Group (Figure 4a).

To the west, the region features the Phetchabun Mountain Range and the Dong Phaya Yen Forest, serving as the source of the Chi River and numerous primary tributaries (Figure 4a). The central zone is typified by level terrain gently inclining southward within the river basin, with the Chi River serving as the principal watercourse. The Chi River Basin (CRB) stands as a significant river basin within Thailand. The topographical variation in the research area ranges from

an altitude of 1250 m in the Phetchabun Mountains to 150 m in the river floodplains, predominantly characterized by level terrain with a gradient of less than 10% (Areerachakul et al., 2022). In Northeast Thailand, while the terrain is primarily characterized by denudational features, significant portions are covered by various surface deposits and weathering products, as identified by Tamura (1986). These include the Old Fluvial Gravels (OFG), Gravelly Slope Deposits (GSD), Laterites, Fine Colluvium (FC), and Young Valley Fill (YVF). Further observation led to the subdivision of Gravelly Slope Deposits into Older Coarse Colluvium (OCC) and Younger Coarse Colluvium (YCC).

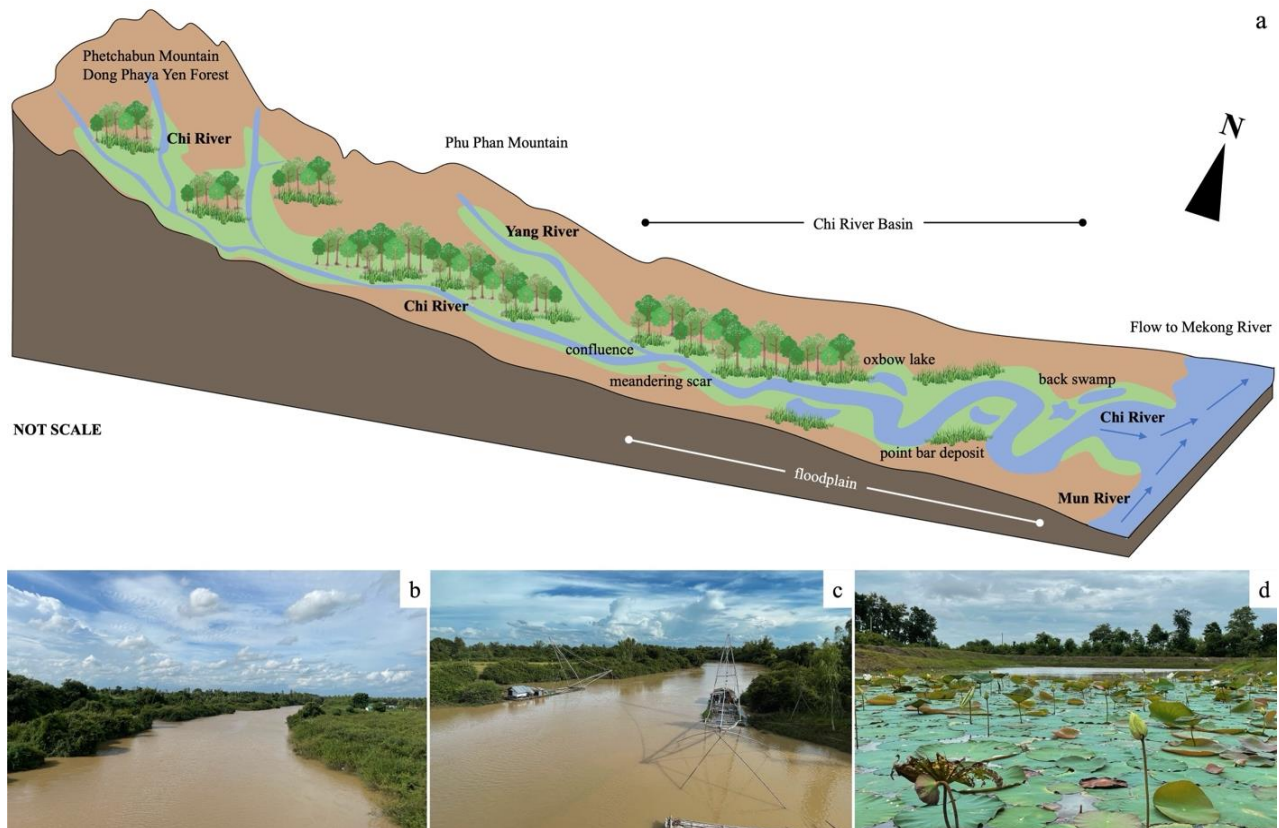


Figure 4. Natural tourist attractions of Na Ngam Area, Selaphum District, Roi Et Province. (a) The Chi River Model illustrates the origin and geomorphological features. This model was constructed by the first author using the PowerPoint program. (b) river plain/riverbed of Chi River, (c) houseboat and fish trap in Yang Rivers, and (d) Lotus Pond in part of Chi Oxbow Lake. (Source: Figures b and c were captured by the first author in 2022 at the Selaphum District, Roi Et Province)

The landform development and environmental changes in the region can be classified into six units, excluding unconfirmed old valley fill, based on their geomorphic positions and stratigraphic relations. The chronosequence of geomorphic processes reveals distinct stages (Tamura, 1992) that consist of 1) deposition of OFG in conditions of greater river tractive force before the fall of tektites around 0.7 Ma (Tamura, 1992), 2) deep weathering of gravel bed and bedrock post OFG deposition with in-situ iron segregation, 3) mass-movement events contributing to the formation of OCC and concentration of iron concretions, concurrent with tektite fall, 4) colluviation leading to YCC formation on sloping land surfaces, and 5) subsequent alluviation predominantly by flood and swamp deposits (YVF), extending from before 20,000 yr B.P. to the present (Tamura, 1992), with tectonic movement during the Quaternary (Tamura, 1992).

The chronosequence of geomorphic processes unfolds a series of climatic and tectonic conditions (Tamura, 1992): higher rainfall and/or more active tectonic movement in the early Pleistocene or late Neogene Tertiary, a humid climate with marked dry seasons in the early Pleistocene, intensified seasonal climate contrasts around the mid-Pleistocene, alternating dry and wet climates in the late Pleistocene and Holocene, with increasing humidity in the latter period, and tectonic movement during the Quaternary. The hydrogeological conditions in the Chi River Basin predominantly feature aquifers in consolidated rocks, covering 86.82% of the basin area, and aquifers in unconsolidated rocks, representing 13.04% (ONWR, 2020). Maha Sarakham aquifers, spanning 3.19 million km<sup>2</sup> (1.99 million rai), make up approximately 26.13% of the basin (ONWR, 2020). Aquifer depths vary from 10-50 m, reaching 50-100 m in unconsolidated sections, with a water yield capacity of 2-10 m<sup>3</sup> per hour (ONWR, 2020). Groundwater elevation maps and flow directions, based on data from the Department of Groundwater Resources (2009), indicate a west-to-east flow pattern along the Chi River and its tributaries, from higher topography to lowland areas.

Agricultural pursuits, including rice cultivation, sugar cane, rubber plantations, orchards, vegetable farming, and pastures, dominate the primary land use, while urban areas and forests are observed in mountainous and specific lowland regions. Meteorologically, the estimated precipitation, aligned with a 2-year rain station measurement equivalent, displayed a Probability of Detection (POD) of 0.927 (Areerachakul et al., 2022). Notably, the Chi River serves as a pivotal water resource for residents in the Na Ngam Subdistrict, particularly those engaged in fishing activities (Figure 4c).

The Yang or Lam Pha Yang River originates from the Phu Phan Mountain Range in the upper Lam Pha Yang region of Kalasin Province. It serves as a watershed for both the Chi River Basin and the Songkhram River Basin and is categorized as a tributary within the Chi River Basin in northeastern Thailand. Encompassing the regions of Kalasin Province, Roi Et Province, and certain parts of Yasothon Province, the river holds significance as a vital water source for the inhabitants of Na Ngam Subdistrict, particularly those engaged in fishing activities. Numerous indigenous inhabitants reside in houseboats that navigate the waters of the Yang and Chi Rivers (Figure 4b).

Characterized by its meandering course, the river follows this pattern due to its proximity to the water outlet, typically close to sea level. This results in horizontal erosion rather than vertical erosion, causing the stream to gradually widen until it ultimately severs the original meander from the primary stream. This process forms oxbow lakes, locally referred to as "Bueng Khong" or "Kud," exhibiting a distinctive curved shape. The Chi River, being a meandering stream, has generated numerous such oxbow lakes. These formations temporarily transform the land into isolated islands. Subsequently, the original river course accumulates sediment, covering both ends and leading to its detachment, resulting in the formation of a yoke-shaped swamp. Over time, coastal sediment deposition disrupts the yoke-shaped lake, transforming it into a floodplain referred to as an "oxbow scar." This perpetuates the existence of wet basins, oxbow lakes, and various ponds as well as a confluence of Yang and Chi Rivers (Figure 4b). Na Ngam Subdistrict is characterized by a diverse array of plant and aquatic life in this environment (Figure 4d).

### Cultural Tourist Attractions

Situated at Ban Kud Khae, the Khantiniwas Temple is designated as an ancient temple with significant cultural importance to the community. It plays a pivotal role as a venue for Dharma examinations and crucial religious ceremonies within the community. Additionally, the temple serves as a frequent site for the initiation of projects aimed at promoting morality and ethics by various governmental agencies. The towering chapel stands as a testament to the distinctive architectural features of the temple, showcasing the intricate beauty of arts and culture (Figure 5a).



Figure 5. Cultural tourist attractions of Na Ngam Area, Selaphum District, Roi Et Province (a) Khantiniwat Temple, (b) Pa Pho Chan Samruedi Temple, and (c) Pa Thammaram Temple (Source: All figures were captured by the first author and her students in 2022 at the Na Ngam Subdistrict, Selaphum District, Roi Et Province)

Wat Pa Pho Chan Somruedi, located at Ban Pho Chan and under the Maha Nikaya Sangha, occupies an expansive 6 rai. Its establishment dates back to November 1998, when Phra Phuttha Sukhito began its development, culminating in the request for temple construction permission in 2011. Mrs. Somruedee Chomchom granted approval in the year B.E. 2012, officially founding Wat Pa Pho Chan Somruedi. The temple's focal point is the revered Luang Pho Yai Sompratana, a statue with a lap width of 9 meters, standing atop a 25-meter-high base, elegantly enshrined within a structurally adorned building, showcasing exquisite religious architecture (Figure 5b). The interior of the temple features displays narrating the Buddha's history, encompassing various beliefs and ancient artefacts.

Established in 1938, Wat Pa Thammaram is considered the oldest temple in the community, with Phrakru Manoon Thammaphirat serving as the ecclesiastical president. Leaders of the villagers, namely Mr. Luan Raha and Mr. On Pho Tai, played integral roles in the temple's construction. Originally situated in a dense forest, the forest temple's secluded, tranquil, and shaded location, not far from the village, made it difficult for easy access. Phrakru Manoon Thammaphirat, the former Abbot of Na Ngam District 1, collaborated with the villagers of Phan Khang to pioneer and clear the area, establishing a residence for monks to conduct religious duties and a village crematorium. In 1940, the temple applied for legal registration. Wat Pa Thammaram currently boasts an array of impressive architecture, notably the "Sim Isan" chapel, which is the sole one of its kind in the Selaphum District (Figure 5c). The temple also showcases Buddha images crafted from sandstone and marble, along with displays of laterite and valuable ancient wood. The unique cultures of Na Ngam Area are Buddhism conservation and the Thai traditional Lent candle festival from July to August.

### Lifestyle Tourism Attractions

Na Ngam Subdistrict, situated in a river basin with a substantial sedimentary layer, exhibits soil composition influenced by coarse-grained sedimentary rocks deposited on the land surface. The terrain is generally smooth, characterized by a low slope and suboptimal drainage, resulting in slow surface water runoff and medium to slow water permeability. The soil, characterized by significant depth, is conducive to rice cultivation, given its suitability for multiple annual farming cycles. Abundant water resources further support agricultural activities, including the rearing of numerous cows and buffaloes within the area (Figure 6).



Figure 6. Lifestyle Tourist Attractions in Na Ngam Area, Selaphum District, Roi Et Province

(a) herds of buffalo in the lowland area, (b) café and restaurant at the rice fields, and (c) commencement of rice farming (Source: All figures were captured by the first author and her students in 2022 at the Na Ngam Subdistrict, Selaphum District, Roi Et Province)

However, it is important to note that the soil in this region exhibits a highly acidic to slightly acidic pH range (5.0–6.5) in the topsoil and a very acidic to slightly acidic pH range (4.5–6.5) in the lower soil layers. This acidity is attributed to water flowing through rock salt present in the Maha Sarakham Formation, which covers the northern part of the area. Consequently, agricultural productivity is affected, rendering certain areas unsuitable for rice cultivation due to high soil salinity. Conversely, regions with moderate salinity levels stimulate biochemical substances in jasmine rice, imparting an extraordinary fragrance to the crop. Additionally, the rice harvesting period is marked by the Bun Khun Lan tradition, a cultural expression of reverence for Phra Mae Phosop. In Thai culture, worship and offerings are made to Phra Mae Phosop to seek blessings related to fertility, prosperity, and overall well-being. The deity is associated with agricultural abundance and is often honored during religious ceremonies and festivals in Thailand.

The Chi and Yang River basins as well as Chi Long Oxbow Lake within the confines of Na Ngam Area, Selaphum District, Roi Et Province, present an area rich in potential for freshwater fishing, supporting the livelihoods of local residents engaged in fish-catching practices, employing traditional methods by bamboo fish trap and kind of fish trap (Figure 4). In certain regions, additional fishing activities involve net casting and fish breeding in cages. The Chi River Basin boasts a complex ecosystem, comprising 18 sub-ecosystems on land and in wetlands, housing over 88 fish species, including 9 rare and 8 endangered species (information sourced from the Chi River Basin Restoration Project, WWF Thailand). The rice cracker and fish product processing group, situated in the Ban Kud Ruea area, focuses on the agricultural contributions of villagers who bring rice for the production of rice crackers and sweet fermented rice.

Simultaneously, villagers engaged in fishing activities process freshwater fish into sun-dried fish and fermented fish. Some residents also rear chickens and their eggs are processed into salted eggs with rock salt in the area. These community product processing groups leverage unique methods and local wisdom in food preservation, offering opportunities for hands-on learning and experimentation (Figure 7a).



Figure 7. Lifestyle tourist attractions of Na Ngam Area, Selaphum District, Roi Et Province (a) making sun-dried fish,

(b) weaving silk looms, and (c) learning to weave cotton. (Source: All figures were captured

by the first author and her students in 2022 at the Na Ngam Subdistrict, Selaphum District, Roi Et Province)

The Ki Kratuk silk group, situated in the vicinity of Ban Kud Khae, is known for its distinctive and unique weaving designs crafted by local villagers, drawing upon the traditional wisdom of the Roi Et people (Figure 7b). The group specializes in weaving cotton into checkered scarves or "khao ma" cloth, as well as producing intricately woven silk patterns. Moreover, community members actively provide opportunities for individuals to engage in hands-on learning and experimentation with traditional hand-weaving techniques (Figure 7c).

### Assessment and Evaluation

The SWOT analysis of the Na Ngam Area indicates strengths and opportunities, with simultaneous consideration of weaknesses and threats as presented in the evaluation below, highlighting its suitability for river basin and meandering stream prototypes (Table 1).

#### Strengths

The Chi River, along with its tributaries, has become a potential destination for geotourism and other nature-based activities. Tourist attractions along the Chi River include natural landscapes, cultural sites, and activities related to the local

way of life. Understanding the characteristics and significance of the Chi River provides insights into the environmental, cultural, and economic aspects of the regions it traverses in northeastern Thailand.

Table 1. The evaluation and strengths–weaknesses–opportunities–threats (SWOT) analysis of Na Ngam Area

<b>Evaluation</b>	<b>Main Point</b>
Geology	<ul style="list-style-type: none"> <li>○ Hydrogeology of Chi River basin</li> <li>○ Representative fluvial landforms (meanders, oxbow lakes)</li> <li>○ Rock salt from Maha Sarakham Formation</li> <li>○ Geochemical characteristics of soil</li> </ul>
Tourism	<ul style="list-style-type: none"> <li>○ Aesthetic viewpoints</li> <li>○ Tourist's activities</li> <li>○ Local products and food</li> <li>○ Famous and majestic temples</li> <li>○ Easily access</li> <li>○ High promotion</li> </ul>
Economy	<ul style="list-style-type: none"> <li>○ merit-making tourists increasing</li> <li>○ creative tourists increasing</li> <li>○ economic area of local people</li> </ul>
Culture	<ul style="list-style-type: none"> <li>○ local people's lifestyles (agriculture, fishing, handicraft)</li> <li>○ ISAN architecture via temples</li> <li>○ ISAN language and festival</li> </ul>
<b>SWOT analysis</b>	
S: strengths	<ul style="list-style-type: none"> <li>○ Diversified riverain landscape generating aesthetic values</li> <li>○ Exemplary model of meandering river</li> <li>○ Numerous oxbow lakes, scars, ponds and swamps</li> <li>○ Many cultural attractions (temple and handicraft groups)</li> <li>○ Many local foods and products related local resources</li> <li>○ Unique of language and festival</li> <li>○ High promotion</li> </ul>
W: weaknesses	<ul style="list-style-type: none"> <li>○ No scientific panel</li> <li>○ No local guide</li> </ul>
O: opportunities	<ul style="list-style-type: none"> <li>○ Prototype of river-related tourism</li> <li>○ Research in pure geology and applied geology</li> <li>○ Geoeducation activities for local people and student</li> <li>○ Sustainable development</li> </ul>
T: threats	<ul style="list-style-type: none"> <li>○ Flooding in rainy season</li> <li>○ High salinity</li> <li>○ Pollution</li> <li>○ Riverbanks/enbankments degradation?</li> </ul>

The Na Ngam Area manifests numerous intrinsic values, notably in geology, tourism, economy, and culture (Table 1). It features numerous oxbow lakes formed during the latter stages of the meandering stream, specifically the Chi River, constituting a segment of one of Thailand's principal rivers. Consequently, this locale represents a river area with the potential for environmental amelioration and improved local livelihoods, paralleling initiatives observed in Europe, China, and India (Steinbach, 1995; Sattar, 2022; Cater, 2000; Akpan and Obang, 2012; Balen et al., 2014).

The region embodies various tourism attractions, particularly in the realms of attractions and handicrafts. Its aesthetic appeal magnetizes tourists, fostering engagement in activities such as photography, rafting (the downstream traversal of rivers on bamboo rafts), and fishing throughout the year, excluding the rainy season. Collaboration among local authorities, government organizations, and universities is robust, facilitating the formulation of strategic developmental plans (Sofield et al., 2017). Local entrepreneurial initiatives encompass the establishment of shops selling indigenous foods, beverages, and products derived from regional resources that can be further developed into gastronomic specialties (Ellis et al., 2018). Visitors have the opportunity to familiarize themselves with the local lifestyle and the distinct 'Isan' language, characterized by unique words and a smooth accent that differentiates it from other Thai languages. Additionally, historical sites and temples are situated in close proximity to the area (within <10 km), enhancing its cultural significance.

### **Weaknesses**

Despite the considerable tourism development potential in the area, there is insufficient communication with local authorities. Local guides possess knowledge at a moderate to low level, and there is a need for qualified personnel. Additionally, there is a requirement for the enhancement of infrastructure, transportation, and accommodation to adequately support a larger influx of tourists. In addition, the Na Ngam Area faces deficiencies, including the absence of geoscientific panels and local guides to disseminate information to visitors.

### **Opportunities**

Despite limitations such as the lack of geoscientific data, explanatory boards, and expert panels for visitor information, the area's distinctive characteristics, rarity, and representativeness make it conducive to advancing research in both pure geology (geomorphology and sedimentology) and applied geology (engineering geology, hydrogeology,



geotourism, mining geology, and environmental management). Geoeducational initiatives can be formulated to raise awareness and instill a sense of responsibility among local communities and schools for the conservation of geological monuments, mirroring the objectives of our project in this study (Figure 8a-8c).

**Threats**

In the rainy season, the downstream segment of the Chi River experiences substantial influxes of water from numerous tributaries, resulting in consequential flooding during this period. The Chi River Basin consistently grapples with water-related challenges. Primary concerns in this regard encompass insufficient water supply for agricultural activities, a scarcity of water for domestic purposes, urban and agricultural flooding, and water quality deterioration stemming from the discharge of municipal and industrial wastewater, runoff of agricultural chemicals into water bodies, and the presence of saline soils. The flat downstream area of the Chi River Basin frequently experiences severe flooding. The integration of river normalization, reservoir operation, and green river (bypass) mechanisms has proven to be highly effective, resulting in a reduction of approximately 24% and 31% in the extent of the 100-year flood event and economic damage, respectively (Kunitiyawichai et al., 2021). In response to the historical record of flood hazards, a suitable flood management proposal has been put forth for the region. This proposed plan encompasses both structural and non-structural measures, amalgamating three approaches to address flood hazards: hazard modification, impact moderation, and risk reduction (Arunyanart et al., 2017).



Figure 8. Training session on community tourism and horsemanship conducted by Khon Kaen University Faculty, collaborating with villagers and monks of Na Ngam Subdistrict, Selaphum District, Roi Et Province. (a) elaborating on the significance and etiquette of being an accomplished host, (b) geographical lecture on community identity and the development of tourism maps, and (c) live online broadcasts facilitating villager participation in idea generation. All figures were captured by the first author’s students in 2022 at the Na Ngam Subdistrict, Selaphum District, Roi Et Province. (d) touristic map promotion created by the first author in 2022. The white line symbols represent rural roads, while the pale blue lines denote rivers and streams. The names of tourist attractions are presented in both Thai and English.

**Discussion for creative tourism development and sustainable territories**

This study establishes a model for creative tourism at Na Ngam 101 (Roi Et Province, denoted as "one hundred and one" in the Thai language) aimed at educating and promoting the attractions within the area. The identification of potential and the formulation of the creative tourism model at Na Ngam 101 draw upon principles and concepts derived from various research studies. This approach entails defining tourist attractions, strategically mapping tourist locations for public relations purposes and disseminating knowledge regarding the concept of community-operated tourism for the sustained well-being of the community. Figure 8 illustrates a concerted effort to enhance villagers' comprehension of the ramifications of tourism, encompassing both advantages and disadvantages, and fostering a welcoming environment for visiting tourists.

The discourse extends to elucidate the significance and etiquette of being an accomplished host, incorporating insightful guidance from a tourism professor with expertise in hospitality. Additionally, a geographical lecture on community identity and the development of tourism maps is provided by professors specializing in geotechnology, offering informative insights into the community's identity and the nuances of crafting tourism maps. The study also incorporates live online broadcasts to facilitate active participation from villagers in collaborative brainstorming sessions, encouraging idea generation for the creative tourism model. The findings of the study identified five key components essential for creating sustainable tourism, which can be succinctly summarized as follows:

- 1) Tourists with a creative inclination, demonstrating an interest in activities and a sense of responsibility for actions affecting the community.
- 2) Empowered and creative hosts who possess awareness and understanding of tourism management formats, exhibit pride, and form collaborative networks.
- 3) Authentic activities and interactions, avoiding staged or commercially driven endeavors, focusing on traditional community lifestyle activities.
- 4) Robust and comprehensive internal control processes resulting from mutual agreements within the community, incorporating penalties for tourists, members, entrepreneurs, and external investors, as well as equitable management of community resources.
- 5) Equitable accessibility to benefits, ensuring that outcomes benefit members with a stake in the community's creative tourism without disadvantaging any party.

Large or small-group travel is facilitated by well-organized tour arrangements, enabling the preservation of consistently appealing tourism resources and enhancing the quality of tourism businesses for equitable profit. The imperative is to attract a substantial and regular influx of tourists while minimizing adverse environmental impacts over the long term, thus establishing the foundations for sustainable tourism. The fundamental tenet of sustainable tourism emphasizes the preservation of the value and identity of tourist destinations. This involves fostering awareness among tourists regarding their responsibility toward tourism resources and the environment.

Additionally, the generated profits from tourism activities must directly benefit the local community or area. This principle has evolved into the concept of Community-Based Tourism (CBT), wherein tourism is designed to ensure the sustainability of the environment, society, and culture (Lee and Jan, 2019). Moreover, CBT is community-directed and managed, ensuring that the community, as owners, actively participates in the stewardship and educational aspects for visitors (Special Area Development Administration for Sustainable Tourism, 2016).

The University to Subdistrict (Tambon in Thai) Project (U2T) initiated by the Faculty of Technology at Khon Kaen University has identified the resources and potential for tourism development in Na Ngam Subdistrict, Selaphum District, Roi Et Province. Consequently, a business model incorporating creative tourism has been devised to stimulate community tourism and disburse income to local villagers. The strategy involves promoting day-long tourism via tourism map experiences encompassing natural, cultural, and lifestyle attractions (Figure 8d). Simultaneously, community products are marketed to diverse tourist groups through digital platforms or online media to maximize outreach.

After a month and a half since the initiation of the project, there has been a noteworthy surge in the sales of community products, such as sun-dried fish and hand-woven cotton, experiencing an increase of over fivefold compared to the pre-project period. Furthermore, daily orders are consistently being placed through online platforms, with a prominent surge in activity observed on Facebook. The heightened interest and awareness about tourist attractions in the Na Ngam subdistrict area are evident, as reflected in the increased reach of public relations media across Facebook, Instagram, and TikTok pages under the banner of U2T Na Ngam Baan Hao. The shared content has garnered attention more than 10,000 times on digital platforms. Within the community, there is a heightened appreciation for cultural values, fostering a collective effort toward environmental conservation. This positive transformation is particularly evident within the university project's working group and their close associates, fostering enhanced unity and communication within the community compared to the pre-project period.

In addition, river tourism represents a significant facet of the broader tourism industry, offering visitors diverse and immersive experiences while contributing positively to the economic development of riverine regions. Furthermore, the initiative contributes to holistic economic development, concurrently addressing three key economic dimensions. This includes bioeconomy, emphasizing the utilization of biological resources to generate added value, intertwined with Circular Economy principles and the Green Economy. The latter signifies economic development harmonized with social development and environmental protection, striving for equilibrium to foster stability and sustainability. The project demonstrates the potential for sustainable development through the advancement of tourism within the Na Ngam Ban Hao community. This encompasses achieving specific Sustainable Development Goals (SDGs), such as poverty eradication (SDG1), improved well-being (SDG3), equitable education (SDG4), decent employment and economic growth (SDG8), reduced inequality (SDG10), and the sustainable use of terrestrial ecosystems (SDG15).

## CONCLUSION

The Creative Tourism initiative at Na Ngam 101, under the University to Subdistrict Project, led by the Faculty of Technology at Khon Kaen University, has successfully crafted tourism maps and disseminated information about various tourist attractions, communities, and local products through digital platforms. The identified tourist attractions in the area can be categorized into three main types:

- 1) Natural Tourist Attractions: Encompassing the Chi River, Yang River, and Chi Long Oxbow Lakes.

2) Cultural Tourist Attractions: Including Khantinivas Temple, Wat Pa Pho Chan Somruedi, and Wat Pa Thammarom.

3) Lifestyle Tourist Attractions: Encompassing rice farming and freshwater fishing, processing of rice cracker products, fish product processing, processing of salted egg products, and loom weaving.

All three categories of tourist attractions are well-prepared to accommodate both tourists and locals, with the community demonstrating an understanding of the tourism development system and a commitment to learning how to be effective hosts. The development of the Creative Tourism project at Na Ngam 101 has significantly increased awareness of tourist attractions within the Na Ngam Subdistrict, leading to a remarkable surge in community product sales by over fivefold. This heightened awareness has prompted the community to recognize the value of their culture and collaborate on more effective environmental conservation efforts toward sustainable development.

**Author Contributions:** Conceptualization, V.S. and E.G.; methodology, V.S. and E.G.; software, V.S. and E.G.; validation, V.S. and E.G.; formal analysis, V.S. and E.G.; investigation, V.S.; data curation, V.S. and E.G.; writing - original draft preparation, V.S. and E.G.; writing - review and editing, V.S. and E.G.; visualization, V.S.; supervision, V.S.; project administration, V.S. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research was funded by the Ministry of Higher Education, Science, Research and Innovation of Thailand, as well as the Faculty of Technology at Khon Kaen University through the U2T project. The Research Administration Division (RAD) of Khon Kaen University also provided financial support for the article processing charges (APC). The funding entities had no role in the study's design, data collection, analysis, decision to publish, or manuscript preparation.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** The data presented in this study may be obtained on request from the corresponding author.

**Acknowledgements:** The authors express their deep gratitude to Piyakorn Preedeesanit and Apussorn Anumat for their invaluable assistance during field observations and for taking numerous photographs with the first author. Additionally, we thank the local community for their support of the project.

**Conflicts of Interest:** The authors declare no conflict of interest.

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