

GEOHERITAGE, SOCIAL SOLIDARITY, AND CULTURAL EDUCATION: THE BAKAR BATU TRADITION AS INDONESIA'S INTANGIBLE CULTURAL HERITAGE IN A SUSTAINABLE GEOTOURISM PERSPECTIVE

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Abstract

The Bakar Batu tradition of the Papuan Highlands is a profound expression of intangible cultural heritage, embodying values of solidarity, gratitude, and harmony between humans and nature. This study examines the recontextualization of the Bakar Batu ritual as a medium for cultural education and sustainable geotourism through a collaborative initiative by the Indonesia Art Movement (IAM) and the Ikatan Keluarga Besar Pemuda Pelajar Mahasiswa (IKB PPM) ELIMA in Jayapura. Employing an interdisciplinary ethnographic approach, the research engaged 38 participants—including students, tribal elders, and local artists—to analyze how the ritual is adapted within an urban diaspora context. The findings reveal that the collaborative performance of Bakar Batu effectively revitalizes ancestral values of social solidarity among urban youth. Crucially, the ritual's utilization of specific igneous stones, fire, and organic insulation is interpreted not merely as a culinary technique but as a complex thermodynamic system that mirrors geological processes. From a comparative perspective, this study identifies significant parallels between Bakar Batu and other Pacific earth-oven traditions such as the Māori Hāngī, proposing a new framework of "Volcanic Geo-Cultural Heritage." However, unlike commercialized tourism adaptations elsewhere, the IAM initiative maintains a community-led governance model that resists commodification. The study concludes that integrating indigenous technical wisdom with artistic collaboration offers a resilient model for community-based geotourism. This approach ensures that cultural preservation remains in the hands of the community, safeguarding the ritual's sacredness while promoting ecological awareness in a contemporary setting.

Keywords: Bakar Batu, Geoheritage, Social Solidarity, Cultural Education, Sustainable Geotourism, Volcanic Geo-Culture.

A. INTRODUCTION

The development of geotourism in recent decades has shifted the paradigm of tourism from consumption toward education, conservation, and community empowerment. Defined as a sustainable form of tourism, it emphasizes the interpretation of a region's geological, ecological, and cultural heritage. In this framework, the Earth is viewed not merely as a natural resource but as a "living text" that stores the memory of human and environmental interactions. Recent studies highlight that synergies between geoheritage, geoeducation, and geotourism are essential for sustainable development, as observed in global contexts from Greece (Zafeiropoulos et al., 2025) to Southeast Asian nations like Laos (Chantharangson et al., 2025). In Indonesia, a country of immense geological diversity, the interrelation between volcanic landscapes and local traditions provides fertile ground for developing such geo-cultural heritage models (Darsiharjo & Supriatna, 2024; Herrera-Franco et al., 2022).

However, the tourism sector faces new challenges regarding the sustainability of food and cultural resources. As global debates on food tourism shift from mere gastronomy to sensory experiences and future availability (Richards, 2024; Okumus, 2025), there is a growing need to preserve indigenous food systems. Empirical evidence suggests that the consumption of local food significantly contributes to the perception of sustainable tourism among domestic travelers (Wani et al., 2024). In this context, the Bakar Batu (Barapen) ritual from Papua stands as a pivotal example. Recognized as an Intangible Cultural Heritage of Indonesia, Bakar Batu is a communal cooking ritual using heated stones, symbolizing unity and gratitude (Ambarita et al., 2024). Sociologically, the ritual functions as a mechanism of social solidarity (Mentel, 2022), and anthropologically as a performance of the spiritual connection between humans and nature (Prasetyo, 2023).

Despite its immense potential, the intersection of geoheritage, social solidarity, and cultural education within the Bakar Batu tradition remains understudied. Previous research has primarily focused on anthropological or religious aspects, leaving a conceptual gap in understanding how the ritual integrates geological materials—stones, fire, and soil—into modern cultural sustainability (Lim et al., 2023). Furthermore, documentation regarding how this tradition is recontextualized by urban youth diasporas is still limited. Addressing this gap is crucial for positioning Bakar Batu not only as a traditional ceremony but as a form of geo-cultural education that bridges the natural and social sciences (Taheri & Thompson, 2025).

Theoretical Framework: Geo-Semiotics To deepen the analysis, this research adopts a geo-semiotic lens. In this view, the landscape elements used in Bakar Batu are treated as signs. The stone is not merely a cooking tool but an index of endurance; fire is an icon of transformation; and the communal meal is a symbol of biological and social unity. As noted by Tektigul et al. (2023), language and ritual are symbol systems that carry culture. In the context of the urban diaspora in Jayapura, these symbols become anchors of identity. When a student picks up a hot stone, they are not just cooking; they are engaging in a semiotic act that communicates "I am Papuan" without uttering a word. This non-verbal communication is vital in the era of digital disruption, offering a tangible, visceral connection to heritage that digital archives cannot replicate.

Therefore, this study aims to interpret the Bakar Batu tradition as an embodiment of Indonesia's geoheritage and intangible cultural heritage. This research explores how ecological symbolism and social values are revitalized through a collaborative initiative between the Indonesia Art Movement (IAM) and IKB PPM ELIMA in Jayapura. Employing an interdisciplinary ethnographic approach, this paper highlights how local wisdom rooted in the Earth can inspire a broader understanding of community resilience (Widodo & Nugroho, 2024), supporting a community-based geotourism model that is educational and culturally resilient (Thornton, 2024).

B. RESEARCH METHOD

This study employs an interdisciplinary ethnographic approach, chosen to capture the Bakar Batu ritual as a dynamic "living heritage" within the urban context of Jayapura City, Papua. The research focuses on the collaborative activities organized by the Indonesia Art Movement (IAM) and the Ikatan Keluarga Besar Pemuda Pelajar Mahasiswa (IKB PPM) ELIMA. This specific location was selected to represent the "urban diaspora," where traditional highland values intersect with modern social dynamics.

The subjects of the study were selected using purposive sampling, involving a total of 38 participants who play specific roles in the ritual ecosystem. The demographic composition

consists of 15 university students from the highlands acting as the primary workforce, 3 traditional elders (tetua adat) serving as technical custodians for the stone selection and pit construction, and 20 local artists affiliated with IAM who facilitated the cultural recontextualization. This specific criteria ensured a comprehensive analysis of the intergenerational transfer of indigenous knowledge.

Data collection was conducted from late 2024 using three primary instruments. First, Participatory Observation was employed where researchers engaged in the technical phases of the ritual—specifically observing the lithic selection (identifying igneous stones) and the thermodynamic arrangement of the earth oven. Second, In-depth Interviews were conducted with elders to validate the ecological symbolism and with student leaders to understand the social solidarity aspects. Third, Visual Ethnography was utilized to document the semiotic arrangement of stones, fire, and soil, providing visual data for the geo-cultural analysis.

Data analysis followed the interactive model by Miles and Huberman, consisting of data reduction, data display, and conclusion drawing. This process was integrated with a geo-semiotic interpretation technique to decode the specific landscape elements used in the ritual as cultural signs. To ensure data validity, triangulation was performed by cross-referencing observational field notes with interview transcripts and visual evidence.

C. FINDINGS AND DISCUSSION

To deeply understand the geoheritage value of Bakar Batu, one must analyze the technical process which acts as a feat of indigenous engineering. Observations in Jayapura revealed that the ritual consists of three critical phases that mirror geological processes: lithic selection, thermal incubation, and stratigraphic layering.

First, the selection of stones (batu kali) is not arbitrary. Interviews with tribal elders in the IAM community revealed that the stones must be of igneous or hard sedimentary origin, typically andesite or basalt found in the Cyclops Mountain riverbeds. These stones are chosen for their specific thermal capacity—they must retain heat for hours without fracturing explosively under high temperatures. This selection process is, in essence, a practical geology lesson passed down through oral tradition. The stones are then arranged in a pyramid structure interlocked with wood, creating a furnace that can reach temperatures exceeding 300°C.

Second, the cooking process utilizes the principle of an "earth oven," a technique that creates a sealed thermodynamic system. The pit is lined with diverse vegetation—fern leaves, banana leaves, and reeds—which serve as thermal insulators to prevent heat loss to the surrounding soil. The placement of food follows a strict stratigraphy: tubers (sweet potatoes, cassava) are placed at the bottom directly on the hot stones as they require the most heat energy. This is followed by layers of meat (pork or chicken), and finally, vegetables are placed at the top layer where they are steamed by the rising vapor.

This complex procedure validates the argument by Wani et al. (2024) regarding the sophistication of indigenous food systems. The ritual is not just cooking; it is a simulation of the earth's geothermal energy managed by human hands. By participating in this, the urban youth from IAM and IKB PPM ELIMA are essentially performing a "geological reenactment," reconnecting their bodily memory with the thermal dynamics of their ancestral land. This technical mastery proves that Bakar Batu is a tangible application of ethno-geology.



Figure 1. The collaborative preparation of the earth oven, demonstrating the stratigraphic layering of stones and food

(Source: Author's Documentation, 2024).

The collaboration between the Indonesia Art Movement (IAM) and IKB PPM ELIMA represents a strategic effort to revitalize the Bakar Batu tradition amidst urban modernization. The findings indicate that for the 15 student participants from the highlands, this event was not merely a cooking procession but a pedagogical space for relearning their ancestral knowledge system. As captured in Figure 1, the ritual involves a collective labor process where gender roles and social hierarchies are harmonized through cooperation. This aligns with recent studies on Papuan indigenous education, which emphasize that traditional practices serve as structured forms of system thinking and cultural transmission (Hastangka et al., 2024). Unlike typical tourism events that often commodify culture, the IAM initiative prioritizes the transfer of values—solidarity, discipline, and mutual respect—before presenting it to the public audience.

A key finding of this study is the reinterpretation of the geological elements used in the ritual through a geo-semiotic lens. The stones act as "ecological memory," connecting the current generation with the land of their ancestors. As seen in Figure 2, the arrangement of stones, leaves, and food creates a microcosm of the Papuan environment. This synergy between geological landscape and cultural practice supports the concept of geoeducation (Zafeiropoulos et al., 2025), where the earth is learned not through textbooks but through ritualistic interaction. Furthermore, preserving this indigenous food sovereignty is vital for maintaining cultural identity against the homogenization of global food culture (Abdul et al., 2024).



Figure 2. The arrangement of hot stones and food materials, representing the connection between geoheritage and culinary tradition

(Source: Author's Documentation, 2024).

Positioning Bakar Batu within a global context strengthens its status as a significant intangible cultural heritage. This study identifies striking parallels between the Papuan tradition and other "earth oven" cultures in the Pacific Ring of Fire. Specifically, distinct similarities are observed with the Hāngī of the Māori in New Zealand, the Umu of Polynesia, and even the Pachamanca of the Andean people. All these traditions utilize heated stones (geo-resources) buried in a pit to cook communal meals, showcasing a universal human ingenuity in utilizing geothermal principles for sustenance.

However, a distinct difference lies in the social execution observed in this study. While modern Hāngī in New Zealand is frequently streamlined for commercial tourism consumption, often managed by professional operators, the Bakar Batu practiced by IAM in Jayapura retains a raw, participatory essence that resists commodification. This aligns with Mammadova et al. (2025) findings on community governance; by keeping the governance of the ritual within the community, IAM avoids the conflicts often seen in top-down tourism sites. Furthermore, unlike the Pachamanca tradition which is deeply tied to agricultural worship, the Papuan Bakar Batu emphasizes the "opening of the pit" as a pivotal moment of conflict resolution and peace-making. Recognizing these similarities and distinctions allows us to propose a new category of "Volcanic Geo-Cultural Heritage," where Papua plays a central role.

Conducting Bakar Batu in an urban setting like Jayapura presents unique challenges regarding the availability of materials and diverse demographics. The study noted that IAM facilitated an inclusive version of the ritual, often preparing separate pits or adjusting ingredients to accommodate the multi-religious context of the city. This flexibility demonstrates the "living" nature of the heritage. Adaptability is crucial for the sustainability of food tourism in the future, as noted by Okumus (2025). By proving that the ritual can survive and evolve in a resource-constrained urban environment without losing its core symbolic meaning, the Bakar Batu tradition shows remarkable resilience suitable for sustainable geotourism development.

D. CONCLUSION

This research has demonstrated that the Bakar Batu tradition, facilitated by the collaborative initiative of the Indonesia Art Movement (IAM) and IKB PPM ELIMA, serves as a dynamic intersection of geoheritage, social solidarity, and cultural education. The study confirms that the ritual transcends its function as a communal feast; it is a pedagogical medium where geological elements—igneous stones, soil, and fire—are transformed into active educational tools. This transformation revitalizes the "ecological memory" of Papuan youth in the urban diaspora, proving that indigenous technical knowledge regarding thermodynamics and material selection is as vital as the social values it conveys.

By recontextualizing local wisdom within a modern framework, this initiative effectively safeguards indigenous food sovereignty and proves that community-led management is the most resilient strategy against the commercial commodification often found in mass tourism. The collaboration successfully instills a sense of identity and environmental stewardship, ensuring that the sanctity of the ritual remains intact even within a changing social landscape. The study establishes Bakar Batu not just as a cultural artifact, but as a living example of "Volcanic Geo-Cultural Heritage" that bridges the gap between ancestral traditions and contemporary urban adaptation.

For future research, it is recommended to expand the scope beyond qualitative ethnography to include quantitative analyses of the economic impact of such community-based geotourism events on local welfare. Additionally, a broader comparative study between the Papuan Bakar Batu and similar earth-oven traditions in the Pacific region (such as the Māori Hāngī or Polynesian Umu) is strongly suggested to establish a comprehensive framework of global volcanic heritage. Currently, further investigation is underway by the authors regarding the digitalization of these rituals to create an accessible visual ethnography archive. This ongoing project aims to ensure that the technical and symbolic intricacies of the ritual can be preserved and transmitted to the younger generation through immersive digital platforms.

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