



Ketupat Processing Traditions in Minangkabau: An Eco-Theological, Health, and Cultural Resilience Study

Azhari Akmal Tarigan¹, Jufri Naldo¹, Syahrial Arif Hutagalung², Uswatun Hasanah¹, Ismail³

¹Universitas Islam Negeri Sumatera Utara, Medan, Indonesia

²Politeknik Negeri Medan, Indonesia

³Universitas Islam Sumatera Utara

Email correspondence: jufriinaldo@uinsu.ac.id

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| <p>Track Record Article</p> <p>Revised: 10 May 2026 Accepted: 23 June 2026 Published: 30 June 2026</p> <p>How to cite : Tarigan, A. A., Naldo, J., Hutagalung, S. A., Hasanah, U., & Ismail. (2026). Ketupat Processing Traditions in Minangkabau: An Eco-Theological, Health, and Cultural Resilience Study. <i>Contagion: Scientific Periodical Journal of Public Health and Coastal Health</i>, 8(2), 318–334.</p> | <p style="text-align: center;">Abstract</p> <p><i>This study examines the Ketupat tradition, a Minangkabau food wrapped in young coconut leaves, through the lenses of eco-theology, public health, and cultural resilience. Employing a qualitative methodology that integrates in-depth interviews with 25 informants (15 entrepreneurs, 5 cultural leaders, and 5 academics), participatory observation, and textual analysis with data analyzed thematically using NVivo software the research was conducted across key centers of Minangkabau diaspora life in Padang (West Sumatra, Indonesia), Yogyakarta (Indonesia), and Negeri Sembilan (Malaysia). The findings reveal three interrelated dimensions. First, the use of natural leaf wrappers embodies the Islamic eco-theological principle of khalifah fil-ardh (humans as stewards of the earth), expressed through faith-driven ecological awareness among tradition bearers. Second, coconut leaves provide tangible health benefits by eliminating risks of chemical migration from plastic and styrofoam packaging, reinforcing community-based food safety rooted in natural materials. Third, Ketupat-making sustains cultural identity and social cohesion within diaspora communities through intergenerational transmission and collective rituals. Overall, the study argues that traditional food practices grounded in natural materials represent a convergence of ecological wisdom, health protection, and spiritual values, underscoring the importance of integrating local wisdom into sustainable food policies and national food security strategies</i></p> <p>Keywords: Ketupat; Minangkabau; Eco-Theology; Traditional Food Systems; Public Health; Cultural Resilience; Food Packaging.</p> |
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INTRODUCTION

The world is facing an accelerating ecological and public health crisis driven in large part by the proliferation of synthetic food packaging. Globally, over 400 million tons of plastic are produced each year, and approximately 8 million tons enter the oceans annually, devastating marine biodiversity and destabilizing the global food chain (United Nations Environment Programme, 2021). Beyond environmental damage, mounting evidence from international health research links synthetic packaging materials particularly those containing bisphenol A (BPA), styrene, and phthalates to endocrine disruption, hormonal imbalances, reproductive disorders, elevated cancer risk, and developmental impairments in children (Halden, 2010; Ibrahim & Sillehu, 2022). These twin crises have prompted renewed scholarly attention to traditional food packaging systems as ecologically safer and culturally meaningful alternatives. Ethnographic studies from South Asia have documented the use of banana and sal leaves as heritage packaging practices with demonstrable antimicrobial properties (Pavithra et

al., 2023), while research from Latin America and sub-Saharan Africa similarly reveals that leaf-based food wrapping represents not merely culinary custom but an embedded system of environmental stewardship and community health knowledge (Chatterjee et al., 2017; Nguyen-Viet et al., 2015; Ramirez & Soto, 2025). These cross-cultural findings invite a deeper inquiry into analogous traditions in Southeast Asia, particularly within communities where ecological practice and spiritual values are inseparable.

At the national and regional level, Indonesia faces particularly acute pressures. Data from the West Sumatra Environmental Agency indicate that plastic use in the traditional culinary sector has risen by 40% over the past five years. A preliminary survey of 20 lapau (food stalls) in Padang City found that 60% had adopted plastic packaging for certain dishes even as *Ketupat* itself continues to be wrapped in coconut leaves. This trend reflects a broader pattern of modernization that erodes traditional practices while generating new risks for both human health and local ecosystems (Aswani et al., 2018).

It is within this national and global context that the Minangkabau *Ketupat* tradition emerges as a case of exceptional scholarly significance. For nearly half a century, modernization has permeated every aspect of human life and continues to shape the trajectory of future civilizations (Khawismaya et al., 2024). In this context, traditional food often functions as a final bastion for safeguarding cultural identity against the erosion of modernity. As Koentjaraningrat notes, every community possesses fundamental cultural characteristics, one of which is food (Koentjaraningrat, 1990). The Minangkabau exemplify this resilience: renowned both for their long-standing tradition of migration (Naldo et al., 2023), and for their creativity in producing diverse traditional cuisines (Heriyati et al., 2024). Among these, *Ketupat* a dish wrapped in young coconut leaves stands out as more than a culinary artifact. It embodies spiritual, ecological, and health-related meanings, representing a system of local knowledge that organically integrates religious, ecological, and health values into a single cultural practice. These values not only endure in the Minangkabau homeland but are also actively transmitted within diaspora communities across the globe.

From an ecological standpoint, coconut leaf wrappers are fully biodegradable, decomposing naturally without leaving harmful residues, and can even be repurposed as compost to enrich the soil. In contrast, natural materials such as coconut leaves are free from chemical contamination and contain antioxidants that can enhance the nutritional quality of the food they encase (Suryani et al., 2024). Within the framework of Islamic eco-theology, the use of such natural materials aligns with the principle of *khalifah fil-ardh*, humans as guardians and stewards of the earth (Widiastuty & Anwar, 2025). This principle underscores that the human–

nature relationship is not one of exploitation but of trust, entailing moral and spiritual responsibility before God. Thus, Ketupat-making transcends its role as an economic activity or culinary tradition, embodying profound theological and ecological significance.

Research on traditional food has been conducted from diverse perspectives. Some studies highlight the uniqueness of traditional cuisine as a marker of identity that is difficult to replicate (Abdul Raji et al., 2024), while others examine the conceptualization of traditional food names (Rocillo-Aquino et al., 2021), or analyze nutritional value from a scientific standpoint (Hassel, 2014). Scholarship on Minangkabau specialties is equally rich; for instance, studies on *rendang* reveal embedded cultural messages of patience, wisdom, and sincerity (Ermanto et al., 2025). More recent findings emphasize the collective preparation of traditional foods such as *lemang*, *lepat*, *ketupat*, and *rendang* as discursive practices that ease social tensions and restore community harmony (Hartati & Karim, 2023; Naurasari et al., 2025; Refisrul, 2018). In addition, research on food packaging demonstrates the ecological superiority of natural, leaf-based materials compared to synthetic (Baidya & Dev, 2025).

Although traditional food has been examined from cultural, nutritional, or ecological perspectives, no study has yet offered a comprehensive framework that integrates eco-theology, public health, and cultural resilience. This gap is not merely an academic oversight it is a missed opportunity for both anthropological theory and public health policy. Theoretically, an integrated framework challenges the artificial separation between spiritual, ecological, and bodily well-being, advancing a more holistic understanding of how indigenous knowledge systems operate. From a policy standpoint, the absence of such a framework has left policymakers without the evidence base needed to incorporate traditional food practices into sustainable packaging regulations and national food security strategies. This research seeks to fill that gap by presenting the first integrated analysis of how traditional culinary practices specifically *Ketupat* can serve as a model for addressing ecological, health, and cultural challenges in the modern era.

Drawing on an anthropological approach to religion and qualitative methods, this study is guided by two central research questions: How do Minangkabau tradition bearers understand and justify the continued use of coconut leaves as food wrappers in the context of modernity and globalization? And what ecological, health, and spiritual meanings do practitioners attach to this practice, and how are these meanings transmitted across generations and diaspora communities? In seeking to answer these questions, the study investigates how the Minangkabau Ketupat tradition embodies ecological wisdom, health consciousness, and cultural identity resilience in the age of globalization.

More specifically, the study aims, first, to uncover the eco-theological concepts embedded in the use of natural materials within the *Ketupat* tradition, interpreted through Islamic values; second, to analyze the health implications of coconut leaf wrappers compared to synthetic packaging; and third, to explain how *Ketupat*-making functions as a mechanism of cultural resilience and social cohesion among Minangkabau communities in both homeland and diaspora contexts. The central argument of this study is that the Minangkabau *Ketupat* tradition, rooted in natural materials, represents a convergence of ecological wisdom, health benefits, and spiritual values a heritage whose relevance is heightened amid contemporary global environmental and health crises.

METHODS

This study employs a qualitative approach within an interpretive paradigm, grounded in the methods of the anthropology of religion. Such an approach was selected for its capacity to explore meaning, values, and religious–social interactions in depth, particularly within the Minangkabau community, where customary law, Islam, and everyday cultural practices are closely interwoven. Importantly, this study does not claim to establish biomedical proof of health benefits from coconut leaf wrappers; rather, it documents community knowledge and perceptions of those benefits, examined in relation to existing biomedical and ecological literature. The research design is thus appropriate for its actual purpose, exploring the socio-cultural and theological dimensions of a health-related traditional practice.

A preliminary exploratory survey of 20 *lapau* (food stalls) in Padang City was conducted prior to the main fieldwork to map current packaging trends in the traditional culinary sector. This survey was not designed as a statistically representative study; it served as an orientation tool to identify the extent of plastic adoption and to guide purposive site and informant selection for the qualitative phase. Its finding that 60% of surveyed stalls had adopted plastic packaging for certain foods while retaining coconut leaves for *Ketupat* is reported here as a contextual indicator, not a generalizable quantitative claim.

Fieldwork was conducted in three purposively selected locations: Padang (West Sumatra Province, Indonesia), Yogyakarta (Indonesia), and Negeri Sembilan (Malaysia). These sites were chosen because each hosts active Minangkabau communities engaged in the trade of traditional foods such as *rendang*, *gulai*, and *ketupat*. The cross-geographical selection spanning the cultural heartland of Minangkabau, a major domestic diaspora hub, and an international diaspora community enabled the researcher to examine how the *ketupat* tradition is reproduced, adapted, and sustained across diverse social contexts.

Data were collected from 25 primary informants across three purposively identified groups: (a) 15 Minangkabau traditional food entrepreneurs who use young coconut leaves as Ketupat wrappers; (b) 5 community and customary (adat) leaders with recognized authority in Minangkabau traditions; and (c) 5 academics specializing in culture, food systems, or public health. Informants in group (a) were identified through referrals from local market associations and Minangkabau community networks at each site. Customary leaders in group (b) were nominated by Lembaga Kerapatan Adat Alam Minangkabau (LKAAM) representatives and community elders at each location. Academic informants in group (c) were recruited through institutional affiliations at Universitas Andalas (Padang), Universitas Gadjah Mada (Yogyakarta), and Universiti Kebangsaan Malaysia (Negeri Sembilan). Recruitment followed a snowball approach within each group, whereby initial contacts facilitated introductions to subsequent participants. The total of 25 informants was deemed sufficient on the basis of data saturation: interviews were concluded when no substantively new themes, concepts, or interpretations emerged across successive conversations. Saturation was formally assessed after each round of coding, with the final three interviews across all sites yielding no new thematic categories, confirming adequacy of the sample. In addition, brief incidental interviews were conducted with 15 local residents (5 at each site) to capture general consumption preferences and community awareness of Ketupat as a traditional food.

Three complementary techniques were employed. First, in-depth interviews were conducted with the 25 primary informants. Each interview lasted 40–60 minutes and followed a semi-structured format, organized around thematic guides covering ecological practices, religious meanings, health perceptions, and cultural transmission. This format allowed topics to emerge organically while ensuring consistency across sites. Second, participant observation was carried out over three months (October–December 2025) at all three sites. The researcher actively joined Ketupat-making activities and observed the dish's role in customary ceremonies, daily food preparation, and communal gatherings, thereby gaining embodied insight into the practices and meanings embedded in the tradition. Third, textual analysis was conducted on relevant national and international scholarly literature in the fields of food anthropology, Islamic eco-theology, food packaging science, and public health, to situate field findings within broader academic discourse.

The collected data were analyzed through a structured thematic process aligned with the interactive model of Miles and Huberman, proceeding through five stages. In stage one, all interview recordings were transcribed verbatim and field notes were organized systematically (Miles et al., 2014). In stage two, open coding was conducted using NVivo 12 software, in

which raw data were broken into discrete meaning units and assigned initial descriptive labels without imposing prior categories. In stage three, axial coding was applied to identify relationships between initial codes, grouping related concepts into sub-categories around central axes such as ecological awareness, spiritual obligation, perceived health protection, and intergenerational transmission. In stage four, selective coding was used to integrate sub-categories into overarching themes, yielding three primary thematic clusters: (1) eco-theological meanings embedded in natural packaging; (2) community health knowledge related to the rejection of synthetic materials; and (3) Ketupat-making as a mechanism of cultural resilience. In stage five, cross-source analysis was performed by integrating thematic findings from the field with relevant biomedical, ecological, and eco-theological literature, allowing community knowledge claims to be examined alongside though not conflated with existing scientific evidence. The resulting thematic framework was documented and is presented transparently in the Findings section through representative quotations and analytical narrative.

Data validity was ensured through multiple strategies. Source triangulation was applied by cross-checking data across the three informant groups and three field sites. Method triangulation was achieved by combining interview data, observational records, and textual analysis. Member checking was conducted with six key informants (two from each site) who reviewed the researcher's interpretive summaries and confirmed their alignment with informants' original intentions. Prolonged engagement over three months of fieldwork further strengthened credibility by allowing the researcher to observe practices across multiple occasions and contexts.

RESULTS

Eco-theological Awareness Among Tradition Bearers

The eco-theological dimension of the Minangkabau Ketupat tradition does not operate as an explicit doctrinal system; rather, it is internalized through everyday cultural practices transmitted across generations (Juhani et al., 2025). Within the Islamic framework, the principle of *khalifah fil-ardh* affirms that human beings are entrusted by God to steward and protect the earth, not as owners at liberty to exploit it (Ruswanda, 2025). The use of young coconut leaves as food wrappers constitutes a tangible expression of this religiously grounded environmental ethic a phenomenon that finds resonance in cross-cultural ethnographic contexts, including the use of banana and sal leaves in South India and corn husks in Mexico, both of which function simultaneously as ecological practices and expressions of spiritual community values.

Field findings demonstrate that this eco-theological awareness while not always articulated in formal theological language is reflected consistently in the practices and narratives of Ketupat tradition bearers. Riko (45), a satay and Ketupat vendor at Pasar Raya Padang with twenty years of experience, stated:

For me, selling satay with Ketupat wrapped in young coconut leaves is a tradition passed down from my parents and grandparents. Besides adding aroma and flavour, the leaves are economical, healthy, and do not pollute the environment leaf waste, left alone, has no harmful impact. Plastic is different; it is hard to break down and can clog drains. I believe this is in line with religious teachings that forbid causing damage on earth. (Interview, 28 October 2025)

Riko's statement illustrates two analytically significant elements: first, an empirical recognition of the superiority of natural materials on grounds of health and sensory quality; and second, an ecological awareness of the environmental consequences of waste, explicitly articulated through a religious framework. Together, these elements constitute what Islamic eco-theological scholarship terms faith-based environmental ethics actions taken to protect nature not solely for pragmatic reasons, but as an expression of spiritual obligation (Nasr, 1994; Supandi et al., 2025). Notably, this awareness is not confined to older generations. Dina (28), a young Minangkabau culinary entrepreneur in Yogyakarta who operates the restaurant "Raso Padang," articulated a parallel perspective:

"I choose to keep using authentic Ketupat wrapped in coconut leaves, even though it is more complicated and I have to order the leaves from Sumatra. Besides satisfying my customers, who are mostly Minangkabau people seeking an authentic taste, I believe there is a special blessing when we preserve tradition and avoid harming nature. I have also read in the Qur'an that God does not favour those who cause destruction on earth." (Interview, 12 November 2025)

Dina's account reflects a dialectic between cultural practice and active theological reasoning a phenomenon that reinforces the argument advanced by Nasr and Khalid that ecological wisdom in Islamic civilization was embedded long before modern environmental discourse emerged in the West, and continues to be reproduced through everyday practice. The eco-theological dimension is further institutionalized within ceremonial contexts. Within the Tigo Tungku Sajarangan leadership structure which unites customary, intellectual, and religious authorities all dishes served during annual ceremonial gatherings employ natural materials exclusively. Saifullah (62), a community and customary leader in Koto Tangah, Padang, explained:

In every customary ceremony turun mandi, baralek, or alek nagari we always serve Ketupat wrapped in real leaves. This is not without reason. In Minangkabau philosophy, alam takambang jadi guru — nature is our teacher. Using natural

materials is a form of respect for nature and for God who created it. Our religious leaders constantly remind us that protecting nature is the same as protecting faith." (Interview, 29 October 2025)

This finding indicates that eco-theological values are not limited to the individual level but have become institutionalized within the customary and religious structures of the Minangkabau community.

Community Health Knowledge and Perceptions of Natural Packaging

Field findings consistently indicated that informants associate the use of coconut leaves not only with cultural heritage but also with health benefits perceived through direct practical experience. Yeni (52), a Ketupat and vegetable trader at Pasar Sentral Yogyakarta with fifteen years of trading experience, stated:

My customers are mostly Minangkabau migrants. They always say Ketupat wrapped in leaves tastes better and is healthier than those made with plastic. With plastic Ketupat, they say it smells odd and spoils quickly. I feel the same Ketupat wrapped in leaves lasts longer. Perhaps it is because the leaves have their own beneficial properties. (Interview, 10 November 2025)

Yeni's account reflects an empirically grounded community awareness of the superiority of natural over synthetic packaging, articulated through sensory and practical experience rather than scientific language. This community health knowledge carries direct policy relevance: the culturally embedded preference for natural leaf wrappers among Minangkabau communities represents a form of social capital that could effectively inform the design of community-based health promotion campaigns aimed at reducing plastic use in the traditional food sector particularly in areas where plastic adoption has increased markedly in recent years.

Ahmad (58), a Minangkabau migrant in Negeri Sembilan, Malaysia, recounted a personal experience that illuminates the intersection of physical and spiritual health:

I once bought Ketupat wrapped in plastic because it was cheaper and more practical. But after eating it, my stomach felt uncomfortable. Since then, I have always looked for Ketupat wrapped in real leaves. The elders used to say that food is not only about filling the stomach, but also about blessing. I believe that blessing includes health. (Interview, 25 November 2025)

Ahmad's narrative illustrates that within Minangkabau local knowledge, the concept of health is inseparable from spiritual concepts such as *berkah* (divine blessing) an integration of physical and spiritual well-being that constitutes one of the core tenets of eco-theology. This finding aligns with ethnographic research on traditional food systems in sub-Saharan Africa, where community knowledge regarding food safety grounded in natural materials is similarly

interwoven with spiritual belief systems (Owusu-Kwarteng et al., 2024). Saifullah further reinforced this observation, noting that community enthusiasm for traditional foods made with natural materials remains high even amid competition from modern food products, sustained by a collective awareness that "food made with natural ingredients is healthier."

Cultural Resilience, Intergenerational Transmission, and Social Cohesion

Within diaspora environments, where Minangkabau identity must negotiate and coexist with other cultural identities, traditional food emerges as one of the most visceral and persistent expressions of belonging. Andre (32), a student from Padang pursuing studies at Universitas Gadjah Mada in Yogyakarta, stated:

When I miss home, the first thing I look for is Padang food, especially Ketupat and rendang. Eating Ketupat wrapped in leaves feels different from those made with plastic. I once tried a plastic-wrapped Ketupat at a food stall near my boarding house — it tasted bland and had no aroma. That is why I am willing to walk quite far to a Padang restaurant that uses real leaves. Eating Ketupat wrapped in leaves feels like being brought back to my village. (Interview, 12 November 2025)

Andre's account illustrates how food functions as a trigger for memory and emotional connection what Sutton conceptualizes as food memory. Ketupat operates not merely as a source of carbohydrates but as a medium through which past experience is relived and attachment to the homeland is sustained within diaspora life. Knowledge transmission regarding Ketupat-making occurs through informal mechanisms within families and communities. Rohana (65), a Minangkabau migrant in Negeri Sembilan who has resided in Malaysia for forty years, described her practice of intergenerational transmission:

Every year I teach my children and grandchildren how to make Ketupat, especially before Eid. At first, they struggled with weaving coconut leaves, but eventually they managed. I told them: this is a heritage from our ancestors; do not let it disappear. Here, many sell plastic Ketupat, but I still make mine from leaves. It may be more troublesome, but this way my children and grandchildren know their identity as Minangkabau people. (Interview, 26 November 2025)

This process of intergenerational transmission faces its own challenges in the digital era. However, several younger informants actively leverage technology to learn and sustain the tradition. Putri (24), a Minangkabau migrant in Yogyakarta who is active in the Perantau Minang Jogja community, explained:

I learned to make Ketupat from YouTube and through video calls with my grandmother in Padang. Now I can do it, and I am often asked to help make Ketupat

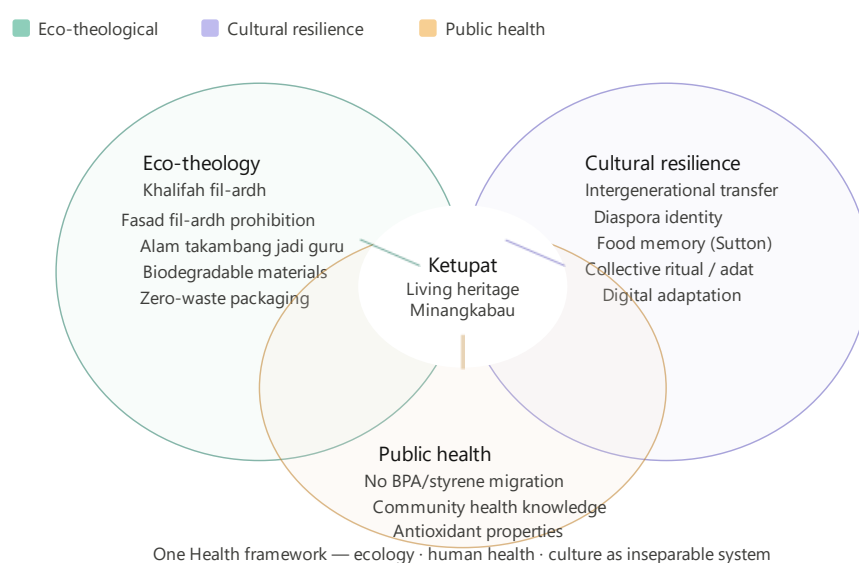
for community events. It is enjoyable we gather, talk, and eat together. This is our way of maintaining togetherness while living away from home. (Interview, 15 November 2025)

This phenomenon suggests that the Ketupat tradition is not static but dynamic and adaptive a form of invented tradition in the diaspora context that employs digital media without relinquishing its cultural substance (Ranger et al., 1983).

Traditional food vendors including Riko in Padang and Yeni in Yogyakarta demonstrate that maintaining the authenticity of the tradition including the use of natural material constitutes an effective commercial strategy. The quality, aroma, and flavour produced by coconut leaf wrappers provide a competitive advantage that cannot be replicated by synthetic packaging, cultivating a consumer segment that consciously selects traditional food on the basis of authenticity, health consciousness, and perceived sustainability. This cultural resilience is neither exclusionary nor defensive in character. Riko articulated this spirit clearly:

Let them sell plastic Ketupat if they wish that is their choice. What matters is that we maintain quality and authenticity. Buyers can judge for themselves. The important thing is that we remain steadfast (*istiqamah*). (Interview, 28 October 2025)

This disposition reflects the Minangkabau customary value of harmonious coexistence, a form of social wisdom that extends into the culinary domain.



DISCUSSION

Eco-theological Findings in Cross-cultural Perspective

The eco-theological findings of this study situate the Minangkabau Ketupat tradition within a broader cross-cultural anthropological conversation. Analogous to the use of banana and sal leaves in South India, documented as possessing antimicrobial properties while simultaneously encoding Hindu ecological values (Tejeswara Rao et al., 2025) and to the use of corn husks in Mexican tamales, which integrates pre-Hispanic cultural identity with contemporary community life (González Jácome, 2018), the Ketupat tradition demonstrates that leaf-based food packaging systems consistently function as convergence points for ecological, spiritual, and health values across diverse cultural contexts.

The theoretical contribution of this study lies in demonstrating that the Islamic principle of *khalifah fil-ardh* operates not as an abstract doctrinal category but as an institutionalized everyday practice a finding that extends Nasr's framework of Islamic ecology into the domain of traditional food studies and material packaging culture (Nasr, 1994). This implies a new analytical proposition: traditional food practices grounded in natural materials may be understood as living eco-theological sites, wherein theological obligation, ecological behaviour, and cultural memory are simultaneously enacted. This conceptualization advances both food anthropology by providing a religiously situated framework for understanding material food choices and Islamic environmental ethics by grounding abstract principles in ethnographically documented practice.

Health Implications: Bridging Community Knowledge and Biomedical Evidence

It is essential to emphasize that this study documents community knowledge and perceptions regarding the health benefits of coconut leaf wrappers, rather than establishing biomedical proof of those benefits through clinical measurement. Nevertheless, the community knowledge documented here aligns substantively with existing scientific evidence. Research by Laelasari et al. found BPA and phthalate residues in 70% of food samples packaged in plastic in Indonesia, while foods packaged in traditional leaves contained no detectable harmful chemical contaminants (Laelasari et al., 2021). Kora's research on analogous practices in India confirmed that leaves are rich in antioxidants and bioactive compounds capable of enhancing nutritional value and food preservation, while Lipoeto et al. documented that leaf-based food packaging contributes positively to consumer health outcomes across Asia-Pacific contexts (Lipoeto et al., 2013).

Of equal policy significance, however, is the implication of the community beliefs themselves. The culturally embedded preference for natural leaf wrappers among Minangkabau communities constitutes a form of social capital with considerable potential for community-based health promotion. Interventions designed to reduce plastic use in the traditional food sector would be substantially more effective if they build upon rather than bypass existing cultural values and community health knowledge systems. This approach is well-supported by the health promotion literature, which consistently demonstrates the superior efficacy of culturally congruent interventions over top-down regulatory approaches in Asian community contexts.

Comparison with internationally recognized traditional food systems further strengthens this argument. The Mediterranean diet and Japanese washoku both recognized by UNESCO as Intangible Cultural Heritage demonstrate that traditional food systems can simultaneously function as markers of cultural identity, community-based health promotion systems, and models of ecological sustainability (Destoumieux-Garzón et al., 2018). The Minangkabau Ketupat tradition exhibits all of these characteristics, despite not yet having received commensurate formal recognition.

An Integrative Model: Ketupat as Living Heritage

The three analytical dimensions examined in this study eco-theology, public health, and cultural resilience do not operate in isolation; rather, they constitute an integrated system of knowledge in which each dimension reinforces and is reinforced by the others. The conceptual model presented in Figure 1 illustrates how these three dimensions converge in the Ketupat tradition, situated within the overarching framework of One Health an integrative approach that recognizes the inseparability of human health, ecosystem health, and cultural well-being (Mumford et al., 2023). In the Minangkabau worldview, this integration has long been practised, predating its formal academic conceptualization.

This integrative model carries substantial implications for policy. At a time when the environmental crisis generated by plastic pollution is intensifying with synthetic packaging accounting for approximately 40% of total global plastic production, the majority of which enters natural ecosystems (United Nations Environment Programme, 2021), the Ketupat tradition offers a demonstrable model of zero-waste food packaging aligned with the principles of the circular economy. At a time when concerns regarding food safety and chemical migration from packaging are gaining prominence in public health policy, this tradition offers a historically tested and culturally validated alternative. At a time when globalization threatens

cultural homogenization, Ketupat demonstrates that the distinctiveness of local cultural knowledge can not only endure but remain globally relevant. These policy implications are not speculative; they are grounded in a convergence of ethnographic evidence, biomedical literature, and ecological research that together point toward the urgent value of integrating indigenous food knowledge into national food safety frameworks and sustainable packaging policy.

Several important limitations of this study warrant explicit acknowledgement. First, the geographic scope is confined to three field sites Padang, Yogyakarta, and Negeri Sembilan and findings therefore cannot be directly generalized to the full range of Minangkabau communities in other diaspora locations, including Riau, Jambi, or communities in the Netherlands and Australia. Second, as an interpretive qualitative study, the research is subject to potential researcher bias, particularly in the processes of thematic coding and narrative interpretation. Although member checking, source triangulation, and method triangulation were systematically employed to mitigate this risk, residual bias cannot be entirely eliminated. Third, the study did not conduct direct measurement of health outcomes such as biomarkers of chemical exposure among informants or morbidity data associated with synthetic packaging use. Claims regarding health benefits in this study are therefore perceptual and supported by alignment with the existing biomedical literature, rather than established through clinical measurement. This limitation points toward an important direction for future research: mixed-methods studies that combine the ethnographic depth of qualitative inquiry with biomedical testing of health outcomes among communities with differential exposure to natural versus synthetic food packaging.

CONCLUSIONS

This study demonstrates that the Minangkabau Ketupat tradition centered on the use of young coconut leaves as food wrappers is a multidimensional cultural practice in which Islamic eco-theological values, community health knowledge, and cultural resilience mechanisms do not operate in parallel but are mutually constitutive. The proposed integrative framework, the Eco-theological, Health, and Cultural Resilience (EHCR) model, shows that a single traditional food practice simultaneously fulfills spiritual trusteeship (*khalifah fil-ardh*), protects community health by eliminating exposure to synthetic chemical contaminants, and reproduces cultural identity and social cohesion in both homeland and diaspora contexts. These findings advance existing scholarship by demonstrating that Islamic eco-theology functions not as abstract doctrine but as institutionalized everyday practice observable in the decisions of food

vendors, the rituals of customary leaders, and the intergenerational pedagogies of diaspora households.

Theoretically, this study contributes to the anthropology of religion, food anthropology, and One Health theory. First, the principle of *khalifah fil-ardh* is empirically shown to be a lived category reproduced through culinary tradition. Second, traditional food practices grounded in natural materials function as living eco-theological sites where theology, ecology, health, and cultural memory converge. Third, this study provides ethnographic evidence that a spiritually motivated cultural practice directly supports a core One Health tenet: biodegradable leaf packaging sustains ecosystem health, eliminates plastic waste and reduces exposure to endocrine-disrupting chemicals, while cultural transmission preserves the social cohesion that enables communities to sustain health-protective behaviors. Policy implications range from local levels (community-based campaigns grounded in customary authority in West Sumatra) to regional levels (micro-grant schemes for traditional vendors), national levels (formal recognition of leaf-based packaging as a food safety standard by Indonesia's BPOM and Ministry of Health), and international levels (nomination of *Ketupat* as UNESCO Intangible Cultural Heritage).

In practical terms, public health nutritionists and community development practitioners are advised to leverage the cultural authority of *Ketupat* for nutritional interventions and non-communicable disease prevention, as well as to support the formalization of *Ketupat*-making as a community skill through hybrid pedagogical models combining intergenerational in-person transmission and digital archiving. Future research should combine biomedical measurement (biomarker analysis of BPA and phthalates) for empirical health outcome data, conduct comparative studies across the broader Minangkabau diaspora, and undertake longitudinal studies of tradition transmission among millennial and Generation Z cohorts. Ultimately, the Minangkabau *Ketupat* tradition is a living heritage that integrates the obligation to protect the earth, the knowledge to protect human health, and the commitment to protect cultural identity. Amid accelerating plastic pollution and the erosion of indigenous knowledge systems, this tradition offers a historically validated, community-embedded, and spiritually grounded model for sustainable food practice. The challenge is not to preserve it as a museum artifact, but to actively integrate its logic into twenty-first-century governance of food safety, environmental policy, and cultural heritage.

REFERENCES

- Abdul Raji, M. N., Ab. Karim, S., & Esa, J. H. (2024). Pengaruh Alam dan Budaya dalam Pembentukan Makanan Tradisional di Lembah Lenggong, Perak. *Kajian Malaysia*, 42(2), 261–285. <https://doi.org/10.21315/km2024.42.2.12>
- Aswani, S., Lemahieu, A., & Sauer, W. H. H. (2018). Global trends of local ecological knowledge and future implications. *PLOS ONE*, 13(4), e0195440. <https://doi.org/10.1371/journal.pone.0195440>
- Baidya, A., & Dev, M. (2025). A Comprehensive Review on Analyzing the Effectiveness of Different Leaves in Food Packaging: A Sustainable Alternative to Plastics. *Swami Vivekananda University Press*, (SE-Articles), 60–86. <https://swamivivekanandauniversitypress.com/index.php/svup/article/view/283>
- Chatterjee, P., Chauhan, A. S., Joseph, J., & Kakkar, M. (2017). One Health/EcoHealth capacity building programs in South and South East Asia: a mixed method rapid systematic review. *Human Resources for Health*, 15(1), 72. <https://doi.org/10.1186/s12960-017-0246-8>
- Destoumieux-Garzón, D., Mavingui, P., Boetsch, G., Boissier, J., Darriet, F., Duboz, P., Fritsch, C., Giraudoux, P., Le Roux, F., Morand, S., Paillard, C., Pontier, D., Sueur, C., & Voituron, Y. (2018). The One Health Concept: 10 Years Old and a Long Road Ahead. *Frontiers in Veterinary Science*, Volume 5-. <https://doi.org/10.3389/fvets.2018.00014>
- Ermanto, E., Triwira Dhika, V., Saddhono, K., Susanto, G., & Ardi, H. (2025). Rendang on the Menu: A Flavorful Approach to Teaching Indonesian Language and Culture. *International Journal of Society, Culture and Language*, 13(1), 308–327. <https://doi.org/10.22034/ijscsl.2025.2054355.3937>
- González Jácome, A. (2018). Maíz y alimentación. Historia breve de un largo viaje. *Revista de Geografía Agrícola*, (60), 9–69. <https://doi.org/10.5154/r.rga.2017.59.007>
- Halden, R. U. (2010). Plastics and Health Risks. *Annual Review of Public Health*, 31(1), 179–194. <https://doi.org/10.1146/annurev.publhealth.012809.103714>
- Hartati, D., & Karim, A. (2023). Identitas Kuliner Nusantara Dalam Kumpulan Puisi Aku Lihat Bali Karya Mas Triadnyani Culinary Identity of the Archipelago in A Collection of Poetry I See Bali by Mas Triadnyani Dian Hartati dan Ahmad Abdul Karim Universitas Singaperbangsa Karawang PENDAHU. *Jenteran: Jurnal Kajian Sastra*, 12(1), 24–36.
- Hassel, C. A. (2014). Reconsidering nutrition science: critical reflection with a cultural lens. *Nutrition Journal*, 13(1), 42. <https://doi.org/10.1186/1475-2891-13-42>
- Heriyati, A., Afriyani, F., Romli, H., Pratiwi Putri, I., & Mulyati, M. (2024). Worksop Digital Marketing Promosi Penjualan Keripik Daun Kelor Hasil Industri Kreatif Mahasiswa Universitas Indo Global Mandiri. *I-Com: Indonesian Community Journal*, 4(3), 2021–2131. <https://doi.org/10.33379/icom.v4i3.5243>
- Ibrahim, I., & Sillehu, S. (2022). Identifikasi Aktivitas Penggunaan Pestisida Kimia yang Berisiko pada Kesehatan Petani Hortikultura. *JUMANTIK (Jurnal Ilmiah Penelitian Kesehatan)*, 7(1), 7. <https://doi.org/10.30829/jumantik.v7i1.10332>
- Juhani, S., Maku, H., Edu, A. L., & Gunawan, V. A. (2025). Traditional Beliefs as an Ecotheological Force for Sustainability: Reinterpreting Mori Keraéng Amid the Climate Crisis. *Jurnal Studi Agama Dan Masyarakat*, 21(2), 67–76.
- Khawismaya, H. P. K., Dei, K. I., Setyowati, L., Wijayati, P. A., & Wijanarko, N. B. (2024). Merawat Tradisi Di Tengah Modernisasi: Desa Tenganan Pegringsingan–Bali. *Jurnal Penelitian Pendidikan Sejarah UHO*, 9(2), 155–161.
- Koentjaraningrat. (1990). *Pengantar Ilmu Antropologi*. Rineka Cipta.
- Laelasari, E., Anwar, A., & Puspita, T. (2021). Perbandingan Risiko Kesehatan Penggunaan Aditif Ftalat Dan Non Ftalat Pada Bahan Plastik Kemasan Makanan. *Jurnal Ekologi Kesehatan*, 20(1), 21–35. <https://doi.org/10.22435/jek.v20i1.3683>

- Lipoeto, N. I., Geok Lin, K., & Angeles-Agdeppa, I. (2013). Food consumption patterns and nutrition transition in South-East Asia. *Public Health Nutrition*, 16(9), 1637–1643. <https://doi.org/DOI: 10.1017/S1368980012004569>
- Miles, M. B., Huberman, A. M., & Saldana, J. (2014). *Qualitative data analysis*. sage.
- Mumford, E. L., Martinez, D. J., Tyance-Hassell, K., Cook, A., Hansen, G. R., Labonté, R., Mazet, J. A. K., Mumford, E. C., Rizzo, D. M., Togami, E., Vreedzaam, A., & Parrish-Sprowl, J. (2023). Evolution and expansion of the One Health approach to promote sustainable and resilient health and well-being: A call to action. *Frontiers in Public Health*, 10. <https://doi.org/10.3389/fpubh.2022.1056459>
- Naldo, J., Tarigan, A. A., & Warfete, U. (2023). Dialectic of Tradition's Strength and Demand for Flexibility: A Study of Minang Families in Yogyakarta. *JSW (Jurnal Sosiologi Walisongo)*, 7(1), 13–24. <https://doi.org/10.21580/jsw.2023.7.1.14101>
- Nasr, S. H. (1994). *Religion and The Order of Nature*. Oxford University Press.
- Naurasari, Z., Muhammad, B. G., Hamida, I. N., & Septy, D. A. (2025). “Dari Dapur Ke Dunia : Eksplorasi Peran Rendang Dalam Diplomasi Kuliner Indonesia .” 640–648.
- Nguyen-Viet, H., Doria, S., Tung, D. X., Mallee, H., Wilcox, B. A., & Grace, D. (2015). Ecohealth research in Southeast Asia: past, present and the way forward. *Infectious Diseases of Poverty*, 4(1), 5. <https://doi.org/10.1186/2049-9957-4-5>
- Owusu-Kwarteng, J., Kehinde, B., Ohomeng-Boahen, G., Kojo Aduampong Mantey, J., Decardi-Nelson, T., & Agyei, D. (2024). The role of indigenous and traditional foods in achieving food security in Africa: A bibliometric snapshot and farm-to-fork perspective. *CABI Reviews*. <https://doi.org/10.1079/cabireviews.2024.0022>
- Pavithra, M., Keshavachandra, K., & Sridhar, K. R. (2023). Ethnic Nutritional, Medicinal, and Packaging Values of Leaves. In *Ethnic Knowledge and Perspectives of Medicinal Plants* (pp. 481–517). Apple Academic Press.
- Ramirez, L., & Soto, C. (2025). Global Society and Knowledge Review. *Global Society and Knowledge Review*, 3(9), 31–45.
- Ranger, T., Hobsbawm, E., & Ranger, T. (1983). The invention of tradition in colonial Africa. *Perspectives on Africa: A Reader in Culture, History, and Representation*, 450–451.
- Refisrul. (2018). Lamang Dan Tradisi Malamang Pada Masyarakat Minangkabau. *Jurnal Penelitian Sejarah Dan Budaya*, 3(02), 772–796. <https://doi.org/10.36424/jpsb.v3i02.2>
- Rocillo-Aquino, Z., Cervantes-Escoto, F., Leos-Rodríguez, J. A., Cruz-Delgado, D., & Espinoza-Ortega, A. (2021). What is a traditional food? Conceptual evolution from four dimensions. *Journal of Ethnic Foods*, 8(1), 38. <https://doi.org/10.1186/s42779-021-00113-4>
- Ruswanda, A. S. (2025). Mengkaji Konsep Ekoteologi Menurut Nasaruddin Umar. *Jurnal Keislaman*, 8(2), 532–545. <https://doi.org/10.54298/jk.v8i2.667>
- Supandi, M. D., Khoiri, M. A., Al Azhmi, I. G., Munawar, A. M., & Nasution, A. (2025). Revisiting Deep Ecology through Qur'anic Exegesis: Comparative Perspectives from al-Sha'rawi and Fazlun Khalid. *ZAD Al-Mufassirin*, 7(2), 306–326. <https://doi.org/10.55759/zam.v7i2.332>
- Suryani, Dafriani, P., Patra, A., & Resmiati. (2024). *Virgin Coconut Oil Dalam Perspektif Nutrisi Modern*. (October).
- Tejeswara Rao, D., V R, A., M Nair, A., & Prasad, G. (2025). Restoring Nature through Culture: Ecological Significance of India's Sacred Plants. *SSRN Electronic Journal*. <https://doi.org/10.2139/ssrn.5659410>
- United Nations Environment Programme. (2021). Making Peace with Nature. *Making Peace with Nature*. https://wedocs.unep.org/bitstream/handle/20.500.11822/37946/UNEP_AR2021.pdf
- United Nations Environment Programme. (2021). Planetary Action. In *UNEP* (Vol. 119,

Number 5). <https://doi.org/10.1007/s00063-024-01190-4>
Widiastuty, H., & Anwar, K. (2025). Ekoteologi Islam : Prinsip Konservasi Lingkungan dalam Al-Qur ' an dan Hadits serta Implikasi Kebijakannya. *Risalah, Jurnal Pendidikan Dan Studi Islam*, 11(1), 465–480.