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Roots in the Highland Mist: Historical Trajectories and Local Wisdom of Gayo Coffee in Aceh as a Living Cultural

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ABSTRACT

Gayo coffee, cultivated in the highland plateaus of Central Aceh at elevations between 1,200 and 1,500 metres above sea level, represents one of Indonesia's most internationally distinguished specialty coffees and one of Southeast Asia's most intricate intersections of agricultural heritage, cultural identity, and indigenous ecological knowledge. This community service study examines the historical trajectories of Gayo coffee cultivation from its pre-colonial introduction through the Dutch colonial plantation era to its contemporary status as a globally traded geographic indication product, while simultaneously documenting the local wisdom (kearifan lokal) systems through which the Gayo people have governed, transmitted, and renewed their coffee-agricultural heritage across generations. Employing ethnographic fieldwork methods—in-depth interviews, participant observation, oral history documentation, and archival research—across four coffee-producing

villages in Bener Meriah Regency, the study identifies six distinct local wisdom categories embedded in the Gayo coffee tradition. Findings demonstrate that these knowledge systems constitute a living cultural heritage whose ecological, social, and economic dimensions demand integrated conservation strategies that honour their community-governed character.

INTRODUCTION

Coffee is among the most culturally saturated agricultural commodities on earth—a plant whose movement across continents has consistently generated not merely economic exchange but the reorganization of social life, the formation of new cultural identities, and the embedding of ecological knowledge within the ritual and material practices of farming communities. In the Indonesian archipelago, no coffee-producing community more vividly exemplifies this cultural saturation than the Gayo people of Central Aceh, whose highland plateau—the Tanah Gayo—has produced Arabica coffee of internationally recognized quality for over a century while simultaneously developing a constellation of indigenous knowledge systems, customary governance practices, and ceremonial traditions that are inseparable from the coffee plant itself. The Gayo highlands, encompassing the modern administrative territories of Bener Meriah, Aceh Tengah, and Gayo Lues regencies, represent one of Indonesia's most important coffee-producing zones: approximately 95,000 hectares of coffee gardens are cultivated by an estimated 40,000 smallholder household farming units, generating annual production volumes that have consistently positioned Indonesian Gayo coffee as a premium product in European and North American specialty coffee markets (Directorate General of Plantations, 2022). Yet the cultural dimensions of this production system—the local wisdom that governs land use, quality standards, water management, and social relations within the coffee community—have received substantially less scholarly and policy attention than the commodity's agronomic and economic dimensions.

The concept of kearifan lokal—local wisdom or indigenous knowledge—occupies an increasingly central position in Indonesian cultural policy and development discourse, formalized through Law No. 32 of 2009 on Environmental Protection and Management, which explicitly mandates the recognition and integration of local communities' environmental wisdom into national natural resource governance. Muhsyanur (2020, 2023) defining local wisdom as a view of life, knowledge, and various life strategies in the form of activities carried out by local communities in answering various problems in meeting their needs; This definition emphasizes that local wisdom is not just an artifact of past cultures but a living, adaptive, and problem-solving knowledge system in community life. In the context of Gayo coffee, Local Wisdom (Muhsyanur, 2020) encompasses a sophisticated body of practical ecological knowledge about soil management, microclimate, water cycling, and pest management that has been validated over

generations of observation and practice—knowledge that, as Berkes (2012) argues in his foundational analysis of traditional ecological knowledge systems, frequently encodes empirical insights that parallel and sometimes exceed what formal agronomic science has independently discovered.

The historical trajectory of Gayo coffee cultivation traces an arc from pre-colonial indigenous agroforestry practices through the profound disruptions of Dutch colonial plantation development to the complex negotiations of postcolonial commodity markets, geographic indication certification, and the global specialty coffee movement. The Dutch colonial administration's introduction of systematic Arabica coffee cultivation in the Gayo highlands in the early twentieth century—primarily through the gedong plantation system centred in the area around Takengon—fundamentally transformed the social and ecological organization of highland agriculture, introducing forms of land tenure, labour organization, and market orientation that partially displaced but never fully eliminated the indigenous agroforestry systems through which Gayo communities had previously related to forest-integrated cultivation. Pelzer (1978), in his comprehensive analysis of Dutch colonial agricultural policy in Sumatra, documents how the Gayo highlands were incorporated into the colonial plantation economy through a combination of land appropriation, corvée labour requirements, and the systematic displacement of traditional shifting cultivation practices—a historical process whose consequences for indigenous land rights, traditional knowledge systems, and community governance structures continue to shape the contemporary coffee landscape of Central Aceh.

The global specialty coffee movement of the past three decades has generated new economic opportunities for Gayo coffee producers while simultaneously creating new pressures on the local wisdom systems that have historically governed coffee quality, land management, and community relations within the producing communities. The award of Geographic Indication (GI) status to Kopi Arabika Gayo by the Indonesian government in 2010—subsequently recognized through the ASEAN GI framework—represents a formal acknowledgment of the place-based distinctiveness of Gayo coffee's quality characteristics, yet the implementation of GI governance has raised complex questions about who controls the definition of authentic Gayo coffee, which communities benefit from premium market access, and whether the standardization requirements of formal GI certification systems are compatible with the diversity and flexibility inherent in indigenous local wisdom systems. Rangnekar (2004) argues in his analysis of GI systems in developing countries that the intersection of indigenous knowledge with intellectual property frameworks creates inherent tensions: formal IP protection for traditional knowledge can simultaneously provide economic protection and impose standardizing constraints that reduce the adaptive flexibility that makes indigenous knowledge systems resilient.

Community service research in the Indonesian higher education context—mandated through the national Tri Dharma Perguruan Tinggi framework as one of

universities' three core obligations alongside teaching and research—provides an institutional mechanism for generating academically rigorous knowledge while directly serving community interests in the documentation, analysis, and revitalization of cultural heritage (Muhsyanur et al., 2022). Prasetyo dan Trisyanti (2018) affirms that research-based community service has a dual value: on the one hand it generates scientific knowledge that can be published and integrated into public policy, and on the other hand it provides direct benefits to the communities that are research partners through the recognition, documentation and strengthening of their capacity to maintain and develop their cultural wealth. The five-institution research team that conducted the present study was assembled precisely to mobilize this dual value: combining disciplinary expertise in Islamic history, agronomy, communication studies, anthropology, and social science to produce a multi-perspectival account of Gayo coffee's historical and cultural dimensions that no single institution's capacity could have achieved independently (Jonathan Kera, Daniel Wong, 2024).

Despite Gayo coffee's global prominence and the growing scholarly interest in Indonesian agricultural heritage, the systematic ethnographic documentation of the specific local wisdom practices governing Gayo coffee cultivation—as distinct from its agronomic characteristics or market value—remains strikingly limited in the peer-reviewed literature. Existing studies have predominantly addressed Gayo coffee through commodity chain, food geography, or agronomic quality lenses, while the indigenous knowledge dimensions have been treated either cursorily as cultural background or enthusiastically but superficially in popular and journalistic accounts that lack the methodological rigour required for scholarly documentation and policy engagement. Mubyarto (1995) identify fundamental weaknesses in Indonesian agricultural research that tend to ignore the cultural dimension and local wisdom in traditional farming systems, treating local farmers' knowledge as a variable that needs to be replaced by modern technology rather than as a resource that needs to be understood, validated, and integrated into sustainable agricultural development strategies. The present community service study directly addresses this gap by providing the first systematic multi-disciplinary ethnographic documentation and analysis of Gayo coffee's local wisdom systems, contributing to both the academic literature on indigenous agricultural knowledge in Indonesia and the practical heritage conservation and policy needs of the Gayo coffee-farming community.

METHODE

This study employed a qualitative ethnographic methodology situated within the interpretive paradigm of ethnoecology and cultural heritage studies, integrating multiple complementary data collection methods to produce a triangulated, multi-perspectival account of Gayo coffee's historical trajectories and living local wisdom systems. Fieldwork was conducted across four purposively selected coffee-producing villages in Bener Meriah Regency—Kampung Pante Raya, Kampung Bener Kelipah, Kampung Simpang Tiga Redelong, and Kampung Wih Ilang—

between March and August 2024, within a community service framework established through formal Memoranda of Understanding between the participating universities and the Bener Meriah Regency Cultural Affairs and Tourism Office (Mulyana et al., 2021).

Village selection was guided by maximum variation sampling criteria encompassing elevation gradient (1,220–1,480 metres above sea level), production system diversity (shade-grown traditional agroforestry, semi-intensive, and certified organic smallholder systems), degree of integration with formal GI certification processes, and perceived vitality of local wisdom transmission, enabling systematic cross-site comparison of how different agricultural and institutional contexts shape the preservation or erosion of kearifan lokal. Primary data were generated through five complementary collection methods: (1) in-depth semi-structured interviews conducted in the Gayo language and Indonesian with 68 participants comprising 24 senior coffee farmers (petani kopi tuaq) aged 55 and above selected as primary local wisdom knowledge holders, 18 middle-generation farmers aged 35–54 representing active production practitioners, 12 youth coffee farmers aged 18–34 representing the transmission frontier, 8 traditional customary leaders (reje and imem), and 6 women's group leaders whose organizations play critical roles in post-harvest processing and quality knowledge transmission; (2) participant observation during a full agricultural cycle including land preparation, planting, flowering, harvesting, wet processing (giling basah), dry processing (natural), and marketing activities, generating approximately 240 hours of structured field notes organized around an observation protocol developed through pre-fieldwork consultative workshops with village elders; (3) oral history documentation sessions with 14 senior informants aged 68–87 employing structured narrative elicitation techniques adapted from Portelli's (1991) oral history methodology, with sessions audio-recorded in Gayo and subsequently transcribed and translated by a bilingual research assistant with subsequent member-checking; (4) archival research at the Banda Aceh State Archives (Arsip Nasional Regional Banda Aceh), the Leiden University's KITLV digital archive, and the Bener Meriah Regency Agriculture Office document repository, generating a corpus of colonial-era plantation records, land tenure documents, and administrative reports spanning 1904–1942 that provided historical depth unavailable through oral sources alone; and (5) ethnobotanical transect walks through coffee garden systems at each site, conducted with two elder farmer guides per village, documenting companion plant species, intercropping arrangements, and the ecological rationale provided by farmers for specific garden management decisions.

All Gayo-language interview transcripts were translated into Indonesian and then into English through a two-stage process involving a Gayo-speaking research assistant and a professional academic translator, with back-translation verification for all passages designated as analytically critical. Data analysis followed Spradley's (1980) ethnographic analysis sequence—domain analysis, taxonomic analysis, componential analysis, and cultural theme analysis—supplemented by Miles et al.'s

(2014) interactive model of qualitative data management. Analytical trustworthiness was established through prolonged engagement (six months of continuous fieldwork), data source triangulation across interview, observation, oral history, archival, and ethnobotanical streams, researcher triangulation across the five-institution team, and communicative validation through two community feedback workshops—one at the midpoint of fieldwork and one following preliminary analysis—at which emerging interpretations were presented to community informants for contestation and refinement. Ethical clearance was granted by the UIN Ar-Raniry Research Ethics Committee (Ref. UIN-AR-EC-2024-021), and the Bener Meriah Regency Government endorsed the study through a formal research permit (Ref. 070/167/2024). All participants provided written or witnessed oral informed consent in their preferred language prior to participation.

RESULT AND DISCUSSION

Historical Trajectories: From Pre-Colonial Agroforestry to Global Specialty Market

The oral histories collected across the four field sites, cross-referenced with archival documentation from the Banda Aceh State Archives and the KITLV colonial record collections, reveal a more complex and contested historical narrative of Gayo coffee cultivation than the simplified origin stories frequently reproduced in commercial coffee marketing materials. The earliest oral accounts—preserved by informants aged over 70 who cited their grandparents' and great-grandparents' testimony—describe coffee plants as arriving in the Gayo highlands through two distinct channels that predate Dutch colonial administration: a westward diffusion route through Acehnese coastal traders who had obtained plants from the Arab and Indian merchants active in Banda Aceh's seventeenth- and eighteenth-century trade networks, and an overland transmission from Batak-speaking communities to the south who had themselves received coffee plants through Minangkabau trading contacts. These pre-colonial introduction narratives, while not independently verifiable through surviving documentary sources, are consistent with the broader historical reconstruction of coffee's diffusion through the Indonesian archipelago documented by Clarence-Smith (2003), who traces multiple simultaneous introduction routes operating across the archipelago's trading network from the seventeenth century onward, predating by a century or more the Dutch colonial-era mass plantation development that official histories frequently cite as the moment of introduction.

The Dutch colonial period—formalized in the Gayo highlands following the final military pacification of Central Aceh in 1904 after over three decades of armed resistance—represented a profound rupture in the indigenous organization of coffee cultivation that oral histories consistently describe in terms of loss, displacement, and forced adaptation. Colonial archival records from the Controleur Takengon administrative files (1908–1930) document the systematic appropriation of highland forest land for state-controlled coffee plantations, the imposition of forced labour

(heerendiensten) requiring Gayo men to work on colonial plantations for specified periods each year, and the prohibition of certain traditional land management practices—including the rotational forest-fallow agroforestry systems through which Gayo farmers had historically maintained soil fertility and biodiversity—that conflicted with colonial plantation management principles. Pelzer (1978) documents how Dutch colonial agrarian policy in highland Sumatra operated on the premise that indigenous shifting cultivation was ecologically destructive and economically irrational, a framing that legitimized land appropriation while systematically erasing the sophistication of the indigenous agroforestry knowledge systems it displaced. Elder informants in all four field sites described the colonial plantation era in terms that precisely mirror this dispossession narrative, with oral accounts consistently emphasizing the loss of access to specific garden sites that families had cultivated for multiple generations and the suppression of traditional ceremonies associated with those sites.

The post-independence period from 1945 onward witnessed a gradual reclaiming of coffee cultivation as a community-governed practice, accelerated by the land redistribution policies of the 1950s and the subsequent development of the smallholder coffee sector through national agricultural extension programs. However, this post-independence reconstitution of Gayo coffee farming did not simply restore pre-colonial arrangements: it emerged as a hybrid system in which elements of traditional agroforestry knowledge, colonial-era cultivation techniques, and post-independence agricultural modernization were integrated—sometimes harmoniously, sometimes in tension—within farming practices that continued to be governed by customary social institutions even as formal market integration increased. Stoler (1985), in her comparative analysis of post-colonial agricultural transitions in Sumatra, identifies this hybrid character as characteristic of the colonial legacy in smallholder agriculture throughout the archipelago: indigenous farmers neither simply preserved pre-colonial practices nor fully adopted colonial models but actively synthesized elements of both within adaptive livelihood strategies shaped by available resources, customary obligations, and market opportunities. Fieldwork data from all four Bener Meriah sites corroborated this hybridization pattern: elder farmers consistently described their cultivation practices as integrating their grandparents' traditional knowledge about soil, shade, and water management with the pest control and fertilization techniques introduced through Dinas Pertanian extension programs from the 1970s onward.

The entry of Gayo coffee into the global specialty coffee market from the late 1990s—catalyzed initially by the engagement of Fair Trade certification bodies, subsequently by direct trade relationships with specialty roasters in Europe, North America, and Japan, and formalized through the 2010 Geographic Indication certification—represents the most recent and in many respects the most complex phase of the historical trajectory documented in this study. Oral history and interview data reveal a community deeply ambivalent about the consequences of global market integration: aware of and grateful for the premium prices that

specialty market relationships have made possible for certified producers, yet anxious about the standardization pressures that GI governance and specialty certification systems impose on cultivation practices, the exclusion of communities whose traditional practices do not align with certification requirements, and the commodification of cultural knowledge that was previously held as community commons. This ambivalence resonates with what Neilson and Pritchard (2009) identify as the "governance squeeze" experienced by smallholder coffee producers in global value chains: the simultaneous pressure from upstream buyers demanding quality standardization and from downstream communities insisting on the preservation of practice diversity creates a structural tension that no individual farmer or community organization can resolve unilaterally. The local wisdom systems documented in this study—particularly the traditional quality selection practices of Opok Bener and the communal trade ethics encoded in Mukemel Buke—represent precisely the community governance resources through which Gayo producers have historically navigated such tensions, and whose preservation is therefore essential for maintaining community agency within the global specialty coffee market.

The Living Wisdom System: Six Pillars of Gayo Coffee's Local Wisdom

Systematic analysis of interview, observation, oral history, and ethnobotanical data identified six functionally distinct but mutually reinforcing categories of kearifan lokal embedded in the Gayo coffee production system—a taxonomy that emerged inductively from the data through iterative rounds of domain and componential analysis rather than being imposed from pre-existing classificatory frameworks. These six categories, summarized in Figure 1 below, collectively constitute what Gadgil et al. (1993) term a "community-level biodiversity register"—a distributed, socially organized system for generating, storing, validating, and transmitting ecological and social knowledge that operates through cultural rather than archival mechanisms. The most ecologically sophisticated of these six categories is the planting ritual system known as Uning Mungerje—literally, "the ceremony of asking permission from the soil"—which prescribes specific timing windows for land clearing, planting, and transplanting based on a lunar-agricultural calendar that integrates observations of cloud formation patterns, river water colour changes, and specific bird call sequences as phenological indicators of optimal planting conditions. Ethnobotanical transect walk data confirmed that the companion plant species maintained in coffee gardens by farmers who actively practise Uning Mungerje protocols—including specific leguminous shade trees, insect-attracting flowering understory plants, and aromatic herbs believed to repel certain pests—correspond remarkably closely to the polyculture configurations that contemporary agroecology research has independently identified as optimal for Arabica coffee productivity and ecosystem resilience in highland tropical environments (Perfecto et al., 2014).

The traditional quality selection system of Opok Bener—the practice of exclusively hand-picking coffee cherries at full red ripeness, guided by a precisely calibrated visual and tactile quality assessment protocol transmitted through apprenticeship rather than formal training—constitutes perhaps the most economically consequential of the six local wisdom categories, as it directly generates the quality characteristics that attract premium prices in specialty coffee markets. Interview data with senior farmers reveal that Opok Bener encompasses not merely a harvesting technique but an entire epistemological system for understanding coffee cherry ripeness that integrates visual colour gradations (the distinction between at least seven stages of ripeness recognized in Gayo terminology versus the single dichotomy of ripe/unripe employed in most formal quality assessment frameworks), tactile assessment of firmness and surface texture, olfactory evaluation of fragrance at the point of detachment, and even acoustic assessment of the characteristic sound made when a perfectly ripe cherry separates from the branch. Wiersum et al. (2004), in their analysis of indigenous quality assessment systems in Indonesian agroforestry, identify this multi-sensory, contextually embedded quality assessment knowledge as fundamentally different in character from the measurable, documentable quality criteria required by formal certification systems—a difference that creates practical challenges for the integration of Opok Bener into GI governance frameworks designed around standardizable, auditable quality indicators.

The governance dimension of Gayo coffee's local wisdom is most comprehensively expressed through the customary institution of Sarak Opat—the "four pillars" governance system that distributes authority over land use, water management, conflict resolution, and community welfare across four complementary roles: the reje (customary chief), the imem (Islamic religious leader), the petue (elder knowledge holder), and the rakyat (community representative body). Fieldwork data indicate that Sarak Opat continues to exercise meaningful governance authority over coffee garden land use in the two most culturally conservative field sites (Kampung Pante Raya and Kampung Bener Kelipah), where decisions about forest clearance for new coffee garden establishment, water access rights during drought periods, and the resolution of boundary disputes between neighbouring gardens are all processed through Sarak Opat deliberation before—and sometimes instead of—being referred to formal administrative channels. Benda-Beckmann et al. (2006) analyze comparable legal pluralism patterns in Indonesian rural governance as generating what they term "forum shopping" by community members navigating disputes: the availability of both customary and formal legal channels gives community members strategic options that can simultaneously preserve social relationships (through customary resolution) and create documentary records (through formal channels) depending on contextual requirements. Sarak Opat's persistence as a preferred governance forum for coffee-related land and water disputes in the most culturally intact field sites suggests that

it continues to provide services—particularly in relational trust-building and community legitimacy—that formal administrative channels do not replicate.

The most endangered of the six local wisdom categories is Didong Kopi—the oral literary tradition of coffee-related poetry and narrative performance that historically served as the primary vehicle for transmitting coffee cultivation knowledge, community histories, and social values across generations within the Gayo cultural system. Didong is a classical Gayo performative genre involving vocal improvisational poetry accompanied by rhythmic percussion, traditionally performed at communal gatherings including wedding ceremonies, harvest celebrations, and the Uning Mungerje planting rituals; coffee-specific Didong compositions encode detailed practical knowledge about cultivation techniques, pest recognition, soil management, and market ethics within melodic structures specifically designed to facilitate memorization and oral transmission. Data from interviews with elderly master practitioners (juara didong) indicate that the number of active performers capable of delivering full-length coffee-specific Didong compositions has declined from an estimated 40–50 across the Gayo highlands in the 1980s to fewer than eight currently active practitioners, all aged over 60, with no identified successors in any of the four field sites. Zulkifli dan Abubakar (2019) documenting a similar decline in the transmission of the didong art among the younger generation of Gayo, identifying a combination of the shift in entertainment preferences to digital media, the weakening of the communal ties that constitute the social context for the performance of the didong, and the absence of a formal mechanism for documenting or teaching the didong repertoire as factors driving the gradual extinction of one of the richest systems of knowledge transmission in the archipelago's agricultural traditions. The imminent loss of Didong Kopi represents not merely a cultural impoverishment but a knowledge security threat: as the oral repositories of Gayo coffee cultivation wisdom age out without successors, the practical ecological knowledge encoded in their performances becomes irretrievably inaccessible to the farming communities that need it most.

Table 1. Taxonomy of Kearifan Lokal (Local Wisdom) Categories Embedded in the Gayo Coffee Production System, with Core Values and Current Transmission Status *Transmission Status*

Kearifan Lokal (Local Wisdom)	Sasaran / Target	Nilai Utama / Core Value	Status Transmisi / Transmission Status
Uning Mungerje (Coffee cultivation ritual)	Soil preparation & planting season	Ecological harmony & communal reciprocity	Actively practised
Urum Inemen (Shared coffee drinking ceremony)	Inter-household social bonding	Brotherhood & conflict resolution	Partially eroded

Opop Bener (Traditional picking selection)	Hand-selective red-cherry harvesting	Quality discipline & environmental stewardship	Actively practised
Mukemel Buke (Dignified trade ethics)	Market transaction norms	Honesty, fair price & communal trust	At risk of loss
Sarak Opat (Four-pillars governance)	Land rights & water management	Collective governance & customary law	Partially eroded
Didong Kopi (Coffee poetry & oral narrative)	Knowledge transmission to youth	Cultural identity & historical memory	Endangered

Note. Classification developed inductively through domain and componential analysis of 68 interviews, 240 hours of participant observation, and 14 oral history sessions across four field sites in Bener Meriah Regency. Transmission status categories: Actively practised = practised by majority of farmers across age cohorts; Partially eroded = practised primarily by older cohorts with limited youth uptake; At risk of loss = practised by fewer than 20% of farmers; Endangered = fewer than ten known active practitioners.

Intergenerational Transmission, Cultural Erosion, and Pathways for Revitalisation

The intergenerational transmission of Gayo coffee's local wisdom systems operates through a constellation of mechanisms—apprenticeship within family farming units, observation and participation in communal ritual events, informal peer learning within working groups, and formal instruction within customary governance contexts—each of which is experiencing varying degrees of structural disruption as a consequence of demographic, economic, and cultural changes that have accelerated markedly over the past two decades. Fieldwork data reveal a pronounced age gradient in local wisdom knowledge proficiency that is consistent and statistically striking across all four field sites: elder farmers aged 55 and above demonstrated comprehensive knowledge of all six kearifan lokal categories documented in this study; middle-generation farmers aged 35–54 showed partial knowledge—typically proficient in the production-relevant categories (Uning Mungerje, Opok Bener) but significantly less familiar with the governance and ceremonial categories (Sarak Opat, Urum Inemen, Didong Kopi); and youth farmers aged 18–34 demonstrated familiarity with only the most economically immediately relevant practices, primarily the quality selection elements of Opok Bener that certification bodies have incorporated into formal training programs, while showing limited awareness of the ecological, social, or ceremonial dimensions of the broader local wisdom system. Gadgil et al. (1993) identify this pattern of knowledge segmentation across age cohorts as characteristic of traditional ecological knowledge systems undergoing transition: market integration tends to selectively preserve the

commercially valorized elements of local knowledge while accelerating the erosion of elements whose value is primarily internal to community social and ecological systems rather than externally legible in market terms.

The primary driver of youth disengagement from Gayo coffee's local wisdom transmission identified through interview and focus group data was not ignorance or indifference but a rational economic calculation shaped by the structure of contemporary coffee market incentives: premium market relationships and GI certification systems reward measurable quality consistency over the holistic, relationship-based quality knowledge of Opok Bener; agricultural extension programs transmit agrochemical management protocols that produce predictable yields but displace the ecological literacy embedded in Uning Mungerje; and the time demands of formal education, smartphone-mediated entertainment, and urban employment aspirations compete directly with the extended intergenerational apprenticeship contexts within which Sarak Opat governance knowledge and Didong Kopi performance repertoires have traditionally been transmitted. Nababan (1995) analyzing similar dynamics in the context of traditional ecological knowledge systems of indigenous peoples in Kalimantan, concludes that the erosion of local knowledge in the younger generation is often not an active rejection of traditional values but a rational response to economic and social incentives that divert their attention and energy to more directly valued domains of knowledge in the market economy. This diagnosis is consequential for revitalization strategy: it suggests that programs targeting individual attitudes or knowledge in the abstract are less likely to succeed than interventions that restructure the incentives, institutional opportunities, and social contexts within which intergenerational knowledge transmission occurs.

Community feedback workshops conducted at the midpoint and conclusion of the fieldwork period generated a set of community-identified revitalization priorities that directly informed the practical recommendations of the present study. Participants across all four sites identified three intervention domains as most urgently needed: first, the systematic audio-visual documentation of Didong Kopi performances by the remaining active master practitioners, creating an accessible archive before their knowledge is permanently lost; second, the integration of local wisdom content—particularly Sarak Opat governance principles, Opok Bener quality assessment practices, and the ecological knowledge embedded in Uning Mungerje—into the formal curriculum of the vocational agricultural school (SMK Pertanian) operating in Bener Meriah town, providing an institutional context for knowledge transmission that does not depend solely on family apprenticeship systems; and third, the advocacy for GI governance reform that would recognize and reward traditional local wisdom practices—particularly Opok Bener quality selection—within the certification framework, creating economic incentives for their continued practice rather than treating standardization as the primary quality governance mechanism. Keraf (2010) affirming that the sustainable preservation of local wisdom can only be achieved if the values of traditional knowledge are

recognized and valued in the prevailing economic and institutional systems; Without institutional recognition and incentives, documentation and education efforts alone will not be able to reverse the trend of knowledge erosion caused by market dynamics and modernization.

The community service outcomes generated through the present initiative—including the completion of a Gayo coffee local wisdom documentation atlas (Atlas Kearifan Lokal Kopi Gayo Bener Meriah), the facilitation of two Didong Kopi recording sessions with the three most knowledgeable elder practitioners identified across the field sites, and the submission of a formal curriculum integration proposal to the Bener Meriah Regency Education Office—represent tangible contributions to the revitalization priorities identified by community participants, while recognizing that sustainable revitalization requires institutional commitments that transcend any single university-community partnership. The documentation atlas, co-produced with community members who reviewed and corrected factual content, serves both as an archival resource for future generations and as a practical advocacy tool for the communities' own engagement with regional government, GI governance bodies, and international coffee market partners regarding the recognition and protection of their knowledge heritage. Prasetyo dan Trisyanti (2018) argue that the most valuable community service research outcomes are those that strengthen communities' own capacity to advocate for their interests rather than simply providing researchers with data for external publications; the documentation atlas, in being authored by and for the Gayo coffee community while also meeting the standards of academic rigour required for policy engagement, attempts to honour both imperatives simultaneously. The present article contributes the scholarly analytical dimension of this partnership, providing the theoretical frameworks and comparative context through which the documented local wisdom systems can be understood not only as Gayo cultural particulars but as expressions of the universal human capacity to develop sophisticated, adaptive, and beauty-imbued relationships with the agricultural landscapes that sustain community life.

CONCLUSION

This multi-institution community service and ethnographic research study establishes that Gayo coffee's kearifan lokal constitutes a living, multi-dimensional cultural heritage system of exceptional depth and ecological sophistication, encompassing six functionally distinct local wisdom categories—Uning Mungerje, Urum Inemen, Opok Bener, Mukemel Buke, Sarak Opat, and Didong Kopi—whose collective integration has historically generated and sustained the agro-ecological conditions responsible for Gayo coffee's globally recognized quality and whose progressive erosion represents a heritage emergency demanding coordinated institutional response. The study's historical analysis reveals that the current configuration of Gayo coffee's local wisdom system is the product not of unchanged tradition but of centuries of adaptive response to colonial disruption, postcolonial development pressures, and global market integration—a resilience narrative that

underscores both the remarkable adaptive capacity of the Gayo farming community and the genuine fragility of knowledge systems that depend on living human transmission chains now weakened by demographic and economic transition. Based on these findings, the following recommendations are advanced with urgency: (1) the Ministry of Education, Culture, Research and Technology (Kemendikbudristek) should formally register the kearifan lokal of Gayo coffee cultivation—particularly the Opok Bener quality system, Sarak Opat governance institution, and Didong Kopi oral tradition—as components of Indonesia's Intangible Cultural Heritage (Warisan Budaya Takbenda) under the 2010 Cultural Heritage Law, providing formal national recognition that strengthens communities' claims in GI governance negotiations; (2) the IG Kopi Arabika Gayo governance body should undertake a participatory review of GI specification requirements to incorporate traditional quality indicators derived from Opok Bener practice into the formal certification framework, creating economic incentives for traditional quality knowledge transmission; (3) Bener Meriah and Aceh Tengah Regency Education Offices should implement the curriculum integration proposal submitted through this community service initiative, incorporating Gayo coffee kearifan lokal content into SMK Pertanian and SMA vocational programs as a formal muatan lokal subject; (4) the Indonesian National Library (Perpustakaan Nasional) and Banda Aceh State Archives should be resourced to create an open-access digital archive of Didong Kopi performances and oral history recordings generated through this and future documentation initiatives, ensuring that knowledge currently held by a small number of elderly practitioners becomes permanently accessible to the Gayo community and to scholarship; (5) partner universities participating in this initiative should institutionalize an annual Gayo Coffee Cultural Heritage Field School—bringing together students from history, anthropology, agronomy, and communication programs—as a recurring community service activity that simultaneously serves the documentation mandate and builds a new generation of scholars with the linguistic and cultural competencies required for sustained engagement with Gayo heritage; and (6) international specialty coffee importers and certification bodies sourcing Gayo coffee should be engaged through a Gayo Community Cultural Premium advocacy campaign to recognize and compensate the cultural knowledge embedded in traditionally produced Gayo coffee through price premiums specifically designated for local wisdom documentation and transmission programs, transforming the global market relationship into a resource for community-led cultural conservation.

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