

The Role of Geographical Indications in Sustainable Coffee Tourism in Forest Areas: Lessons from Lemukih Coffee

**Abdul Kadir Jaelani ^a✉ , Resti Dian Luthviati ^b ,
Anila Rabbani ^c, Zamira Esanova Normurotovna ^d ,
Akbar Zafar Ogli Tojiboev ^d**

^a Faculty of Law, Universitas Sebelas Maret, Surakarta, Indonesia

^b Vocational School, Universitas Sebelas Maret, Surakarta, Indonesia

^c Universitas Sebelas Maret, Surakarta, Indonesia

^d Tashkent State University of Law, Tashkent, Uzbekistan

✉ Corresponding email: jaelaniabdulkadir@staff.uns.ac.id

Abstract

Geographical Indications (GIs) protect distinctive local products while supporting community development and sustainable tourism. However, their effectiveness depends on regional government capacity to integrate product protection, economic development, environmental conservation, and tourism. This study examines the potential of Lemukih Robusta Coffee as a regional flagship product, evaluates the effectiveness of the Buleleng Regency Government's policies in managing and protecting its GI in areas adjacent to forests, and explores how GI protection can support sustainable coffee tourism. This empirical legal study employs socio-legal, statutory, and conceptual approaches. Data were collected through observations and interviews conducted in July–August 2025 with MPIG, agricultural and tourism officials, agricultural extension officers, village and subdistrict authorities, and coffee stakeholders. The findings show that, *first*, Lemukih Robusta Coffee has distinctive geographical and agroecological characteristics, but its management

near forest areas must consider land status and conservation principles. *Second*, Buleleng Regency Government policies remain suboptimal, particularly in inter-agency coordination, farmer and MPIG capacity, facility utilization, and economic benefits for farmers. *Third*, GI management should be strengthened through quality control, traceability, capacity building, and integration with forest conservation and sustainable coffee tourism. The study's novelty lies in linking GI governance, forest-area management, and sustainable coffee tourism within a rural regional policy context. Strengthening regional government intervention is essential to improve GI competitiveness, community welfare, and environmental sustainability.

Keywords

Agroforestry, Geographical Indication, Lemukih Coffee, Protection, Sustainable.

HOW TO CITE:

Chicago Manual of Style Footnote:

- ¹ Abdul Kadir Jaelani, Resti Dian Luthviati, Anila Rabbani, Zamira Esanova Normurotovna, and Akbar Zafar Ogli Tojiboev, "The Role of Geographical Indications in Sustainable Coffee Tourism in Forest Areas: Lessons from Lemukih Coffee," *Journal of Law and Legal Reform* 7, no 4 (2026): 1929–1962, <https://doi.org/10.15294/jllr.v7i4.63413>.

Chicago Manual of Style for Reference:

Jaelani, Abdul Kadir, Resti Dian Luthviati, Anila Rabbani, Zamira Esanova Normurotovna, and Akbar Zafar Ogli Tojiboev. "The Role of Geographical Indications in Sustainable Coffee Tourism in Forest Areas: Lessons from Lemukih Coffee." *Journal of Law and Legal Reform* 7, no 4 (2026): 1929–1962. <https://doi.org/10.15294/jllr.v7i4.63413>.

Introduction

Indonesia's geographical and ecological diversity has produced a wide range of regional products whose qualities, characteristics, and reputations are closely associated with their places of origin.¹ Coffee is one such product, with geographical characteristics that connect agricultural production with local livelihoods, cultural identity, environmental conditions, and tourism development.² In this context, Geographical Indications (GIs) provide a legal mechanism to link a product's reputation and characteristics to its geographical origin while creating opportunities to strengthen producer communities and build regional economic value.³ Sustainable coffee tourism further extends this relationship by connecting coffee production, local livelihoods, cultural practices, tourism activities, and environmental conservation.⁴ Accordingly, developing GI-based coffee tourism requires governance that does not separate product protection from the ecological and social conditions that support its production.⁵

¹ Delfirman and Hilmy M. Dzaki, "Shifts in the Control of Natural Resources: An Analysis of the Resource Curse in Tin-Rich Bangka Belitung, Indonesia," *The Extractive Industries and Society* 23 (September 2025): 101682, <https://doi.org/10.1016/j.exis.2025.101682>.

² Daniela-Lumina Constantin and Irina-Alina Popescu, "Traditions and Entrepreneurial Spirit: The Evolving Geography of Craft Brewing in Romania and Dynamic Interactions with the Local Development Environment," *Applied Geography* 176 (March 2025): 103543, <https://doi.org/10.1016/j.apgeog.2025.103543>.

³ Al Hanisham Mohd Khalid et al., "Geographical Indications In Malaysia And Indonesia: Enhancing Protections For Economic Growth And Cultural Heritage," *ASEAN Legal Insights* 1 (December 30, 2024): 33–53, <https://doi.org/10.32890/aseanli2024.1.3>.

⁴ Riad Azkar et al., "Sustainability of the Toraja Arabica Coffee Value Chain in Indonesia: Economic, Cultural, Environmental, and Certification Dimensions," *Frontiers in Sustainability* 6 (December 3, 2025), <https://doi.org/10.3389/frsus.2025.1691977>.

⁵ Songyu Jiang et al., "Enhancing Sustainable Coffee Tourism Behavior Among Y-Generation via Environment Knowledge," *International Journal of Customer Relationship Marketing and Management* 16, no. 1 (September 30, 2025): 1–20, <https://doi.org/10.4018/IJCRMM.389736>.

This challenge is particularly relevant in Lemukih Village, Sawan District, Buleleng Regency, Bali. Lemukih has approximately 2,768.259 hectares of protected forest and 640.265 hectares of coffee plantations, creating a landscape where agricultural production and forest conservation are closely connected.⁶ The forest area performs important ecological functions, including maintaining vegetation cover, supporting water absorption, and reducing environmental risks such as landslides. At the same time, coffee cultivation provides an important livelihood and has potential for tourism development. The coexistence of these functions makes Lemukih a relevant case for examining GI governance in a forest-adjacent landscape. The legal issue therefore extends beyond how the geographical origin and reputation of Lemukih Robusta Coffee are protected; it also concerns how its production and tourism potential can be managed in ways consistent with land-use conditions, forest conservation, community interests, and sustainable development.

Lemukih Robusta Coffee has subsequently obtained GI protection, with the Lemukih Buleleng Robusta Coffee Geographical Indication Protection Society (MPIG) serving as the community institution responsible for its protection and management. Under Law Number 20 of 2016 concerning Trademarks and Geographical Indications, GI protection establishes a legal relationship between a product and its geographical origin.⁷ Protection therefore is not limited to distinguishing the product from similar products; it also requires maintaining the characteristics, quality, and reputation associated with the designated geographical area.⁸ In the context of Lemukih, this legal relationship has an important ecological dimension because the coffee's geographical characteristics are produced within a landscape that

⁶ Abdul Kadir Jaelani et al., "Perlindungan Potensi Lokal Berbasis Pendaftaran Indikasi Geografi Guna Mengoptimalkan Potensi Ekonomi Kopi Robusta Di Desa Lemukih," *Abdimas Mahakam Journal* 9, no. 01 (2025): 1–13.

⁷ Ussy Gina Sabrina and Rindri Andewi Gati, "Protection of Geographical Indications of Local Indonesian Products from the Perspective of World Intellectual Property Organization," *KnE Social Sciences* 10, no. 15 (2025): 611–28, <https://doi.org/10.18502/kss.v10i15.19216>.

⁸ Rifqi Muttaqin, "Analisis Yuridis Peran Pemerintah Kabupaten Gayo Dalam Perlindungan Indikasi Geografis Terhadap Produk Lokal," *Locus : Jurnal Konsep Ilmu Hukum Republik Indonesia* 2, no. 4 (2022): 156–63.

includes agricultural and forest areas. Consequently, GI governance requires mechanisms that can maintain product standards while also considering the sustainability of the geographical environment in which the product is produced.⁹

Regional governments play an important role in translating this legal protection into effective local governance. Law Number 23 of 2014 concerning Regional Government provides a framework for regional governments to manage governmental affairs based on regional characteristics and needs, including agricultural development and community welfare.¹⁰ This framework provides a basis for local government involvement in developing and protecting regional products. However, regional autonomy alone does not establish an integrated system for managing GI products in forest-adjacent areas. In practice, GI development may involve different governmental and non-governmental actors, including regional government agencies, farmer groups, MPIG, forest-management institutions, and tourism stakeholders. Their responsibilities may overlap across product protection, agricultural development, environmental conservation, and tourism. The effectiveness of GI governance therefore depends not only on legal protection but also on coordinating these actors and implementing their respective functions.¹¹

Several prior studies have examined GIs from various perspectives, ranging from enhancing local product value, economic and environmental sustainability, and resilience to climate change to preserving cultural and territorial identity. Ravish Mathew et al. (2025) state that GIs are increasingly vital for policymakers, farmers, producers, and academics because they can add value while increasing recognition

⁹ Indra Hendrawan, Dimas Yanuarsyah, and Atik Winanti, “Perbandingan Pelindungan Indikasi Geografis Di Indonesia Dan Malaysia,” *Konstitusi : Jurnal Hukum, Administrasi Publik, Dan Ilmu Komunikasi* 2, no. 3 (June 18, 2025): 140–54, <https://doi.org/10.62383/konstitusi.v2i3.821>.

¹⁰ Dani Habibi, “Empowering Local Governments: Regional Autonomy As A Catalyst For Good Governance In Indonesia,” *Jurnal Hukum Progresif* 13, no. 1 (April 30, 2025): 68–98, <https://doi.org/10.14710/jhp.13.1.68-98>.

¹¹ Jie Wang et al., “Activating the Income Increase Effect of Geographical Indications: The Critical Roles of Intellectual Property Protection and Internet Development,” *Journal of Rural Studies* 118 (August 2025): 103696, <https://doi.org/10.1016/j.jrurstud.2025.103696>.

of local products. In tourism, GIs can also help develop local products that appeal to tourists.¹² Research by R. Nirosha and J. Paul Mansingh (2025) posits that GIs contribute significantly to the sustainability of regional flagship products by creating opportunities for local economic development, preserving cultural heritage, and promoting sustainable agricultural practices through biodiversity conservation, thereby supporting economic, social, and environmental sustainability.¹³ A study by Eloy Orlando Paiva Lima et al. (2026) highlights the importance of flexible regulatory mechanisms that integrate scientific evidence with adaptive strategies. It concludes that the resilience of GIs will depend on the integration of climate adaptation, institutional governance, and the preservation of territorial identity.¹⁴ Research by Matius J. Zinsli et al. (2026) emphasizes that GIs identify goods originating from a specific territory whose quality, reputation, or other characteristics are essentially attributable to their geographical origin.¹⁵ Research by Diana Harding et al. (2024) underscores that cultural and traditional values play a significant role in shaping GI products.¹⁶

Although prior research has shown how GIs enhance the value of local products, sustainability, climate resilience, territorial identity, and cultural preservation, studies remain limited in examining regional governments' role in integrating GIs with sustainable tourism development at the local level. Most research focuses on the benefits and

¹² Ravish Mathew et al., "Geographical Indication of Food in Promoting Gastronomic Sustainable Tourism: An Indian Outlook," in *Gastronomic Tourism* (GB: CABI, 2025), 17–24, <https://doi.org/10.1079/9781800628854.0003>.

¹³ R. Nirosha and J. Paul Mansingh, "Mapping the Sustainability of Geographical Indication Products: A Systematic Literature Review," *Discover Sustainability* 6, no. 1 (June 18, 2025): 549, <https://doi.org/10.1007/s43621-025-01332-4>.

¹⁴ Eloy Orlando Paiva Lima et al., "Coffee, Land, and Regulation: Climate Resilience Strategies for Geographical Indications," *Revista Ft* 30, no. 161 (August 10, 2026): 01–16, <https://doi.org/10.69849/j12as059>.

¹⁵ M. Zinsli and R. Villota-Jetzer, "Grounding Coffee Value in Territory: Localised Agro-Food Systems and the Implementation of Geographical Indication in the Global South," *The International Journal of Sociology of Agriculture and Food*, 32, no. 1 (2026): 87–103, <https://doi.org/10.48416/ijisaf.v31i1.734>.

¹⁶ Diana Harding et al., "Geographical Indication in Indonesia: A Review on the Spatial Distribution and Classification of Geographical Indication-registered Products and -related Publications," *The Journal of World Intellectual Property* 28, no. 1 (March 26, 2025): 263–85, <https://doi.org/10.1111/jwip.12332>.

sustainability of GIs from the perspectives of the product, the community, and institutions. At the same time, the regional government's role as a facilitator, regulator, coordinator, and driver of GI utilization within the tourism ecosystem has not been widely and specifically investigated. This gap matters for Lemukih Robusta Coffee, as the existence of a GI does not automatically improve community welfare or regional tourism development. Regional government involvement is essential to support farmers and community groups, strengthen GI management institutions, maintain product standards and quality, develop marketing strategies, and link GI products with tourist destinations and activities. Therefore, research on the regional government's role in utilizing the Lemukih Robusta Coffee GI is relevant to address this research gap while also developing a GI utilization model that supports sustainable tourism development.

This study used an empirical legal research method, drawing on socio-legal, statutory, and conceptual approaches. The socio-legal approach examined the implementation of Geographical Indication (GI) protection for Lemukih Robusta Coffee and the local government's role in developing it as part of sustainable tourism.¹⁷ The statutory approach examined legal provisions concerning GI protection, local government, forestry, and tourism. In contrast, the conceptual approach examined GI, local government roles, community empowerment, and sustainable tourism. The research was conducted in Lemukih Village, Sawan District, Buleleng Regency, Bali, in July–August 2025 through semi-structured interviews and direct observation. The researchers selected seven informants through purposive sampling based on their authority, knowledge, and involvement in GI management, agriculture, government, community empowerment, and tourism. The informants consisted of a representative of the Lemukih Robusta Coffee GI Protection Society (MPIG), the Head of the Buleleng Regency Agriculture Office, an Agricultural Extension Officer, the Head of the Plantation Division, the Head of the Buleleng Regency Tourism Office,

¹⁷ Lis Julianti and Artit Pinpak, "The Digitalization of Investment Impact on Developing Tourism Industry," *Journal of Human Rights, Culture and Legal System* 4, no. 3 (December 3, 2024): 655–81, <https://doi.org/10.53955/jhcls.v4i3.289>.

the Head of Lemukih Village, and the Head of Sawan District. These informants were considered sufficient because they represented the main actors involved in GI management, from the community level to local government.

Secondary data were obtained through literature and document review, including legislation, policies, books, journal articles, and relevant previous studies. The data were analyzed qualitatively using Miles, Huberman, and Saldaña's interactive model through three stages: data condensation, data display, and conclusion drawing and verification. The study grouped interview data into themes on GI protection, local government roles, community empowerment, forest conservation, and sustainable tourism. The study strengthened data validity through source and method triangulation by comparing information from different informants and checking it against field observations and relevant legal documents. Where informants differed, the study compared the information with other sources and supporting documents to identify the most consistent findings. The study is limited by the relatively small number of informants and the absence of systematic farmer income data, which limits the ability to measure the economic benefits of GI protection quantitatively.

A. The Role of Lemukih Coffee as a Regional Flagship Product Based in Forest Areas

Based on interview findings, the history of Lemukih Robusta Coffee is closely connected to the agricultural development of Lemukih Village, Sawan Subdistrict, Buleleng Regency, Bali. The Dutch introduced Robusta coffee, and it later became part of the local agricultural system. Lemukih is situated at an elevation of approximately 500–1,000 meters above sea level and has developed as a Robusta coffee-producing area. Farmers predominantly cultivate Robusta varieties BP 42 and BP 534 through an intercropping system involving coffee, cloves, and shade vegetation.¹⁸ These characteristics are relevant to geographical indication (GI) protection not only because they describe Lemukih's agricultural conditions, but also because they may establish the

¹⁸ Pudji Rahardjo, *KOPI* (Penebar Swadaya Grup, n.d.).

relationship between geographical factors, production practices, and the product's resulting characteristics.¹⁹

Under Law No. 20 of 2016 on Trademarks and Geographical Indications, a GI identifies the origin of a product where geographical environmental factors, including natural and human factors or a combination of both, give the product a particular reputation, quality, or characteristic. The law also defines the GI Description Document as containing information on the product's reputation, quality, and characteristics associated with geographical factors.²⁰ Accordingly, present the geographical and agroecological characteristics of Lemukih Coffee only to the extent they demonstrate such a geographical relationship. For example, the elevation, local climatic conditions, and intercropping practices may constitute relevant factual evidence. At the same time, detailed agronomic information such as soil pH or individual varietal characteristics is legally relevant only insofar as it contributes to the product's identifiable quality or characteristics. The available findings indicate a soil pH of approximately 6.18 and temperatures of 20–28°C, while coffee is cultivated alongside cloves and shade vegetation.²¹ Rather than serving as independent technical data, these characteristics should be incorporated into the GI specification only where their relationship to the distinctive quality, characteristics, or reputation of Lemukih Coffee can be demonstrated.

Lemukih's geographical context is also significant because coffee-producing areas are located near forested landscapes. The available local information identifies approximately 250 hectares of forest associated with the village and indicates that forested areas border the village to the

¹⁹ Zerihun Misgana et al., "The Influence of Shade Tree Species and Coffee Varieties on Selected Soil Physicochemical Properties in Coffee-Based Farming System of Southwestern Ethiopia," *Trees, Forests and People* 17 (September 2024): 100650, <https://doi.org/10.1016/j.tfp.2024.100650>.

²⁰ Radigya M. Correia et al., "Analysis of Robusta Coffee Cultivated in Agroforestry Systems (AFS) by ESI-FT-ICR MS and Portable NIR Associated with Sensory Analysis," *Journal of Food Composition and Analysis* 94 (December 2020): 103637, <https://doi.org/10.1016/j.jfca.2020.103637>.

²¹ Prakoso Adi et al., "Improving Flavor, Safety, and Sustainability of Coffee Substitute: Challenges and Future Research Directions," *Trends in Food Science & Technology* 162 (August 2025): 105083, <https://doi.org/10.1016/j.tifs.2025.105083>.

south.²² However, proximity to a forested area does not, by itself, establish that the coffee plantations are located within a legally designated Forest Area. This distinction matters because Indonesian forestry law divides Forest Areas into Conservation Forest, Protected Forest, and Production Forest. Consequently, describing Lemukih as a forest-adjacent coffee-producing area should not be interpreted as establishing that its coffee plantations are located within Protected Forest or another category of Forest Area.

The legal status of the coffee plantations must therefore be distinguished from their geographical proximity to forest areas. If a plantation is located outside a legally designated Forest Area, its cultivation is primarily subject to the applicable land-use, environmental, agricultural, and spatial-planning framework. If it is located within a Forest Area, however, the legality of cultivation depends upon the function and legal regime applicable to that particular area. Production Forest, Protected Forest, and Conservation Forest do not have identical management objectives or permissible uses. PP No. 23 of 2021 expressly distinguishes these three forest functions, demonstrating that the legal consequences of cultivation cannot be determined merely by describing an area as “forest.”²³

This distinction is particularly relevant to the agroforestry practices used by Lemukih farmers. Coffee is cultivated together with cloves and other vegetation rather than through a purely monocultural system. Agroforestry may contribute to vegetation cover, soil protection, erosion control, and ecological stability.²⁴ Nevertheless, the environmental benefits of agroforestry should not be equated with automatic legal authorization to cultivate land within a Forest Area. The

²² Markos Makiso Urugo et al., “Ethiopian Coffee: Production Systems, Geographical Origin Traceability, and European Union Deforestation Regulation Directive Compliance,” *Journal of Agriculture and Food Research* 19 (March 2025): 101695, <https://doi.org/10.1016/j.jafr.2025.101695>.

²³ Parid Pakaya, Dewi Wahyuni K. Baderan, and Marini Susanti Hamidun, “Efektivitas Sistem Agroforestri Dalam Meningkatkan Kesehatan Tanah Dan Produktivitas Pertanian,” *Hidroponik: Jurnal Ilmu Pertanian Dan Teknologi Dalam Ilmu Tanaman* 2, no. 2 (May 21, 2025): 12–27, <https://doi.org/10.62951/hidroponik.v2i2.329>.

²⁴ Rishabh Raj et al., *Good Agricultural Practices (GAP): Principles, Implementation and Impact on Sustainable Agriculture*, n.d.

legal permissibility of the activity depends on the land's status and function and on the applicable authorization or management regime.

Permen LHK No. 10 of 2022 further supports this distinction by recognizing agroforestry within the framework of vegetative rehabilitation while differentiating its objectives by land status. Agroforestry in Production Forest areas aims to increase forest productivity, while rehabilitation or enrichment in Conservation Forest areas aims to support habitat recovery and biodiversity enhancement. The regulation also recognizes agroforestry as a form of vegetative land restoration outside Forest Areas where land requires enrichment with perennial vegetation.²⁵ Accordingly, the existence of an agroforestry system in Lemukih cannot, by itself, establish whether coffee cultivation is legally permissible. Instead, it reinforces the need to determine whether the relevant plantation plots are located within a Production Forest, Protected Forest, Conservation Forest, or outside a Forest Area.

The distinction also exposes an evidentiary limitation in the current description of Lemukih Coffee. Available agricultural and interview findings show that coffee plantations are close to forested areas. Still, they do not, by themselves, establish the formal legal status of each plantation plot or show whether the cultivation is authorized or unlawful. Therefore, the present analysis should not characterize the coffee plantations as illegally occupying forest land without documentary evidence of their spatial status and applicable permits or rights. Rather, the legal issue is whether the actual location of the plantations corresponds with the officially designated Forest Area and, if so, whether the cultivation is conducted under a legally recognized management, utilization, or social-forestry regime. This requires verification against the relevant official spatial and forestry maps and, where applicable, land rights or forestry authorizations.²⁶

This legal distinction is also important for GI protection. Law No. 20 of 2016 provides that a GI is based on the connection between a geographical area and the reputation, quality, or characteristics of the

²⁵ Yakobus Harewan et al., "Analisis Keberlanjutan Pengelolaan Hutan Sosial Berbasis Agroforestri Dalam Meningkatkan Kesejahteraan Masyarakat Di Papua Barat," *Moderna Sains Journal* 2, no. 1 (August 2026): 131–42.

²⁶ Ary Widiyanto, "Agroforestry Dan Peranannya Dalam Mempertahankan Fungsi Hidrologi Dan Konservasi," *Al-Basia* Vol 9 (December 2013): 55–68.

protected product. Therefore, the GI description of Lemukih Coffee should identify not only the geographical area and product characteristics but also the production practices that are genuinely connected to those characteristics. You may include agroforestry as a production characteristic if you can demonstrate its contribution to Lemukih Coffee's identity and quality. At the same time, the geographical area described in the GI specification should not be used to legitimize cultivation on land where the underlying land use is prohibited or unauthorized. GI protection protects a product's geographical identity; it does not independently confer land rights or authorization to use Forest Areas.²⁷

Local farmers' collective organization through Subak Abian groups may support implementation of these requirements. The Manik Galih and Gunung Sari groups reportedly involve 49 members managing approximately 74.5 hectares and 72 members managing approximately 61.4 hectares, respectively. Their collective role may help maintain consistent production standards, geographical traceability, quality control, and compliance with agreed production practices. In the context of GI governance, such collective institutions can therefore function as an important mechanism for ensuring that the characteristics identified in the GI specification are consistently maintained by producers within the designated geographical area.²⁸

The relationship between GI protection, forest governance, and tourism is particularly relevant to Lemukih because the coffee-producing landscape is associated with natural attractions and forest-adjacent environments. GI-based tourism can promote Lemukih Coffee's geographical origin and distinctive production practices through agritourism and related activities. However, such development should remain consistent with the area's legal status and environmental carrying capacity. Increased demand for coffee or tourism should not incentivize expanding plantations into Forest Areas without the required legal basis. Instead, the economic value generated through GI recognition and

²⁷ Adi et al., "Improving Flavor, Safety, and Sustainability of Coffee Substitute: Challenges and Future Research Directions."

²⁸ Nizar Apriansyah, "Perlindungan Indikasi Geografis Dalam Rangka Mendorong Perekonomian Daerah," *Jurnal Penelitian Hukum De Jure* 18, no. 4 (December 10, 2018): 525–42, <https://doi.org/10.30641/dejure.2018.V18.525-542>.

tourism should be linked to sustainable production practices and the conservation of the geographical environment that contributes to the product's identity.²⁹

Therefore, the legal significance of Lemukih Coffee lies not simply in its agroecological characteristics or proximity to forest areas, but in the relationship between those characteristics, GI requirements, and the legal status of the land on which coffee is produced. The geographical and production characteristics may support developing a GI specification that establishes a demonstrable link between Lemukih Coffee and its reputation, quality, or characteristics. At the same time, the proximity of plantations to forest areas creates a separate legal issue concerning spatial status and the permissibility of cultivation. Because the available evidence does not yet establish the formal status of each plantation plot, the appropriate legal approach is to distinguish between Conservation Forest, Protected Forest, Production Forest, and land outside Forest Areas and to verify the location and legal basis of cultivation before concluding legality. This distinction is necessary to ensure that GI protection and sustainable tourism development strengthen the economic value of Lemukih Coffee without inadvertently legitimizing unauthorized land use or undermining forest conservation.

B. Government Policy in the Protection and Development of Lemukih Coffee

The Buleleng Regency Government has implemented several policies to protect and develop Lemukih Robusta Coffee as a regional flagship product. These policies include agricultural extension, seed distribution, implementation of Good Agricultural Practices (GAP), pest management, and agricultural infrastructure. The 2024–2044 Buleleng Regional Spatial Plan (RTRW) supports these measures by promoting agricultural productivity, farmer institutions, production and marketing facilities, and integrating agricultural activities with

²⁹ Marja Zattoni Milano and Ademir Antonio Cazella, “Environmental Effects of Geographical Indications and Their Influential Factors: A Review of the Empirical Evidence,” *Current Research in Environmental Sustainability* 3 (2021): 100096, <https://doi.org/10.1016/j.crsust.2021.100096>.

tourism. The policy direction is also reflected in the development of Lemukih Coffee, which has approximately 250 hectares of coffee-growing area and increased productivity from 3.6 tons/ha in 2021 to 4.2 tons/ha in 2023, with production reaching 1,050 tons in 2023³⁰. Regarding GAP implementation, research by Yusifa and Sudarko highlights the importance of farmer motivation and other determining factors in adopting agricultural innovations in coffee-producing areas³¹. At the same time, implementing agricultural policies also depends on the availability of supporting resources and the effectiveness of local policy implementation, including agricultural land protection³². Coffee agroforestry can further support integrating agricultural production with environmental conservation by maintaining biodiversity, ecosystem services, soil protection, and other ecological functions³³.

The protection and development of Lemukih Coffee are also linked to forestry, spatial planning, and tourism policies because the village's agricultural landscape is closely tied to surrounding forest ecosystems. Therefore, agricultural and tourism development must align with the legal status and functions of forest areas. Government Regulation No. 23 of 2021 on Forestry Administration provides the legal framework for using and managing forest areas according to their designated functions and applicable requirements. This framework needs to align with the 2024–2044 Buleleng RTRW and Lemukih's development as a tourism village so coffee-based agrotourism, educational plantation visits, and nature-based tourism can develop in legally appropriate areas without changing or encroaching on protected

³⁰ Jaelani et al., "Perlindungan Potensi Lokal Berbasis Pendaftaran Indikasi Geografi Guna Mengoptimalkan Potensi Ekonomi Kopi Robusta Di Desa Lemukih."

³¹ Norma Yusifa and Sudarko, "Motivasi Petani Kopi Dan Faktor-Faktor Penentu Dalam Penerapan Inovasi Gap Di Sentra Kopi Hutan Rakyat Kabupaten Banyuwangi," *Jurnal Ilmiah Respati* 13, no. 1 (2022): 9–20.

³² Kadek Mertada, I Gede Surata, and I Komang Kawi Arta, "Efektivitas Pasal 43 Ayat 1 Peraturan Daerah Nomor 4 Tahun 2021 Tentang Lahan Pertanian Pangan Berkelanjutan (Studi Di Kelurahan Penarukan, Kecamatan Buleleng, Kabupaten Buleleng)," *Kertha Widya Jurnal Hukum* 12, no. 1 (2024): 1–34.

³³ Isabella Mayorga et al., "Tradeoffs and Synergies among Ecosystem Services , Biodiversity Conservation , and Food Production in Coffee Agroforestry," *Frontiers in Forests and Global Change* 5 (2022): 1–15, <https://doi.org/10.3389/ffgc.2022.690164>.

forest functions. The policy direction thus emphasizes optimizing existing agricultural areas and developing conservation-compatible tourism rather than expanding agricultural or tourism activities into protected forest areas. This approach is consistent with the importance of strengthening upstream forest conservation policies as part of sustainable development³⁴.

In the tourism and local economic sectors, the Buleleng Regency Government supports developing Lemukih Village as a tourism village, including by designating it as a pilot tourism village project in 2024 and providing local champion training. This policy creates opportunities to integrate Lemukih Coffee plantations with agrotourism and to introduce visitors to coffee cultivation, processing, and the distinctive characteristics of Lemukih Robusta Coffee. In parallel, the government facilitates the legal protection of Lemukih Coffee through Geographical Indication (GI) registration under Law No. 20 of 2016 on Trademarks and Geographical Indications, as amended by Law No. 6 of 2023, and is further supported at the regional level by Buleleng Regency Regulation No. 1 of 2024 on the Empowerment and Development of Micro-Enterprises and the Protection of Local Products. The regional government involved the Tourism Office, Agriculture Office, BRIDA, the Office of Trade/Industry/Cooperatives/SMEs, Sawan District, and the Lemukih Village Government in preparing the Description Document and facilitating the GI registration process. The application was submitted on 28 August 2025, announced by the Directorate General of Intellectual Property in September 2025, and subsequently received GI Certificate No. ID G 000000257 on 29 December 2025. The Description Document also establishes the Buleleng Lemukih Robusta Coffee Geographical Indication Protection Society (MPIG), involving farmers, processing units, traders, government institutions, and academics, with functions covering production, marketing, processing, quality control, legal affairs, and public relations, supported by monitoring and product traceability mechanisms. These institutional

³⁴ Absori Absori et al., “Strengthening Upstream Forest Conservation Policies to Achieve Sustainable Development Goals,” *Journal of Human Rights, Culture and Legal System* 5, no. 3 (November 20, 2025): 780–805, <https://doi.org/10.53955/jhcls.v5i3.767>.

arrangements align with research emphasizing GI protection to maintain the identity and reputation of Indonesian coffee and noting that implementation is influenced by producers' knowledge, attitudes, perceptions of economic benefits, and capacity to comply with GI provisions³⁵. The establishment of MPIG as a community-based institution also aligns with Rahmayanti and Sudiarta's finding that community organizations play an important role in supporting GI protection through managing and monitoring distinctive regional products³⁶.

Based on the various policies the Buleleng Regency Government has implemented to protect and develop Lemukih Coffee, this study can analyze their effectiveness using Soerjono Soekanto's Theory of Legal Effectiveness³⁷. From the first factor, the legal factor, the Buleleng Regency Government's policy on Lemukih Coffee can be assessed through the existence and clarity of regulations, harmonization among relevant legal instruments, the availability of legal protection mechanisms, and their implementability. Various legal instruments support the policy, covering agricultural and spatial planning, forest area protection, tourism village development, and Geographical Indication protection. GI protection has also gained an institutional foundation through the establishment of the MPIG and support from the Buleleng Regent in the GI registration process. Buleleng Lemukih Robusta Coffee subsequently obtained GI Certificate No. ID G 000000257 in December 2025. These conditions show that the legal and formal institutional framework for protecting Lemukih Coffee has been established. However, within Soekanto's framework, regulations alone do not establish legal effectiveness, because effectiveness also depends on how systematic, mutually consistent, and implementable the applicable rules

³⁵ Rinda Ayu Andieni and Tiurma M. Pitta Allagan, "Perlindungan Indikasi Geografis Produk Biji Kopi Luwak Arabika Indonesia Dari Jawa, Sumatera Dan Sulawesi Di Amerika Serikat," *Bina Hukum Lingkungan* 8, no. 2 (2024): 107–35.

³⁶ Ni Luh Putu Nia Rahmayanti and I Ketut Sudiarta, "Pembentukan Organisasi Masyarakat Sebagai Perlindungan Terhadap Indikasi Geografis Kopi Kintamani," *Jurnal Kertha Semaya* 10, no. 10 (2022): 2235–45.

³⁷ Soerjono Soekanto, *Faktor-Faktor Yang Mempengaruhi Penegakan Hukum*, 2005.

are in practice.³⁸ In the context of Lemukih Coffee, the available evidence therefore more clearly demonstrates the existence of a regulatory and legal-protection framework than its effectiveness in producing the intended policy outcomes. In particular, the available evidence does not yet establish whether the relevant legal instruments are implemented consistently across agricultural, forestry, tourism, spatial planning, and intellectual property sectors, or whether such implementation has generated measurable economic benefits for coffee farmers.³⁹ Accordingly, the legal factor should be understood as providing a necessary institutional basis for policy implementation. In contrast, its contribution to overall policy effectiveness remains dependent on the consistency, synchronization, and practical implementation of the relevant legal instruments.

The second factor is law enforcement, analyzed through the clarity of institutional roles, inter-agency coordination, implementation, supervision, and monitoring. Various government agencies and related institutions support policy implementation, including the Agriculture Office, Tourism Office, BRIDA, regional units responsible for trade and MSMEs, the Sawan District Government, the Lemukih Village Government, and DJKI. In addition, the Buleleng Regency Government established the MPIG management structure, along with a supporting team comprising regional agencies and academics, through a Regent's decree. For GI protection, monitoring is also conducted through internal and external mechanisms, including the MPIG Quality Control Team and the Ministry of Law. These arrangements demonstrate that institutional responsibilities and formal monitoring mechanisms have been established to support the implementation and protection of Lemukih Coffee. However, the existence of responsible institutions and monitoring mechanisms does not, by itself, demonstrate effective law enforcement. The effectiveness of this factor must also be examined through the consistency of inter-agency coordination, the

³⁸ Guilherme Silva Fracarolli, "The Effects of Institutional Measures : Geographical Indication in Mercosur and the EU," *Sustainability* 13, no. 3476 (2021): 1–16.

³⁹ I Gusti Ayu Ketut Rachmi Handayani, Cindy Yosiana, and Sutasinee Kongrawd, "Reform of Environmental Approval Policy for Renewable Energy in Indonesia," *Journal of Sustainable Development and Regulatory Issues (JSDERI)* 3, no. 2 (July 12, 2025): 286–323, <https://doi.org/10.53955/jsderi.v3i2.101>.

implementation of monitoring mechanisms in practice, the follow-up to identified violations or non-compliance, and the continuity of supervision at the producer and processing levels.⁴⁰ Based on the available evidence, the law enforcement factor can therefore be considered institutionally established, but its practical effectiveness cannot yet be determined conclusively. The available information demonstrates the presence of relevant institutions and monitoring arrangements more clearly than their sustained performance in ensuring compliance with applicable requirements. Further evidence on the frequency and results of monitoring, inter-agency coordination, producer compliance, and follow-up actions is needed to determine how much these enforcement mechanisms contribute to the Lemukih Coffee policy's effectiveness.

The third factor is facilities, assessed by the availability, adequacy, accessibility, and use of facilities that support coffee production, processing, financing, marketing, digital development, and tourism activities. The government has directed its policy toward providing agricultural facilities, developing agricultural machinery, GAP training, and developing coffee-based tourism potential. In the tourism context, developing coffee agrotourism requires facility support and management capable of sustainably connecting production activities with the tourism experience⁴¹. The empirical findings show that although Lemukih Village has six two-wheeled tractors and five coffee processing machines, their utilization has not yet been optimized because of the need for further training and improved management. These findings indicate that facilities are available to some extent, but their use remains constrained by operational and management capacity. From the perspective of Soerjono Soekanto's Legal Effectiveness Theory, the facilities factor therefore demonstrates an established level of facility provision. At the same time, its effectiveness in supporting production and post-harvest

⁴⁰ Yordan Gunawan and Mohammad Hazyar Arumbinang, "The Climate Change Litigation Based Human Rights Approach in Corporations: Prospects and Challenges," *Journal of Human Rights, Culture and Legal System* 3, no. 2 (2023): 288–307, <https://doi.org/10.53955/jhcls.v3i2.116>.

⁴¹ Fajar Rasyidi Hidayat, Luchman Hakim, and Rita Parmawati, "Analysis of Community-Based Coffee Agro-Tourism Sustainability in East Java , Indonesia," *HABITAT* 34, no. 1 (2023): 1–12, <https://doi.org/10.21776/ub.habitat.2023.034.1.1>.

activities remains constrained by utilization capacity. The main issue is not merely the availability of physical facilities, but how effectively they can support production, post-harvest processing, product development, and the integration of coffee production with tourism activities. Accordingly, strengthening this factor requires continuous technical training, improved facility management, and support for the productive utilization of existing agricultural and coffee-processing infrastructure.

The fourth factor is the community factor, which is assessed through community participation, knowledge and capacity, compliance with GI standards, involvement in GI management, and the economic benefits generated by the policy. The community has participated through the MPIG, which involves farmers, processing units, and traders in maintaining product quality and traceability. Community participation is also important in developing Lemukih Village as a tourism village, since sustainable local-based tourism requires community involvement and capacity. Community motivation, the use of digital information, and *green tourism branding* are important aspects in the sustainability of ecotourism villages in Buleleng Regency⁴². These conditions show community involvement in GI management and tourism development. Still, they provide limited evidence on the level of knowledge, compliance with GI standards, and economic benefits the community receives. Accordingly, the community factor provides a solid basis for participation. At the same time, its broader contribution to policy effectiveness still depends on capacity building, the use of digital technology, and greater community involvement in developing coffee-based products and tourism.⁴³

The fifth factor is culture, assessed through the continuity of local values, traditional agricultural practices, local knowledge, intergenerational cultural transmission, and farmer regeneration. Lemukih Coffee has a strong cultural foundation in the community, as

⁴² I Gusti Ayu Purnamawati, Gede Adi Yuniarta, and I Gusti Bagus Baskara Nugraha, "Strategy and Sustainability of Ecotourism Villages in the Buleleng Regency," *International Journal of Organizational Behavior and Policy* 3, no. 1 (2024): 1–14.

⁴³ Bambang Ali Kusumo et al., "Corporate Crime Prevention Through Sustainable Governance and Regulatory Reform," *Journal of Sustainable Development and Regulatory Issues (JSDERI)* 3, no. 3 (October 11, 2025): 616–40, <https://doi.org/10.53955/jsderi.v3i3.168>.

farming and coffee-processing practices have long been embedded in local life. However, the policy's sustainability still faces challenges, including farmer regeneration, changing business patterns, and the need to adapt traditional practices to quality standards and market demands. This aligns with research showing that regenerating coffee farmers is important for sustaining the coffee business through capacity building, access to information, and involving the younger generation⁴⁴. These conditions indicate that Lemukih Coffee's cultural foundation remains present. Still, challenges in farmer regeneration and adapting traditional practices to current quality and market requirements may constrain its continuity. Accordingly, the cultural factor's contribution to policy effectiveness depends on maintaining local knowledge and practices while strengthening intergenerational participation and the capacity to meet the production standards established under the GI system.

Taken together, the five-factor analysis indicates that the effectiveness of the Buleleng Regency Government's policy cannot be determined solely by legal and institutional arrangements; it must also be assessed by implementation capacity and measurable policy outcomes. The legal and institutional dimensions are relatively strong, as reflected in the availability of regulatory instruments, the establishment of MPIG, the GI registration and certification of Lemukih Robusta Coffee, and the involvement of multiple government agencies. However, these institutional achievements do not necessarily translate into proportional economic benefits for farmers, particularly because the available findings do not yet provide sufficient evidence that GI certification has led to higher farm-gate prices, increased farmer income, broader market access, or a measurable improvement in farmers' bargaining position. Likewise, although MPIG has established quality-control and traceability mechanisms, the available evidence demonstrates their existence more clearly than their long-term effectiveness in ensuring consistent compliance among producers. From a political economy perspective, this gap also raises the need to examine whether government priorities,

⁴⁴ Ramadhan Miftah Fauzi, Elnovani Lusiana, and Evi Nursanti Rukmana, "Perilaku Pencarian Informasi Petani Kopi Pada Program Regenerasi Petani Provinsi Jawa Barat," *Pustaka Karya: Jurnal Ilmiah Ilmu Perpustakaan Dan Informasi* 13, no. 1 (2025): 33–47.

available resources, and implementation support are sufficiently aligned with farmers' interests and capacity to benefit from the policy. At the same time, agricultural productivity and coffee-based tourism must be balanced with forest conservation, as increased land use and tourism infrastructure may put pressure on forest functions, biodiversity, water resources, and ecological stability. Therefore, the main policy challenge is to strengthen implementation and measurable outcomes by improving farmers' access to production and post-harvest facilities, market linkages, GI compliance monitoring, and the distribution of economic value, while optimizing existing coffee-growing areas and developing conservation-compatible tourism without encouraging the conversion or encroachment of protected forest areas.

C. Protection Policy for Lemukih Coffee in Forest Areas through Geographical Indications to Promote Sustainable Coffee Tourism

In addition to increasing production, protecting the local community's characteristics, sustainable cultivation systems, environmental conditions, and economic continuity should be priorities for protecting Lemukih Robusta Coffee as a regional flagship product.⁴⁵ Consequently, the protection policies should be based on the characteristics as described in the Description Document, including the cultivation conditions, human factors, production processes, and geographical factors that determine the identity and uniqueness of Lemukih Coffee. These characteristics must be translated into clear production and quality standards that farmers and processors can implement. MPIG should coordinate the implementation of these standards and producer registration, with technical assistance and institutional support from the local government. The Geographical Indication should therefore be not only a label but also a governance tool

⁴⁵ Oanh Thi Kim Vu et al., "Hospitality and Tourism Development through Coffee Shop Experiences in a Leading Coffee-Producing Nation," *International Journal of Hospitality Management* 106 (2022): 103300, <https://doi.org/10.1016/j.ijhm.2022.103300>.

to preserve the link between geographical origin, characteristics, quality, and production standards.⁴⁶

The protection system should support regular authentication, quality control, supervision, and traceability to ensure that products marketed under the Lemukih name comply with the established standards.⁴⁷ In the first stage, MPIG and local government can establish traceability through simple records of registered producers, cultivation locations, harvesting periods, and processing activities. Quality monitoring can be done periodically using standardised checklists and corrective measures applied to producers who do not meet the required standards. Digital traceability can be introduced subsequently as financial and technological capacity improves.⁴⁸ Local government programs, MPIG contributions, and cooperation with private companies and educational organisations could support these activities. This gradual approach allows quality control and traceability to be implemented according to local producers' capacity.

The protection system should also build local communities' and institutions' capacity through training, shared processing facilities, and technical assistance.⁴⁹ Training should focus on cultivation, harvesting, fermentation, drying, roasting, and developing derivative coffee products to increase the economic value farmers, processors, and local entrepreneurs receive.⁵⁰ MPIG and farmer groups can share processing

⁴⁶ Yotsaphat Kittichotsawat, Erwin Rauch, and Korrakot Yaibuathet Tippayawong, "Designing Sustainability Measurement of a Thai Coffee Supply Chain Using Axiomatic Design and Business Model Canvas," *Results in Engineering* 24 (2024): 103443, <https://doi.org/10.1016/j.rineng.2024.103443>.

⁴⁷ Dionisio Pedro Amorim-Neto et al., "In Vitro Biological and Functional Properties of Fermented Roasted Coffee Extracts in the Context of Parkinson's Disease," *Food Bioscience* 81 (2026): 109094, <https://doi.org/10.1016/j.fbio.2026.109094>.

⁴⁸ Sebastian Niezen et al., "Coffee Consumption and Lower Advanced Fibrosis Risk in MASLD and MetALD: Dose-Dependent Association With Heightened Protection Among Moderate Alcohol Users," *Journal of Clinical and Experimental Hepatology* 16, no. 5 (2026): 103612, <https://doi.org/10.1016/j.jceh.2026.103612>.

⁴⁹ Amnaj Khaokhrueamuang and Lee Jolliffe, "Tea and Coffee Tourism," in *Reference Module in Social Sciences* (Elsevier, 2026), <https://doi.org/10.1016/B978-0-443-27698-9.00091-X>.

⁵⁰ Sara A Gomaa et al., "Active Biocomposite Packaging Films Based on Carboxymethyl Cellulose/Sodium Alginate/Polyethylene Glycol Reinforced with Spent Ground Coffee Melanoidins for Oily Food Applications," *International*

facilities, possibly utilizing technical equipment and training provided through collaboration with local government, private companies, and educational institutions. These measures should be implemented progressively, in line with technological, organisational, and financial capacity. The proportion of trained producers, the number of processing facilities, and producer compliance would serve as implementation indicators.⁵¹

The GI protection system should integrate environmental sustainability because Lemukih Coffee is linked to the forest-area landscape. Therefore, production standards should include environmentally friendly methods such as terracing, cover crops, drainage systems, and shade trees.⁵² MPIG and farmer groups should monitor compliance, while the local government and environmental or forest-management authorities should provide technical advice and regular evaluation. Indicators might include adoption of soil and water conservation practices, retention of shade trees, and protection of sensitive forest areas. This incorporation matters because GI protection alone does not ensure environmental sustainability; production and monitoring systems must include environmental safeguards.⁵³ Geographical Indication can also support sustainable coffee tourism by linking Lemukih Coffee's origin to the plantation landscape, cultivation, processing activities, local knowledge, and consumer experiences.

Journal of Biological Macromolecules 376 (2026): 153614,
<https://doi.org/10.1016/j.jbiomac.2026.153614>.

⁵¹ Saeedeh Afsar, Sebastien Garnier, and Miguel Angel Lopez, "A Comprehensive Review on Current Strategies for Managing Coffee Leaf Rust, Coffee Berry Borer and Coffee Leaf Miner with Reduced Pesticide Use," *Journal of Agriculture and Food Research* 30 (2026): 103206, <https://doi.org/10.1016/j.jafr.2026.103206>.

⁵² Thierry Delatour, Mathieu Dubois, and Viviane Theurillat, "Chapter 14 - Trace Levels of Plant Protection Products Derived from Coffee Roasting Instead of Agricultural Practices," in *Coffee in Health and Disease Prevention (Second Edition)*, ed. Victor R Preedy and Vinood B Patel, Second Edi (Academic Press, 2025), 139–47, <https://doi.org/10.1016/B978-0-443-13868-3.00027-2>.

⁵³ Kaoutar Boufous et al., "Carbon and Nitrogen Stocks and Soil Organic Matter Stabilization in a Tropical Coffee Agroecosystem: A 15-Year Study on Phosphogypsum and Brachiaria Intercropping," *Journal of Environmental Management* 413 (2026): 130314, <https://doi.org/10.1016/j.jenvman.2026.130314>.

However, tourism development should be controlled to avoid excessive pressure on forest ecosystems from increased visitor activity. Visits to plantations, coffee tastings, harvesting activities, and processing demonstrations should therefore be held only in designated areas, with consideration for visitor capacity, routes, waste-management arrangements, and environmental safeguards.⁵⁴ Tourism routes must not pass through sensitive forest areas, water sources, or areas not suitable for public access. MPIG, local government, farmers, and tourism operators should jointly monitor visitor numbers, waste, vegetation disturbance, and other environmental impacts. If monitoring indicates a negative environmental impact, tourism activities should be adapted.

The protection policy should be implemented progressively through three phases. The first phase (months 1-12) should include registering producers, validating production standards, establishing basic traceability, and providing training. The second phase (months 13-24) should intensify quality monitoring, environmental compliance, shared processing facilities, and pilot coffee tourism activities. Phase 3 (months 25-36) should focus on evaluation, product diversification, improving processing facilities, and gradually digitalizing traceability. GI governance, producer registration, quality control, and traceability should be under the responsibility of MPIG; policy support, technical assistance, infrastructure, and access to relevant financing programs should be provided by local government; farmers and processors should ensure production and processing standards; tourism operators should manage tourism activities according to environmental requirements.⁵⁵ Progress could be measured through indicators such as the number of registered producers, the percentage of producers maintaining traceability records, the number of quality inspections, the percentage of

⁵⁴ Eva Sánchez-Hernández et al., “Circular Economy Approach to Coffee Processing Residue Valorization: Bioactive by-Product Extracts for Managing Pre- and Post-Harvest Fungal Pathogens,” *Crop Protection* 199 (2026): 107442, <https://doi.org/10.1016/j.cropro.2025.107442>.

⁵⁵ Luis F Aristizábal et al., “Fungicide Efficacy and Duration of Protection against Coffee Leaf Rust (*Hemileia Vastatrix*) on Commercial Coffee Farms in Hawaii,” *Crop Protection* 196 (2025): 107269, <https://doi.org/10.1016/j.cropro.2025.107269>.

producers implementing environmental practices, and the number of tourism activities complying with visitor-management requirements.

This step-by-step approach also helps address the potential conflict between coffee tourism and forest protection. Tourism growth should be based not on visitor numbers, but on the area's ecological and institutional capacity. Before expanding tourism activities, the area should set visitor limits, designate routes, monitor the environment, and ensure community participation. Meanwhile, tourism revenue can support local farmers, processors, and community activities through transparent benefit-sharing mechanisms. Therefore, the development of Lemukih Coffee by Geographical Indication should be supported by product protection, product traceability, community capacity, environmental conservation, and controlled tourism development. This strategy can develop the economic potential of coffee tourism while maintaining the geographical and ecological conditions that underpin Lemukih Coffee's identity and sustainability.⁵⁶

Conclusion

Based on the findings, Lemukih Robusta Coffee has distinctive geographical and agroecological characteristics; therefore, GI management in areas adjacent to forests needs to consider land status and conservation principles. *Second*, the implementation of the Buleleng Regency Government's policy remains suboptimal, particularly in inter-agency coordination, the capacity of farmers and MPIG, the utilization of supporting facilities, and the realization of economic benefits for farmers. Therefore, reform should begin with strengthening the capacity of farmers and MPIG and improving inter-agency coordination, with the Buleleng Regency Government serving as the main coordinator and MPIG and farmer groups as the primary community-level actors. *Third*, GI management should be strengthened through quality control, traceability, forest conservation, and sustainable coffee tourism to

⁵⁶ Alessandro Lo Bianco et al., "Sustainable Food Packaging Films by Methylcellulose Enriched with Spent Coffee Grounds Extract," *International Journal of Biological Macromolecules* 359 (2026): 151852, <https://doi.org/10.1016/j.ijbiomac.2026.151852>.

generate economic benefits while maintaining the area's sustainability. This study contributes to GI legal scholarship by demonstrating the importance of integrating GI protection with institutional governance, environmental conservation, and community empowerment. However, the study is limited by the relatively small number of informants and the absence of farmer income data to measure the economic benefits of GI protection directly. Future research should use more measurable economic data and compare Lemukih with other GI products located in forest or conservation areas to develop a more sustainable GI governance model.

References

- Absori, Absori, Trias Hernanda, Rizka Rizka, Mohammad Indra Bangsawan, and Arief Budiono. "Strengthening Upstream Forest Conservation Policies to Achieve Sustainable Development Goals." *Journal of Human Rights, Culture and Legal System* 5, no. 3 (November 20, 2025): 780–805. <https://doi.org/10.53955/jhcls.v5i3.767>.
- Adi, Prakoso, Rizka Mulyani, Bara Yudhistira, Fuangfah Punthi, Ratna Sari Listyaningrum, Chao-Kai Chang, Mohsen Gavahian, and Chang-Wei Hsieh. "Improving Flavor, Safety, and Sustainability of Coffee Substitute: Challenges and Future Research Directions." *Trends in Food Science & Technology* 162 (August 2025): 105083. <https://doi.org/10.1016/j.tifs.2025.105083>.
- Afsar, Saeedeh, Sebastien Garnier, and Miguel Angel Lopez. "A Comprehensive Review on Current Strategies for Managing Coffee Leaf Rust, Coffee Berry Borer and Coffee Leaf Miner with Reduced Pesticide Use." *Journal of Agriculture and Food Research* 30 (2026): 103206. <https://doi.org/10.1016/j.jafr.2026.103206>.
- Ali Kusumo, Bambang, Rustambekov Islambek Rustambekovich, Yakubov Axtam Nusratilloevich, and Xodjayev Baxshillo Kamolovich. "Corporate Crime Prevention Through Sustainable Governance and Regulatory Reform." *Journal of Sustainable Development and Regulatory Issues (JSDERI)* 3, no. 3 (October 11, 2025): 616–40. <https://doi.org/10.53955/jsderi.v3i3.168>.

- Amorim-Neto, Dionisio Pedro, Joao Victor Virgilio-da-Silva, Jaqueline Sousa Correia, Matheus Pércles Silva Láscares, Jhonathan Vinícius Menezes Silva, Carla Alves Barbosa, Beatriz Dal Pian Machado, et al. "In Vitro Biological and Functional Properties of Fermented Roasted Coffee Extracts in the Context of Parkinson's Disease." *Food Bioscience* 81 (2026): 109094. <https://doi.org/10.1016/j.fbio.2026.109094>.
- Andieni, Rinda Ayu, and Tiurma M. Pitta Allagan. "Perlindungan Indikasi Geografis Produk Biji Kopi Luwak Arabika Indonesia Dari Jawa, Sumatera Dan Sulawesi Di Amerika Serikat." *Bina Hukum Lingkungan* 8, no. 2 (2024): 107–35.
- Apriansyah, Nizar. "Perlindungan Indikasi Geografis Dalam Rangka Mendorong Perekonomian Daerah." *Jurnal Penelitian Hukum De Jure* 18, no. 4 (December 10, 2018): 525–42. <https://doi.org/10.30641/dejure.2018.V18.525-542>.
- Aristizábal, Luis F, Colby T Maeda, Tracie Matsumoto, and Melissa A Johnson. "Fungicide Efficacy and Duration of Protection against Coffee Leaf Rust (*Hemileia Vastatrix*) on Commercial Coffee Farms in Hawaii." *Crop Protection* 196 (2025): 107269. <https://doi.org/10.1016/j.cropro.2025.107269>.
- Azkar, Riad, Rahim Darma, Ayu Anisa Amir, Siti Hardianti Syam, Musliar Kasim, Hamed Norolla Bakheet Ali, Riri Amandaria, and Putra Astaman. "Sustainability of the Toraja Arabica Coffee Value Chain in Indonesia: Economic, Cultural, Environmental, and Certification Dimensions." *Frontiers in Sustainability* 6 (December 3, 2025). <https://doi.org/10.3389/frsus.2025.1691977>.
- Bianco, Alessandro Lo, Martina Maria Calvino, Giuseppe Cavallaro, Mingxian Liu, Stefana Milioto, and Giuseppe Lazzara. "Sustainable Food Packaging Films by Methylcellulose Enriched with Spent Coffee Grounds Extract." *International Journal of Biological Macromolecules* 359 (2026): 151852. <https://doi.org/10.1016/j.ijbiomac.2026.151852>.
- Boufous, Kaoutar, Luis Carlos Colacho Hurtarte, Nicolas Gustavo da Cruz da Silva, Lílian Angélica Moreira, Malak Elmeknassi, Paulo Sergio Pavinato, Luiz Antonio Martinelli, Matheus Sampaio Carneiro Barreto, and Hudson Wallace Pereira de Carvalho.

- “Carbon and Nitrogen Stocks and Soil Organic Matter Stabilization in a Tropical Coffee Agroecosystem: A 15-Year Study on Phosphogypsum and Brachiaria Intercropping.” *Journal of Environmental Management* 413 (2026): 130314. <https://doi.org/10.1016/j.jenvman.2026.130314>.
- Constantin, Daniela-Lumina, and Irina-Alina Popescu. “Traditions and Entrepreneurial Spirit: The Evolving Geography of Craft Brewing in Romania and Dynamic Interactions with the Local Development Environment.” *Applied Geography* 176 (March 2025): 103543. <https://doi.org/10.1016/j.apgeog.2025.103543>.
- Correia, Radigya M., Renato Andrade, Flávia Tosato, Mariana T. Nascimento, Lucas L. Pereira, João B.S. Araújo, Fernanda E. Pinto, et al. “Analysis of Robusta Coffee Cultivated in Agroforestry Systems (AFS) by ESI-FT-ICR MS and Portable NIR Associated with Sensory Analysis.” *Journal of Food Composition and Analysis* 94 (December 2020): 103637. <https://doi.org/10.1016/j.jfca.2020.103637>.
- Delatour, Thierry, Mathieu Dubois, and Viviane Theurillat. “Chapter 14 - Trace Levels of Plant Protection Products Derived from Coffee Roasting Instead of Agricultural Practices.” In *Coffee in Health and Disease Prevention (Second Edition)*, edited by Victor R. Preedy and Vinood B. Patel, Second Edition, 139–47. Academic Press, 2025. <https://doi.org/10.1016/B978-0-443-13868-3.00027-2>.
- Delfirman, and Hilmy M. Dzaki. “Shifts in the Control of Natural Resources: An Analysis of the Resource Curse in Tin-Rich Bangka Belitung, Indonesia.” *The Extractive Industries and Society* 23 (September 2025): 101682. <https://doi.org/10.1016/j.exis.2025.101682>.
- Fauzi, Ramadhan Miftah, Elnovani Lusiana, and Evi Nursanti Rukmana. “Perilaku Pencarian Informasi Petani Kopi Pada Program Regenerasi Petani Provinsi Jawa Barat.” *Pustaka Karya: Jurnal Ilmiah Ilmu Perpustakaan Dan Informasi* 13, no. 1 (2025): 33–47.
- Fracarolli, Guilherme Silva. “The Effects of Institutional Measures: Geographical Indication in Mercosur and the EU.” *Sustainability* 13, no. 3476 (2021): 1–16.

- Gomaa, Sara A, Maha Gomaa, Salwa Gamal Arafa, Ahmed A Metwally, and Mohamed Abdin. "Active Biocomposite Packaging Films Based on Carboxymethyl Cellulose/Sodium Alginate/Polyethylene Glycol Reinforced with Spent Ground Coffee Melanoidins for Oily Food Applications." *International Journal of Biological Macromolecules* 376 (2026): 153614. <https://doi.org/10.1016/j.ijbiomac.2026.153614>.
- Gunawan, Yordan, and Mohammad Hazyar Arumbinang. "The Climate Change Litigation Based Human Rights Approach in Corporations: Prospects and Challenges." *Journal of Human Rights, Culture and Legal System* 3, no. 2 (2023): 288–307. <https://doi.org/10.53955/jhcls.v3i2.116>.
- Habibi, Dani. "Empowering Local Governments: Regional Autonomy As A Catalyst For Good Governance In Indonesia." *Jurnal Hukum Progresif* 13, no. 1 (April 30, 2025): 68–98. <https://doi.org/10.14710/jhp.13.1.68-98>.
- Harding, Diana, Kevin Muhamad Lukman, Miranda Risang Ayu Palar, and Ryo Kohsaka. "Geographical Indication in Indonesia: A Review on the Spatial Distribution and Classification of Geographical Indication-registered Products and -related Publications." *The Journal of World Intellectual Property* 28, no. 1 (March 26, 2025): 263–85. <https://doi.org/10.1111/jwip.12332>.
- Hidayat, Fajar Rasyidi, Luchman Hakim, and Rita Parmawati. "Analysis of Community-Based Coffee Agro-Tourism Sustainability in East Java , Indonesia." *HABITAT* 34, no. 1 (2023): 1–12. <https://doi.org/10.21776/ub.habitat.2023.034.1.1>.
- Indra Hendrawan, Dimas Yanuarsyah, and Atik Winanti. "Perbandingan Pelindungan Indikasi Geografis Di Indonesia Dan Malaysia." *Konstitusi : Jurnal Hukum, Administrasi Publik, Dan Ilmu Komunikasi* 2, no. 3 (June 18, 2025): 140–54. <https://doi.org/10.62383/konstitusi.v2i3.821>.
- Jaelani, Abdul Kadir, Resti Dian Luthviati, Anila Robbani, Cindy Yosiana, and Tsabitta Ahmilul Husna. "Perlindungan Potensi Lokal Berbasis Pendaftaran Indikasi Geografi Guna Mengoptimalkan Potensi Ekonomi Kopi Robusta Di Desa Lemukih." *Abdimas Mahakam Journal* 9, no. 01 (2025): 1–13.

- Jiang, Songyu, Aker Ratchavieng, Han Wang, Nutteera Phakdeephirot, and Yi OuYang. "Enhancing Sustainable Coffee Tourism Behavior Among Y-Generation via Environment Knowledge." *International Journal of Customer Relationship Marketing and Management* 16, no. 1 (September 30, 2025): 1–20. <https://doi.org/10.4018/IJCRMM.389736>.
- Julianti, Lis, and Artit Pinpak. "The Digitalization of Investment Impact on Developing Tourism Industry." *Journal of Human Rights, Culture and Legal System* 4, no. 3 (December 3, 2024): 655–81. <https://doi.org/10.53955/jhcls.v4i3.289>.
- Ketut Rachmi Handayani, I Gusti Ayu, Cindy Yosiana, and Sutasinee Kongrawd. "Reform of Environmental Approval Policy for Renewable Energy in Indonesia." *Journal of Sustainable Development and Regulatory Issues (JSDERI)* 3, no. 2 (July 12, 2025): 286–323. <https://doi.org/10.53955/jsderi.v3i2.101>.
- Khaokhrueamuang, Amnaj, and Lee Jolliffe. "Tea and Coffee Tourism." In *Reference Module in Social Sciences*. Elsevier, 2026. <https://doi.org/10.1016/B978-0-443-27698-9.00091-X>.
- Kittichotsawat, Yotsaphat, Erwin Rauch, and Korrakot Yaibuathet Tippayawong. "Designing Sustainability Measurement of a Thai Coffee Supply Chain Using Axiomatic Design and Business Model Canvas." *Results in Engineering* 24 (2024): 103443. <https://doi.org/10.1016/j.rineng.2024.103443>.
- Lima, Eloy Orlando Paiva, Flávio Ribeiro da Costa, Miriam Pinheiro Bueno, and Luiz Ricardo Baptista de Godoy. "Coffee, Land, and Regulation: Climate Resilience Strategies for Geographical Indications." *Revista Ft* 30, no. 161 (August 10, 2026): 01–16. <https://doi.org/10.69849/j12as059>.
- Mathew, Ravish, Shwetasaibal Samanta Sahoo, Manoja Padyala, and Sampada Kumar Swain. "Geographical Indication of Food in Promoting Gastronomic Sustainable Tourism: An Indian Outlook." In *Gastronomic Tourism*, 17–24. GB: CABI, 2025. <https://doi.org/10.1079/9781800628854.0003>.
- Mayorga, Isabella, Jose Luiz, Vargas De Mendonça, Zachary Hajian-forooshani, and Javier Lugo-perez. "Tradeoffs and Synergies among Ecosystem Services, Biodiversity Conservation, and Food Production in Coffee Agroforestry." *Frontiers in Forests and*

- Global Change* 5 (2022): 1–15.
<https://doi.org/10.3389/ffgc.2022.690164>.
- Mertada, Kadek, I Gede Surata, and I Komang Kawi Arta. “Efektivitas Pasal 43 Ayat 1 Peraturan Daerah Nomor 4 Tahun 2021 Tentang Lahan Pertanian Pangan Berkelanjutan (Studi Di Kelurahan Penarukan, Kecamatan Buleleng, Kabupaten Buleleng).” *Kertha Widya Jurnal Hukum* 12, no. 1 (2024): 1–34.
- Milano, Marja Zattoni, and Ademir Antonio Cazella. “Environmental Effects of Geographical Indications and Their Influential Factors: A Review of the Empirical Evidence.” *Current Research in Environmental Sustainability* 3 (2021): 100096.
<https://doi.org/10.1016/j.crsust.2021.100096>.
- Misgana, Zerihun, Weyessa Garedew, Yibekal Alemayehu, Zelalem Bekeko, and Amsalu Nebiyu. “The Influence of Shade Tree Species and Coffee Varieties on Selected Soil Physicochemical Properties in Coffee-Based Farming System of Southwestern Ethiopia.” *Trees, Forests and People* 17 (September 2024): 100650.
<https://doi.org/10.1016/j.tfp.2024.100650>.
- Mohd Khalid, Al Hanisham, Khadijah Mohamed, Ahmad Shamsul Abd. Aziz, and Nor Azlina Mohd Noor. “Geographical Indications In Malaysia And Indonesia: Enhancing Protections For Economic Growth And Cultural Heritage.” *ASEAN Legal Insights* 1 (December 30, 2024): 33–53.
<https://doi.org/10.32890/aseanli2024.1.3>.
- Muttaqin, Rifqi. “Analisis Yuridis Peran Pemerintah Kabupaten Gayo Dalam Perlindungan Indikasi Geografis Terhadap Produk Lokal.” *Locus: Jurnal Konsep Ilmu Hukum Republik Indonesia* 2, no. 4 (2022): 156–63.
- Niezen, Sebastian, Markos Kalligeros, Manaav K S Mehta, and Elliot B Tapper. “Coffee Consumption and Lower Advanced Fibrosis Risk in MASLD and MetALD: Dose–Dependent Association With Heightened Protection Among Moderate Alcohol Users.” *Journal of Clinical and Experimental Hepatology* 16, no. 5 (2026): 103612. <https://doi.org/10.1016/j.jceh.2026.103612>.
- Nirosha, R., and J. Paul Mansingh. “Mapping the Sustainability of Geographical Indication Products: A Systematic Literature Review.” *Discover Sustainability* 6, no. 1 (June 18, 2025): 549.

- <https://doi.org/10.1007/s43621-025-01332-4>.
- Parid Pakaya, Dewi Wahyuni K. Baderan, and Marini Susanti Hamidun. "Efektivitas Sistem Agroforestri Dalam Meningkatkan Kesehatan Tanah Dan Produktivitas Pertanian." *Hidroponik: Jurnal Ilmu Pertanian Dan Teknologi Dalam Ilmu Tanaman* 2, no. 2 (May 21, 2025): 12–27. <https://doi.org/10.62951/hidroponik.v2i2.329>.
- Purnamawati, I Gusti Ayu, Gede Adi Yuniarta, and I Gusti Bagus Baskara Nugraha. "Strategy and Sustainability of Ecotourism Villages in the Buleleng Regency." *International Journal of Organizational Behavior and Policy* 3, no. 1 (2024): 1–14.
- Rahmayanti, Ni Luh Putu Nia, and I Ketut Sudiarta. "Pembentukan Organisasi Masyarakat Sebagai Perlindungan Terhadap Indikasi Geografis Kopi Kintamani." *Jurnal Kertha Semaya* 10, no. 10 (2022): 2235–45.
- Sabrina, Ussy Gina, and Rindri Andewi Gati. "Protection of Geographical Indications of Local Indonesian Products from the Perspective of World Intellectual Property Organization." *KnE Social Sciences* 10, no. 15 (2025): 611–28. <https://doi.org/10.18502/kss.v10i15.19216>.
- Sánchez-Hernández, Eva, Jorge Clérigo-de Santiago, Vicente González-García, Marta Herrera-Sánchez, José Luis Marcos-Robles, Jesús Martín-Gil, and Pablo Martín-Ramos. "Circular Economy Approach to Coffee Processing Residue Valorization: Bioactive by-Product Extracts for Managing Pre- and Post-Harvest Fungal Pathogens." *Crop Protection* 199 (2026): 107442. <https://doi.org/10.1016/j.cropro.2025.107442>.
- Sia, Rico, Rahim Darma, Darmawan Salman, and Mahyuddin Riwu. "Sustainability Assessment of the Arabica Coffee Agribusiness in North Toraja: Insight from a Multidimensional Approach." *Sustainability* 17, no. 5 (March 3, 2025): 2167. <https://doi.org/10.3390/su17052167>.
- Soekanto, Soerjono. *Faktor-Faktor Yang Mempengaruhi Penegakan Hukum*, 2005.
- Urugo, Markos Makiso, Mohammed Worku, Yetenayet B. Tola, and Habtamu Fekadu Gemedé. "Ethiopian Coffee: Production Systems, Geographical Origin Traceability, and European Union

- Deforestation Regulation Directive Compliance.” *Journal of Agriculture and Food Research* 19 (March 2025): 101695. <https://doi.org/10.1016/j.jafr.2025.101695>.
- Vu, Oanh Thi Kim, Abel Duarte Alonso, Wil Martens, Lan Do Thi Ha, Thanh Duc Tran, and Trung Thanh Nguyen. “Hospitality and Tourism Development through Coffee Shop Experiences in a Leading Coffee-Producing Nation.” *International Journal of Hospitality Management* 106 (2022): 103300. <https://doi.org/10.1016/j.ijhm.2022.103300>.
- Wang, Jie, Zequn Dong, Zhaoshuo Ning, Qianfeng Luo, and Lixiang Zhang. “Activating the Income Increase Effect of Geographical Indications: The Critical Roles of Intellectual Property Protection and Internet Development.” *Journal of Rural Studies* 118 (August 2025): 103696. <https://doi.org/10.1016/j.jrurstud.2025.103696>.
- Yusifa, Norma, and Sudarko. “Motivasi Petani Kopi Dan Faktor-Faktor Penentu Dalam Penerapan Inovasi Gap Di Sentra Kopi Hutan Rakyat Kabupaten Banyuwangi.” *Jurnal Ilmiah Respati* 13, no. 1 (2022): 9–20.
- Zinsli, M., and R. Villota-Jetzer. “Grounding Coffee Value in Territory: Localised Agro-Food Systems and the Implementation of Geographical Indication in the Global South.” *The International Journal of Sociology of Agriculture and Food*, 32, no. 1 (2026): 87–103. <https://doi.org/10.48416/ij saf.v31i1.734>.

Acknowledgment

The authors gratefully acknowledge the financial and institutional support provided by the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia and Universitas Sebelas Maret, Surakarta, Indonesia, which contributed to the successful implementation of this research.

Funding Information

This research was funded by the Ministry of Higher Education, Science, and Technology of the Republic of Indonesia under the 2026 Applied Research Grant for Prototype Development Scheme, pursuant to Research Agreement No. 312.1/UN27.22/PT.01.03/2026.

Conflicting Interest Statement

The authors state that there is no conflict of interest in the publication of this article.

Publishing Ethical and Originality Statement

All authors declared that this work is original and has never been published in any form and in any media, nor is it under consideration for publication in any journal, and all sources cited in this work refer to the basic standards of scientific citation.

Generative AI Statement

None.