



Geographical indications as a tool for environmental sustainability and community development

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Abstract

Geographical Indications (GIs) have been conceived historically in the intellectual property law regime as indicators of product origin and quality. This article analyses whether harmonizing environmental sustainability standards with GI protection can strengthen both intellectual property rights and environmental conservation in India. The paper does a doctrinal examination of the Geographical Indications of Goods (Registration and Protection) Act, 1999, pertinent environmental laws, and international agreements like the TRIPS Agreement, the research examines how GIs can function as a twofold legal instrument. Case studies such as Darjeeling Tea, Araku Coffee, and Nilgiri Orthodox Tea illustrate that when GI administration integrates ecologically friendly production methods, results are biodiversity conservation, ecologically sustainable livelihoods, and minimized environmental damage. Comparative lessons from the EU's PDO/PGI system show that incorporating sustainability standards into product standards can effectively harmonize market incentives with ecologically sustainable practices. Nonetheless, the existing Indian GI regime lacks obligatory environmental provisions, rendering such practices reliant on voluntary industry or community initiatives.

The paper concludes that it is both desirable and possible to incorporate binding sustainability requirements into GI registration and enforcement.

Policy suggestions are to modify Section 11 of the GI Act so as to make environmental norms compulsory, anchoring GI Codes of Practice in biodiversity and pollution-control legislation, and promoting international collaboration through TRIPS reform. By rediscovering GIs as tools for both intellectual property protection and environmental regulation, India can take the lead to create a model that protects cultural heritage but advances ecological resilience and sustainable countryside development.

Environmental sustainability is the foundation upon which the rights of future generations rest.” – Christopher D. Stone

Keywords: Geographical indications, intellectual property rights, environmental law, biodiversity conservation, trips agreement, sustainable rural development, eco-labelling, pdo/pgi system, community development, india, traditional ecological knowledge

Introduction

In 2021, the Tea Board of India faced mounting concerns that erratic rainfall and rising temperatures were reducing the aroma profile of Darjeeling Tea, a product whose international reputation rests on its distinctive terroir ^[1]. While the Darjeeling Tea Geographical Indication (GI) ensures protection against counterfeit branding, it offers no legal safeguard against the climate-driven ecological degradation that threatens the very qualities it protects. This paradox underscores a critical gap in the current GI regime: the absence of mandatory environmental sustainability provisions.

Geographical Indications (GIs) occupy a distinct place in the spectrum of Intellectual Property Rights (IPRs), protecting goods that derive their quality, reputation, or other characteristics essentially from their geographical origin. Under *Section 2(1)(e)* of the Geographical Indications of Goods (Registration and Protection) Act, 1999 (hereinafter “GI Act”), a Geographical Indication (GI), which is a sign used on products that have a specific geographical origin and possess qualities, reputation, or other characteristics that are essentially attributable to that place ^[2]. In the international context, GIs are governed by *Articles 22–24* of the TRIPS Agreement, 1994, which obligates member states to provide legal means for their protection ^[3].

Historically, they have been used to protect artisanal methods, preserve cultural heritage, and ensure market

exclusivity. Yet, in an era of accelerating biodiversity loss, soil degradation, and climate stress, the question arises: can GIs be re-envisioned as instruments for ecological protection alongside economic development? This paper addresses this question through a doctrinal legal analysis of the GI Act, relevant environmental laws such as the *Biological Diversity Act, 2002*, and international instruments including the TRIPS Agreement and the Geneva Act of the Lisbon Agreement. It also examines Indian and international case studies to assess practical outcomes.

Research Question

How can the integration of environmental sustainability requirements into Geographical Indications protection under Indian and international intellectual property law enhance biodiversity conservation and support community development?

History

The concept of associating goods with a specific place predates modern intellectual property law. In pre-colonial India, guild systems, artisanal communities, and local markets used distinctive signs, seals, and naming conventions to signal the authenticity and quality of goods. For example, *Kanchipuram silk* and *Bidriware* had reputational value linked to the skills and resources of their regions, functioning much like proto-GIs. These customary practices ensured both consumer trust and the preservation

of local knowledge, though they lacked formal legal recognition.

The colonial export economy brought Indian specialties, such as Malabar pepper, Assam tea, and Mysore sandalwood, into global trade networks, but protection was inconsistent. British laws prioritized trademarks over geographic origin, leading to instances where foreign producers could freely use Indian place names without adhering to traditional methods or quality standards. This erosion of authenticity catalysed calls for stronger protection in post-independence policy discourse.

The concept of protecting goods based on origin is centuries old. In medieval Europe, products such as *Champagne* or *Parma Ham* were known for their unique quality tied to specific regions^[4]. The modern legal recognition of GIs developed in the late 19th and early 20th centuries, with France pioneering appellation d'origine contrôlée systems^[5]. In India, the protection of GIs came into effect after the country's accession to the WTO, when compliance with TRIPS necessitated domestic legislation. The GI Act, 1999, enforced from 15 September 2003, made *Darjeeling Tea* the first registered GI in India in 2004^[6].

As of 2024, India has registered 643 GIs, including 605 of Indian origin and 38 of foreign origin. These GIs are categorized into five groups: handicrafts, agricultural goods, foodstuffs, manufactured goods, and natural goods^[7]. Approximately 65% of these are agro-based products, many of which are deeply tied to specific agro-climatic conditions and traditional cultivation methods. This intrinsic linkage between production and environment means that GI protection often indirectly safeguards ecosystems. For instance, Araku Coffee from Andhra Pradesh is cultivated using shade-grown, biodiversity-friendly methods^[8], while Channapatna toys from Karnataka are crafted using natural, non-toxic dyes that minimise environmental harm^[9].

From an environmental perspective, GIs encourage sustainable production practices, promote biodiversity conservation, and safeguard traditional ecological knowledge (TEK). This aligns with several environmental law objectives, such as those under the *Environment (Protection) Act, 1986*, and the *Biological Diversity Act, 2002*^[10]. In effect, GIs can serve as a bridge between IPR protection and environmental sustainability, fostering both community development and ecological preservation.

Integrating environmental compliance into GI governance is not only desirable, but also necessary given the mounting dangers posed by climate change to traditional agricultural zones and the growing demand from consumers for sustainable goods. This study examines the function of GIs as instruments for community development and environmental sustainability, examining their legal foundations, practical uses, difficulties, and future directions.

Legal Framework in India And Internationally

▪ Intellectual Property Law Provisions in India

The Geographical Indications of Goods (Registration and Protection) Act, 1999 (GI Act) provides the statutory basis for GI protection in India^[11]. Under *Section 2(1)(e)*, a GI identifies goods as originating from a territory, region, or locality where a given quality, reputation, or characteristic is essentially attributable to its geographical origin^[12]. *Sections 11–13* detail the procedure for application and registration, requiring a clear description of the product,

production process, and geographical boundaries^[13]. Notably, these “production specifications” can embed environmental requirements, though the Act does not explicitly mandate eco-compliance.

Under *Sections 21–25*, infringement occurs when a GI is used in a manner that is misleading consumers as to the origin of the goods or in a way that constitutes unfair competition^[14]. Remedies include injunctions, damages, and destruction of infringing goods. The Act's linkage with environmental sustainability is indirect, where eco-friendly methods form part of the specification, infringement also constitutes deviation from such methods.

The GI Rules, 2002, under *Rule 32*, further require an “affidavit as to how the applicant represents the interests of producers,” which can be leveraged to include sustainable production obligations^[15].

▪ Environmental Law Provisions Relevant to GIs

While the GI Act is part of IPR law, several environmental statutes intersect with GI protection. The Environment (Protection) Act, 1986, empowers the central government to regulate industrial processes to protect the environment, allowing it to issue notifications for eco-friendly practices linked to GI products^[16]. The Biological Diversity Act, 2002, protects biodiversity and traditional knowledge. GIs like *Naga Chilli* or *Mizo Chilli* involve indigenous plant varieties whose commercial use is regulated under this Act^[17]. The Forest Rights Act, 2006, recognises community rights over forest produce; relevant for GIs such as wild honey or lac^[18]. The Wildlife Protection Act, 1972, prevents the exploitation of species used in traditional handicrafts that may be linked to GIs^[19]. These laws, though separate, can work in tandem with GI specifications to ensure that environmental sustainability is embedded in product standards.

At the global level, the TRIPS Agreement sets minimum standards for GI protection. *Article 22* defines GIs, *Article 23* provides additional protection for wines and spirits, and *Article 24* contains exceptions^[20]. While TRIPS does not expressly address environmental sustainability, the linkage can be inferred under *Article 20 of the WTO Agreement on Agriculture* and sustainable development clauses in the Marrakesh Agreement preamble^[21].

Darjeeling Tea^[22]: Case Highlights Disputes over the use of the “Darjeeling” name demonstrate how GI protection guarantees that only tea cultivated in the specified location, following tight cultivation and manufacturing criteria, may be sold as Darjeeling Tea. Here, the Environmental Link is about the conservation of this GI fosters the adoption of traditional agriculture practices and maintains local biodiversity within the Darjeeling area, generating a deeper knowledge of the need to conserve local ecosystems.

Basmati Rice^[23]: The Case Highlights The registration of Basmati Rice's GI status safeguards its name against abuse by foreign enterprises, assuring that only rice grown in the Indo-Gangetic Plains region may be marketed as such. Here, Environmental Links includes protection that preserves the long-term viability of the region's distinctive agricultural techniques related to Basmati rice growing, which can also be linked to sustainable land use and biodiversity.

Cognac (France): The Case Highlights the French GI for Cognac safeguards against its abuse in goods such as non-alcoholic beverages^[24]. Here, the Environmental Link involves protection for Cognac's specialised and resource-

intensive manufacturing process, which is linked to the unique terroir of the Cognac area in France, as well as its specific farming and distilling practices. Protecting the GI protects both the accompanying biological system and the unique cultural history that is linked with it.

Asociacion De Productores De Pisco A.G. vs. Union of India & Ors. (2025) ^[25]: This recent case highlights the importance of GIs in protecting regional products. Protecting Pisco's GI ensures that its specific production methods, tied to the region's natural resources and human traditions, are preserved from misuse, thereby supporting sustainable production practices.

Geographical Indications- A Tool for Environmental Sustainability

The environmental dimension of Geographical Indications is not expressly provided in either the GI Act, 1999, or the TRIPS Agreement. However, in practice, GIs frequently serve as indirect environmental governance mechanisms by embedding sustainable practices in the product specifications required for registration ^[26]. These specifications, once registered, become legally enforceable, ensuring that all authorised users follow the prescribed methods.

GI registration requires a detailed description of the goods and the method of production (*Section 11(2)(f) of the GI Act*) ^[27]. This provides an opportunity to take part in environmental safeguards. Organic farming requirements, Soil and water conservation methods, Prohibition of certain chemical inputs, Preservation of indigenous seed varieties.

For example, *Darjeeling Tea*, India's first registered GI, is cultivated under specific altitude, climate, and shade conditions. The Tea Board of India's Code of Practice mandates integrated pest management, soil conservation, and minimal chemical use to preserve the Himalayan ecosystem ^[28]. Any deviation can lead to the producer losing GI certification, creating a direct incentive to maintain eco-friendly practices.

Araku Coffee, registered as a GI in 2019 ^[29], is produced by tribal farmers in Andhra Pradesh using shade-grown cultivation, which maintains forest cover and supports biodiversity. Coffee manufacturing has provided the residents of Araku with the means they need to construct educational and medical facilities, as well as access to better food and drinking water. What coffee brought them was a genuine social revolution. The people of Araku have recently escaped from poverty and recovered complete authority. The valley has become a model for other locations throughout the world. We can attest to the following: if the miracle occurred in Araku, it can happen anywhere ^[30]. The linkage between GI enforcement and environmental law here is operational: violation of agroforestry requirements not only breaches GI conditions but may also constitute an environmental law infraction.

The *Nilgiri Orthodox Tea* GI mandates contour planting to prevent soil erosion in the hilly terrain ^[31]. It promotes organic cultivation, helps small tea farmers and workers, and develops premium marketplaces that encourage environmentally responsible methods ^[32]. The GI certification preserves the tea's quality and provenance, providing farmers with a competitive advantage and

motivation to use sustainable practices like as agroforestry and water management, which help the local ecology and economy.

Many GI products in India incorporate traditional ecological knowledge (TEK), for example, *Mizo Chilli* practices indigenous pest-control techniques based on locally available herbs ^[33]. This contributes to biodiversity preservation and reduces chemical contamination in soil and water.

Varanasi Brocades and Sarees (registered 2009) ^[34] have an environmental angle—traditional weaving processes employ handlooms, needing no energy, therefore lowering carbon emissions compared to mechanised alternatives. The use of natural colours in particular variations lower water pollution. GI protection has helped to revitalise demand for handwoven items, preserving livelihoods for thousands of weavers and averting migration to ecologically pressured metropolitan areas.

International Context

Geographical Indications are recognised globally under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), specifically Articles 22–24, which define GIs and establish minimum protection standards for WTO Members ^[35]. While TRIPS primarily frames GIs as a trade-related IPR, several jurisdictions have interpreted and implemented GI protection in ways that promote environmental sustainability and rural development.

A GI, as defined in TRIPS Article 22(1), defines products as originating in an area where a specific quality, reputation, or other attribute is primarily due to their geographical origin ^[36]. This “other characteristic” can encompass environmental attributes, such as climate, soil quality, and biodiversity, thereby allowing eco-friendly production requirements to be embedded in GI specifications. Article 23 provides additional protection for wines and spirits, while Article 24 outlines exceptions and negotiation clauses. Notably, TRIPS do not explicitly require sustainability criteria in GI specifications, leaving such integration to national laws. However, in practice, many countries use GIs as environmental governance tools.

The EU operates one of the most advanced GI systems, distinguishing between Protected Designation of Origin (PDO) and Protected Geographical Indication (PGI) ^[37]. The EU's implementing regulations require detailed product specifications, which may include environmental criteria. *Parmigiano Reggiano PDO* dairies must comply with strict waste disposal and manure management rules to protect local water quality ^[38].

The World Intellectual Property Organization (WIPO) has promoted GIs as a means of protecting traditional knowledge (TK) and fostering environmentally sustainable livelihoods ^[39]. In its case studies, WIPO documents how GIs such as *Tequila* (Mexico) enforce sustainable agave farming practices to prevent soil degradation, and how *Penja Pepper* (Cameroon) incorporates agroforestry.

Challenges in Using GI For Environmental Sustainability

While Geographical Indications offer a promising tool for linking intellectual property rights to environmental

protection, several challenges hinder their effectiveness. These challenges span from legal loopholes and enforcement gaps to conflicts between commercial exploitation and ecological preservation.

Misuse and Counterfeiting of GI Tags

The proliferation of counterfeit GI-labelled products undermines both economic and environmental objectives. In India, fake *Darjeeling Tea* sold in domestic and international markets not only harms producers but also circumvents sustainable cultivation requirements embedded in the GI Code of Practice ^[40]. Globally, *Champagne* producers have repeatedly litigated against misappropriation of the name in unrelated sparkling wines ^[41], demonstrating that even strong GI systems require constant enforcement. Misuse dilutes the incentive for environmentally responsible practices since counterfeit goods are not bound by the same ecological standards.

Lack of Effective Enforcement Mechanisms

Under the Geographical Indications of Goods (Registration and Protection) Act, 1999, Section 21 provides for infringement actions, yet actual enforcement depends on producer groups initiating costly litigation. Many small-scale farmer collectives lack the resources to pursue infringers.

Balancing Commercialisation with Environmental Protection

In some cases, market demand for GI products can lead to unsustainable intensification of production. For instance, in *Basmati rice*, ⁵ increased export demand has led to expansion into non-traditional areas, threatening soil fertility and water resources. This reliance on groundwater is causing an underground water crisis, jeopardising the long-term viability of rice agriculture, which is critical for both local and global food security ^[42]. In *Blue Mountain Coffee*, over-planting in unsuitable terrains has raised concerns over deforestation.

Fragmented Governance and Policy Overlaps

GI governance often operates in isolation from environmental regulatory frameworks. For example, GI registration under the 1999 Act does not require compliance with environmental statutes like the Biological Diversity Act, 2002, or eco-sensitive zone guidelines under the Environment (Protection) Act, 1986. This creates a gap where products may carry a GI tag without meeting sustainability standards.

Fake Eco-Labeling and Greenwashing

A growing concern is the overlap between GIs and eco-labelling claims. Some producers use environmental claims (e.g., “organic,” “eco-friendly”) alongside GI tags without certification, misleading consumers.

Policy Recommendations

India should align Geographical Indications (GIs) with environmental sustainability and community development by integrating eco-compliance directly into the *Geographical Indications of Goods (Registration and Protection) Act, 1999*. A new clause in Section 11(2) can mandate proof of adherence to notified environmental

standards, covering sustainable production, biodiversity conservation, and waste management. GI Codes of Practice should be linked to the Biological Diversity Act, 2002, the Environment (Protection) Act, 1986, and the Water Act, 1974, to ensure legal consistency. A hybrid “GI + Eco-Label” certification, modelled on the EU Organic Logo, can distinguish genuinely sustainable products. Enforcement mechanisms could be enhanced through State-level GI Enforcement Cells empowered to inspect markets, seize counterfeit goods, and impose statutory damages for wilful infringement. Benefit-sharing provisions, similar to those outlined in the Nagoya Protocol, may direct a portion of GI revenues to community conservation funds. Public R&D should prioritise eco-innovations such as low-water irrigation for Basmati, biodegradable packaging for Araku coffee, and renewable-energy tea processing in Darjeeling.

Conclusion

This paper set out to examine whether the integration of environmental sustainability requirements into Geographical Indication (GI) protection can strengthen both intellectual property rights and ecological conservation. The analysis of Indian law, comparative international frameworks, and case studies such as *Darjeeling Tea*, *Araku Coffee*, and *Nilgiri Orthodox* demonstrates that GIs possess inherent potential to link market recognition with eco-friendly production practices. However, without explicit environmental compliance obligations, this potential remains underutilised. The Indian Geographical Indications of Goods (Registration and Protection) Act, 1999 currently operates in a silo, offering robust protection for origin-linked products but leaving biodiversity conservation and sustainable resource management to parallel environmental statutes. In contrast, the EU’s PDO/PGI system and certain community-led models embed sustainability standards directly into product specifications, ensuring that market benefits are tied to environmental responsibility.

Case studies reveal that where GIs are managed with strong Codes of Practice, including restrictions on chemical inputs, preservation of native crop varieties, and ecosystem-friendly harvesting, both rural livelihoods and local ecosystems benefit. Conversely, weak enforcement, counterfeiting, and over-commercialisation can result in environmental degradation and dilution of cultural heritage.

The answer to the research question, therefore, is affirmative but conditional: the integration of environmental compliance into GI frameworks can indeed strengthen intellectual property protection and ecological sustainability in India, provided that such integration is legally mandated, effectively enforced, and supported by community participation and benefit-sharing mechanisms.

Policy recommendations offered in this paper, such as amending Section 11 of the GI Act to include environmental criteria, linking GI Codes of Practice to biodiversity and pollution-control laws can bridge the current governance gap. International cooperation through TRIPS reform and the WIPO model laws could further reinforce this link on a global scale.

Ultimately, GIs should not merely certify geographical origin; they should embody a commitment to environmental stewardship, community empowerment, and intergenerational equity. By reimagining GI protection as both a tool of intellectual property law and an instrument of environmental governance, India can lead in crafting a

model where cultural heritage and ecological resilience grow together.

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