Between Biodiversity and Biopiracy: Indonesia's Legal Approach

Dominggus Ferdinan *

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Article

Between Biodiversity and Biopiracy: Indonesia's Legal Approach

Dominggus Ferdinan

Master's Student, Faculty of Law, Universitas Pelita Harapan, Surabaya, Indonesia;
02669240005@student.uph.edu or dominggus@aksesi.cloud

Abstract: The protection of biodiversity and genetic resources has become a strategic legal concern both nationally and internationally, particularly for megadiverse countries like Indonesia. Amidst the growing exploitation of biological materials by the global biotechnology industry, biopiracy—defined as the unauthorized appropriation and utilization of genetic resources and traditional knowledge without prior informed consent or equitable benefit-sharing—poses serious threats to the bio-cultural sovereignty of local communities. This study critically examines Indonesia's legal approach to biopiracy by analyzing the evolution of its national regulatory framework following the ratification of the Convention on Biological Diversity (CBD) and the Nagoya Protocol, and by contrasting it with the global intellectual property regime, especially the TRIPS Agreement under the World Trade Organization (WTO). Employing a normative legal approach and grounded in Rudolf von Jhering's theory of law as an instrument of social struggle toward utilitarian ends, the article advocates for a more responsive and contextually grounded legal reform in Indonesia. This includes the development of a sui generis system to recognize Communal Intellectual Property Rights (CIPRs), mandatory disclosure of origin in patent applications, and the legal empowerment of Indigenous and local communities as rightful holders of ecological knowledge. The study concludes that Indonesia must adopt a legal strategy that is not only defensive but also proactive and sovereign within the global legal order, ensuring that the nation's biodiversity is effectively protected, sustainably utilized, and fairly shared for the benefit of present and future generations.

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1. Introduction

Indonesia is recognized as a Mega Cultural Biodiversity Country, possessing vast potential in the field of intellectual property rooted in traditional values, cultural heritage, and the richness of natural resources across its archipelago. This substantial intellectual property potential can serve as a foundation for developing Indonesia's nation branding. The concept of nation branding encompasses a wide range of integrated dimensions that require systemic development, including economic, tourism, cultural, and governance aspects, among others. Nation branding holds the potential to significantly enhance a country's global competitiveness. (Rizkytia 2022). Indonesia is one of the centers of world agro-biovariety, because 10% of the world's high plant species are found in Indonesia. In terms of fauna variety, about 12% of the world's mammals (515 species) are found in Indonesia. This places Indonesia in second place after 'Federal Republic of Brazil' at the international level. Having around 16% of the world's reptiles (791 billion species), and 35 primate species places Indonesia in fourth place in the world for both categories. for bird species, Indonesia is the fifth ranked country in the world with 17% of the realm 's birds (1,592 species); and ranked sixth for frogs with 270 species. But unfortunately, judging from the status of biovariety starting from ecosystems, species, and genetics; Indonesia is the 6th ranked country experiencing damage to natural biovariety in the realm. Then, utilization efforts are very exploratory, but efforts to protect the ecosystem are very minimal. (Duadji et al. 2023)

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According to (Imran et al. 2021) Biopiracy is "the unauthorized extraction of biological resources and/or associated traditional knowledge from developing countries, or the patenting of spurious inventions based on such knowledge or resources without compensation." Hidden cases of biopiracy began to be opposed, and the term biopiracy was coined in the 1990s by environmentalists and nongovernmental organizations - Biopiracy, as a "silent disease," is hardly detectable because it frequently does not leave any traces. Unfortunately, electronic media tend to highlight environmental pollution and deforestation, while incidents of biopiracy are less frequently reported. This silent pillaging deprives countries that lack proper advancement in biotechnology—primarily in Africa, Latin America, and Asia—of the means to financially support the development and sustainability of biotechnological projects. In the long run, biopiracy disrupts biodiversity conservation efforts. This practice embodies a form of modern-day colonialism: a subtle commodification of biological heritage that has been preserved and developed over generations by Indigenous and local communities. Behind patents on tropical plant compounds or cosmetic formulations based on traditional herbal remedies lies a structural inequality between collective, localized knowledge systems and the global intellectual property (IP) regime, which tends to privilege individual ownership and the commercialization of knowledge.

The concept of Communal Intellectual Property (CIP) provides a legal foundation for recognizing the collective rights of indigenous peoples and local communities over intellectual creations rooted in traditional knowledge, cultural expressions, and inherited ecological practices. Unlike conventional intellectual property regimes, which emphasize individual ownership and original authorship, CIP encompasses forms of knowledge and innovation that are developed collectively over generations and cannot be attributed to a single inventor. The categories of CIP include Indications of Source, Geographical Indications, Appellations of Origin, Traditional Knowledge, Traditional Cultural Expressions (Folklore), and Genetic Resources. Legal protection of these communal assets is essential to preserve the cultural integrity of local communities, prevent biopiracy, and ensure equitable benefit-sharing arising from the commercial use of these resources. As such, CIP serves not only as a mechanism for intellectual recognition but also as a tool for social and ecological justice within global and national frameworks of biodiversity governance. (Harsa et al. 2021).

One illustrative case is the patent awarded to Japan's Shiseido Corporation for eleven (11) active compounds derived from Indonesia's traditional *jamu (herbal & spices drinks)* remedies. These compounds were claimed to offer skin care benefits and were incorporated into high-end cosmetic products, all without the involvement or acknowledgment of the communities that have historically maintained and transmitted this knowledge (Gonzalez 2023).

Biopiracy does not occur in a vacuum but rather within the architecture of international law, still largely influenced by the interests of developed nations. The global patent system, governed by the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement under the World Trade Organization (WTO), de facto favors industrial actors and inventors from the Global North over small-scale farmers or Indigenous peoples in the Global South. Meanwhile, international legal instruments aimed at safeguarding genetic resources—such as the Convention on Biological Diversity (CBD) and the Nagoya Protocol on Access and Benefit-Sharing—have yet to achieve robust and uniform implementation at the national level.

Indonesia ratified the Nagoya Protocol through Law No. 11 of 2013, in Article 5(5) of the Nagoya Protocol operationalizes the principle of equity through a binding and enforceable benefit-sharing mechanism, ensuring that Indigenous and local communities receive a fair share of the benefits arising from the utilization of their traditional knowledge. By addressing the aspirational limitations of Article 8(j) of the Convention on Biological Diversity (CBD), the Protocol strengthens the legal standing of local knowledge holders within the international legal framework. (Lim 2020) In the Indonesian context, although the Protocol was ratified through Presidential Regulation No. 21 of 2018, its domestic implementation remains constrained by normative and institutional challenges. Unclear procedures for identifying rightful knowledge holders, the absence of established consent

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mechanisms, and the lack of representative institutions for Indigenous communities hinder effective enforcement. Therefore, the concretization of equity under Article 5(5) must be reflected in national legislation through context-specific, community-oriented regulatory instruments. This legal refinement is essential for promoting an inclusive, fair, and sustainable biodiversity governance framework in Indonesia.

This perpective invites a deeper philosophical reflection on the role of law in society. If law is viewed solely as a normative text or bureaucratic mechanism, it risks lagging behind the fast-evolving dynamics of power and technology. A more conceptual approach is required to assess law as a tool for social and political struggle. In this context, the jurisprudence of Rudolf von Jhering, a 19th-century German legal philosopher, offers significant insights. (Roscoe 1911)

Jhering rejected the notion of law as static and dogmatic. In his seminal work *Der Zweck im Recht* (*The Purpose in Law*), he argued that law exists to achieve social objectives and that its legitimacy derives from its capacity to serve communal interests. For Jhering, rights are not merely born of private ownership but emerge from collective conflict and the pursuit of justice. Accordingly, legal norms should be evaluated based on their contribution to societal well-being. Law, in Jhering's view, must take a stance in the struggle between power and popular interest. (Roscoe 1911)

Applying Jhering's framework of *social utilitarianism*, biopiracy can be understood not merely as a violation of intellectual property rights or traditional customs, but as a manifestation of structural injustice that undermines collective utility. When compounds from Indonesian plants are patented abroad without benefit-sharing, the loss is not only borne by Indigenous communities but also by the nation as a whole, as it forfeits control over a vital strategic resource. In this light, the law must function as a mechanism to reclaim and redistribute those benefits for the broadest segment of society, including future generations.

Consequently, Indonesia's legal response to biopiracy must address both philosophical and practical imperatives. Philosophically, the state must redefine the relationship between humanity, law, and nature through the lenses of ecological justice and genetic sovereignty. Practically, a comprehensive legal strategy should include: (1) legal protection for traditional knowledge and cultural expressions of Indigenous peoples; (2) an integrated documentation and registration system for genetic resources; (3) enhanced negotiating power in international forums, particularly regarding global patent reform and the recognition of collective rights; and (4) community empowerment through legal education and active participation in ABS schemes.

Thus, the envisioned legal approach must transcend reactive enforcement and evolve into a transformational framework. Law should no longer be perceived solely as a top-down instrument but as a contested space wherein local communities, scholars, activists, and the state collectively reshape the meaning of justice in the context of biodiversity governance. Jhering referred to this as *Kampf ums Recht*—the struggle for a law that lives within society, not one that merely survives in legal texts.

In addressing these multifaceted challenges, this paper seeks to explore the following research question: How can Indonesia design legal strategies and approaches to protect its genetic resources and traditional knowledge from the threat of biopiracy, using the instrumentalist legal philosophy of Rudolf von Jhering as a conceptual framework?

This question will be examined through a normative legal approach grounded in literature review, analysis of national and international legal frameworks, and philosophical reflection on the function of law in confronting global inequities. By positioning Jhering's thought as the theoretical foundation, this study aims to contribute both conceptually and practically to the development of a legal architecture in Indonesia that upholds ecological justice and biological sovereignty.

2. Literature Review

Biodiversity and genetic resources are no longer viewed merely as environmental concerns; rather, they have increasingly become a contested legal and geopolitical domain, involving complex intersections of economic interest, national sovereignty, and social justice. In the Indonesian

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context—recognized as one of the world's megadiverse countries—efforts to safeguard genetic resources and traditional knowledge are shaped by the dynamic interplay between domestic legal frameworks, international obligations, and the structural pressures imposed by global intellectual property regimes such as the TRIPS Agreement under the World Trade Organization (WTO).

Historically, Indonesia's legal approach to biodiversity has predominantly been rooted in environmental law rather than developed as a distinct legal discipline. The foundational Law No. 5/1990 on the Conservation of Biological Natural Resources and Their Ecosystems serves as an early milestone. This statute explicitly emphasizes conservation and preservation, incorporating criminal sanctions against activities causing ecological degradation. However, its focus is primarily on the physical conservation of species and habitats, with limited attention to the genetic information they contain or the associated economic and cultural values.

The ratification of the Convention on Biological Diversity (CBD) through Law No. 5/1994 marked a paradigm shift, promoting a model in which conservation must be coupled with sustainable use and the fair and equitable sharing of benefits. The CBD affirms state sovereignty over genetic resources within national jurisdictions and calls upon Parties to develop national legal systems to regulate access and benefit-sharing (ABS) mechanisms in the utilization of such resources.

In line with this, Indonesia ratified the Nagoya Protocol via Law No. 11/2013 and introduced subsequent technical regulations such as Ministerial Regulation No. P.92/MENLHK/SETJEN/KUM.1/8/2018. Nonetheless, the effectiveness of these regulations remains hindered by fragmented institutional mandates, low community awareness regarding their rights, and weak enforcement mechanisms. National assessments indicate that only approximately 30% of the commitments under the CBD and Nagoya Protocol have been adequately translated into domestic legislation.

Additionally, there exists a stark asymmetry between national efforts to conserve biodiversity and the political economy embedded within the international intellectual property system. The TRIPS regime mandates minimum standards for intellectual property protection, including patents over inventions derived from biological material. (Rahmah 2020) However, these standards are predicated on private and individualistic legal assumptions, which run counter to the collective and communal nature of traditional knowledge and genetic resources developed over generations.

Several scholarly works have underscored the limitations of defensive protection mechanisms such as traditional knowledge databases. Bagley (2008) notes that while such databases can serve to invalidate illegitimate patent claims, they offer little substantive protection in the absence of positive legal rights to govern the use of traditional knowledge. Furthermore, procedural discrepancies across jurisdictions regarding patent disclosure requirements and the obligation to identify the origin of genetic material continue to undermine the position of developing countries.

In response, many legal scholars advocate for the development of a sui generis legal regime—i.e., a specialized legal system tailored to the unique characteristics of genetic resources and traditional knowledge. In Indonesia, this proposition faces considerable institutional and legal-political hurdles. As highlighted by (Lubis 2021), despite the existence of more than 28 biodiversity-related statutes, there remains no comprehensive legal instrument that addresses genetic resources and associated knowledge as a unified and integrated system.

Comparatively, countries such as Australia and New Zealand have seen the evolution of biodiversity law as a distinct academic and legal discipline. In institutions like the University of Melbourne and the University of Wollongong, biodiversity law is integrated into environmental law and natural resource policy curricula, reflecting a recognition that biodiversity is not merely an ecological matter but also a question of knowledge sovereignty and intergenerational justice. (Holley 2012)

At the international level, there are ongoing efforts to reform the approach to traditional knowledge and communal intellectual property rights. A notable development is the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), which affirms indigenous peoples' rights to maintain, control, and develop their cultural expressions and traditional knowledge. Article 11(1)

 doi:10.20944/preprints202506.1147.v1

of UNDRIP obliges states to establish redress and restitution mechanisms for cultural assets taken without free, prior, and informed consent.

Despite this, the practical implementation of UNDRIP and the CBD remains constrained by the dominance of the global patent regime. For instance, under many national patent laws, disclosure of origin for genetic material remains optional. Even when procedural violations are identified, patent validity is often maintained as long as novelty and inventive step criteria are met. This reveals a structural disjuncture between customary law systems and the formalism of international intellectual property law.

Critical legal scholarship has consistently highlighted the epistemic asymmetries inherent in the TRIPS regime, whereby Western scientific knowledge is privileged over indigenous epistemologies. Vandana Shiva, for instance, has illustrated how multinational corporations utilize patent law to claim exclusive rights over plant varieties long cultivated by local farmers. This process not only encloses traditional knowledge but also reassigns economic and cultural control from local communities to global actors. As she emphasized during protests in the late 1990s, two notable examples from the Indian context include the transfer of basmati rice varieties to support the rice economy of the United States, and the export of neem seeds from Indian farms by large corporate entities (Imran et al. 2021)

In light of these challenges, there is an urgent need for Indonesia to articulate a coherent and context-sensitive legal architecture. Such a framework must move beyond the mere transposition of international models, toward constructing a national legal regime grounded in principles of ecological justice and collective rights. Legal recognition of traditional knowledge and genetic resources should not be confined to economic valuation, but understood as central to cultural identity, self-determination, and sovereign control over the country's biological heritage.

As biotechnological innovation and pharmaceutical development increasingly depend on genetic materials sourced from tropical ecosystems, countries like Indonesia are compelled to develop legal and policy responses that are not only defensive but also anticipatory. This includes strengthening domestic regulations, engaging in legal diplomacy at forums such as WIPO and WTO, and advocating for substantive reforms to global patent law—particularly with respect to mandatory disclosure of origin and recognition of community-based rights. (Rahmah 2020)

These efforts will only be impactful if supported by systematically documented national databases of genetic resources and traditional knowledge, as well as inclusive governance structures that center indigenous and local communities as legal subjects. In this regard, the legal recognition of Communal Intellectual Property (CIP) rights should not be reduced to mere benefit-sharing arrangements; it must be framed within a broader discourse of cultural recognition, legal empowerment, and the right of communities to shape their own futures.

3. Discussions

The phenomenon of biopiracy serves as a stark mirror reflecting the structural imbalance ingrained within the international legal order—an imbalance that transcends mere technical or normative deficits and permeates dimensions of social justice, ethical legitimacy, and the sovereignty of nation-states over their biological wealth. In this context, countries of the Global South—particularly those endowed with high biodiversity—frequently occupy vulnerable positions, becoming prime targets for exploitation by multinational entities that exploit loopholes within both domestic and international legal frameworks. Far from serving as protectors of the underprivileged, law often operates as an instrument that legitimizes exploitation under the sanctity of formal legality.

Historically, the case of turmeric patenting in India in the mid-1990s illustrates the consequences of inadequate systematic documentation of traditional knowledge within global intellectual property regimes. When two U.S. researchers were granted a patent for turmeric's wound-healing use, despite long-documented Ayurvedic practices in India, the lack of accessible prior art enabled a foreign claim on knowledge held in trust by local communities for centuries. India's invocation of prior art to overturn the U.S. patent underscores two critical realities: first, that undocumented traditional

 doi:10.20944/preprints202506.1147.v1

knowledge is vulnerable to expropriation; and second, that the absence of mandatory disclosure of origin within the TRIPS framework constitutes fertile ground for legal forms of biopiracy.

A similar narrative unfolded in Brazil, where global cosmetic corporations patented extracts from copaiba and andiroba—rich Amazonian resources—without consent from indigenous communities. This exploitation propelled Brazil to enact Law No. 13.123/2015, featuring a national registry and stringent Access and Benefit-Sharing (ABS) requirements. However, legislation alone proved insufficient, as enforcement remained hampered by limitations in political commitment, funding, and institutional capacity—revealing that formal legal recognition does not automatically guarantee substantive justice. (Secom 2024)

In East Africa, Ethiopia's experience with teff—a staple cereal and cultural emblem—demonstrates how European patent systems can disregard collective claims rooted in ethnic identity and communal practice. Although a Dutch entity eventually lost its patent, the symbolic and economic harms endured by Ethiopian farmers point to a broader pattern: global intellectual property structures remain aligned with Western proprietary paradigms at the expense of indigenous stakeholders.

Turning to Indonesia, a megadiverse nation with extraordinary biological and epistemic richness, the Shiseido case stands out conspicuously. Eleven bioactive compounds derived from Indonesian jamu were patented for cosmetic use with zero involvement of local communities or benefit-sharing mechanisms. Similar appropriation occurred in patents claimed over Tongkat Ali, Kaempferia rotunda (Kunci Pepet), and Pegagan—plants rooted in local custom and medicinal usage, resold at high prices to local populations who receive no form of compensation. These incidents underscore the persistent vulnerability of Indonesia's biodiversity heritage in the absence of robust legal safeguards.

Indonesia has sought to address these challenges through ratification of the Nagoya Protocol via Law No. 11/2013 and Ministerial Regulation P.92/2018, establishing a domestic legal framework for ABS. Despite these normative advances, enforcement remains fragmented and sectorally siloed. Responsibility is dispersed across the Ministry of Environment and Forestry, the Ministry of Law and Human Rights, the Ministry of Research and Technology, and the Ministry of Education and Culture—without unified oversight. Critically, there is no national registry equivalent to India's Traditional Knowledge Digital Library (TKDL), and local communities lack the legal literacy and resources to assert their rights within national or global fora.

The illicit appropriation of biodiversity is often camouflaged under the veneer of legitimate research or eco-tourism. The 2012 case involving a British student collecting biological samples in Kalimantan, and a 2017 incident of a French national smuggling rare Ornithoptera goliath butterflies from Papua, exemplify this "gray zone." In these scenarios, the absence of digital traceability systems and robust verification mechanisms renders administrative permits insufficient to distinguish lawful endeavor from covert extraction, challenging regulators and emboldening exploitative behavior.

Indonesia's intellectual property regime—rooted in an individualistic and liberal understanding of rights—currently fails to recognize collective knowledge or communal innovation. Traditional knowledge is often shared across generations and lacks singular ownership, making it ineligible for patent protection under conventional standards. This disconnect between legal theory and cultural reality weakens moral legitimacy and allows multinational actors to appropriate communal knowledge through procedural technicalities, undermining the communal compact that sustains indigenous stewardship.

It is within this troubled landscape that the philosophy of Rudolf von Jhering offers critical insight. Rejecting normative legal formalism, Jhering conceptualizes law as a site of struggle (*Kampf ums Recht*), an instrument of social contestation rather than a static framework. Law, to Jhering, is not neutral; it is designed to side with the just. Mere regulatory formalism—a proliferation of statutes or procedural guidelines—is insufficient. Rather, law must be wielded strategically and proactively to dismantle structural inequities.

 doi:10.20944/preprints202506.1147.v1

In the fight against biopiracy, a Jhering-inspired teleological approach demands more than technical compliance. It calls for a robust civil society and activist-oriented legal posture: one that orchestrates litigation to challenge illegitimate patents, convenes community mobilization for enforcement of prior art, and leverages transparent public review mechanisms. The State, legally and morally compelled, must support these endeavors, reinforcing litigation with policy backing and funding.

From a diplomatic standpoint, such an approach necessitates proactive engagement in international policy fora. Indonesia could spearhead an alliance across the Global South to lobby for amendments to the TRIPS Agreement—mandating disclosure of origin, ensuring mandatory prior informed consent, and enhancing protections for communal rights. In parallel, it could advocate for the Nagoya Protocol to include enforceable cross-border mechanisms against ABS violations and monetary reparation for affected communities.

Domestically, the establishment of a single ABS authority—the *National ABS Management Agency*—could unify administrative processes while fostering digital traceability and community-contributed knowledge registries. Legislative reform to explicitly recognize communal intellectual property through amendments to patent law should follow, enabling community-based patent oppositions and access to state-supported legal services. This form of law-based activism epitomizes collective resistance—transforming legal conflict into a platform for embedding ecological justice.

Culture and education also play pivotal roles. Legal ecological literacy campaigns—from grassroots to academic levels—would empower indigenous and rural communities to document, assert, and legally defend their rights. Such a paradigm transcends compliance; it cultivates skeptical and informed citizens who hold state and corporations accountable.

Jhering's doctrine around moral perseverance emphasizes that law gains vitality through the resistance it enables. Applied to biopiracy, this resistance involves confronting privatization of communal heritage and asserting legal primacy of ecological stewardship over narrow commercial gains(Roscoe 1911). Indonesia stands at a crossroads: will its legal order function as a shield for non-state exploitation, or be reclaimed as an instrument of ecological justice?

Achieving biological sovereignty requires a two-pronged strategy: internally, by building coherent, participatory, and well-enforced legal infrastructures; and externally, by reshaping international intellectual property norms to affirm collective rights. This synergy—grounded in Jhering's vision—can help Indonesia escape the trap of exploitative global frameworks and emerge as a beacon of transformative biodiversity governance.

In sum, Indonesia's path forward demands that law be more than a passive regulator: it must actively combat injustice, support community agency, and foster environmental stewardship across generations. Only then can ecological justice transcend technical compliance, culminating in a reimagined form of *Rechtskampf*—a morally infused struggle for sovereignty, justice, and the preservation of life itself.

The protection of biodiversity and genetic resources has evolved into a strategic legal issue positioned at the intersection of environmental law, intellectual property regimes, and national sovereignty. For Indonesia—a megadiverse country—striking a balance between the sustainable utilization of its genetic assets and the imperative to safeguard against biopiracy presents a multifaceted legal and political challenge. The rise of biotechnological innovation and global demand for tropical bioresources have exacerbated the risks of unauthorized access and misappropriation, often disadvantaging the communities that have historically stewarded such resources.

Indonesia has undertaken several commendable legal initiatives by ratifying the Convention on Biological Diversity (CBD) and the Nagoya Protocol, and by introducing a range of national regulations to operationalize access and benefit-sharing (ABS) principles. Nevertheless, the implementation of these instruments remains fraught with institutional fragmentation, low legal awareness at the community level, and insufficient enforcement mechanisms. Only a limited portion of Indonesia's CBD and Nagoya Protocol commitments have been translated into enforceable national legislation, creating legal gaps that are routinely exploited.

 doi:10.20944/preprints202506.1147.v1

On the global stage, the asymmetry between national efforts to protect biodiversity and the legal infrastructure of international intellectual property rights—particularly under the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS)—poses a significant structural dilemma. The TRIPS regime, with its emphasis on private and individual rights, often clashes with the collective, communal, and intergenerational nature of traditional knowledge and genetic resources. Cases of biopiracy—where foreign corporations obtain patents based on endemic Indonesian plants such as *Centella asiatica* (pegagan) or *Eurycoma longifolia* (tongkat ali) without equitable benefit-sharing—highlight the enduring inequities embedded in current global IP norms.

Drawing on Rudolf von Jhering's theory of law as a social struggle rooted in utilitarian ends, this article argues that the law must serve the broader public interest and protect the societal values embedded in traditional ecological knowledge. In this context, biodiversity governance in Indonesia should not be limited to conservation or regulatory compliance but must embody a broader vision of ecological justice and cultural sovereignty. We are better off with the traditional utilitarian explanation for intellectual property, because it at least attempts to strike an appropriate balance between control by inventors and creators and the baseline norm of competition. If we must fall back on a physical-world analogy for intellectual property protection – and I see no reason why we should – treating intellectual property as a form of government subsidy is a more apt description than treating it as real property. (Lemley 2004)

A comprehensive legal strategy is therefore necessary—one that incorporates the development of sui generis legal systems recognizing communal intellectual property rights, mandates disclosure of origin in patent applications, establishes robust national databases of traditional knowledge and genetic resources, and empowers local and Indigenous communities as rightful legal subjects. Such reforms must be accompanied by proactive legal diplomacy within international fora such as WIPO and the WTO, advocating for substantive reforms to patent regimes and recognition of biocultural rights.

4. Conclusions

Biopiracy remains a critical legal and ethical issue in the global governance of biodiversity and traditional knowledge. It reveals the asymmetries between developed countries that dominate intellectual property regimes and developing countries rich in genetic resources and indigenous knowledge. Indonesia, home to one of the world's richest biodiversity ecosystems, finds itself in a precarious position. While it possesses an immense biological wealth, its legal infrastructure to protect such resources from unauthorized appropriation remains fragmented, underdeveloped, and reactive rather than preventive.

The primary finding of this study highlights the highly sectoral and unintegrated nature of Indonesia's legal framework regarding genetic resources (GR) and traditional knowledge (TK). Various laws such as Law No. 5/1990 on Conservation of Natural Resources and Ecosystems, Law No. 32/2009 on Environmental Protection and Management, and Law No. 11/2013 on the Ratification of the Nagoya Protocol, among others, collectively contribute to biodiversity governance. However, there remains a critical absence of a sui generis regime specifically designed to address access and benefit-sharing (ABS), disclosure of origin (DO), and the rights of indigenous communities over their communal intellectual heritage.

Moreover, despite Article 26 of the Patent Law (Law No. 13/2016) stipulating disclosure obligations for genetic resources and traditional knowledge, the absence of implementing regulations creates significant legal uncertainty. Procedural details such as the format, standards, timing, verification mechanisms, institutional responsibilities, sanctions, and enforcement mechanisms remain unclear. This regulatory vacuum opens pathways for misappropriation—often disguised as academic research, eco-tourism, or collaborative development projects—and weakens Indonesia's ability to exercise legal control over the exploitation of its biological assets.

Furthermore, Indonesia's accommodative stance in international trade negotiations and its commitment to WTO/TRIPS rules often compromise its regulatory sovereignty. The current legal

 doi:10.20944/preprints202506.1147.v1

regime does not compel patent applicants to obtain prior informed consent (PIC) or enter into mutually agreed terms (MAT) before filing patents that utilize genetic material or traditional knowledge. In practice, this has resulted in numerous instances of "research tourism" where foreign actors extract genetic samples or ethnobotanical knowledge under the guise of academic study, bypassing proper authorization and without benefit-sharing.

The theoretical framework provided by Rudolf von Jhering offers a critical lens through which to understand this dilemma. His view of law as a tool of social struggle (Rechtskampf) rather than a mere expression of abstract rights supports the argument that legal systems must evolve to protect collective societal interests. In this light, the law should serve not merely to formalize proprietary claims under international patent norms but also to defend the cultural and biological sovereignty of local and indigenous communities.

In conclusion, Indonesia urgently requires a comprehensive and integrated legal reform to address biopiracy effectively. This includes establishing a sui generis legal regime for genetic resources, strengthening institutional capacity for enforcement, developing a transparent national database for TK and GR, and ensuring fair benefit-sharing mechanisms. Only by aligning domestic legal frameworks with the principles of justice and equity—both nationally and globally—can Indonesia safeguard its biodiversity from exploitative practices and fulfill its obligations under the Convention on Biological Diversity and the Nagoya Protocol.

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