

A Comparison of Sanctions for Non-Compliance with the Disclosure of Origin Requirement in Patent Law and Its Relevance to Shari'ah Principles

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Abstract: This article analyses how India, Brazil, Switzerland, and Indonesia design sanctions for non-compliance with origin disclosure obligations under patent law and examines their implications for fairness, administrative feasibility, and benefit-sharing. It employs a normative-doctrinal legal approach using comparative analysis based on five indicators: legal basis, relationship with access and benefit-sharing regimes, types of sanctions, institutional design, and implications for patent validity. The findings show that differences among these countries lie not primarily in the existence of disclosure obligations, but in sanction design and its normative function: safeguarding patent validity, ensuring biodiversity compliance, or promoting administrative transparency. India represents a stringent patent-enforcement model; Brazil demonstrates an integrated biodiversity-compliance model; Switzerland emphasises administrative transparency; while Indonesia remains largely declarative, without a fully operational enforcement framework. From a Shari'ah perspective, these variations reflect different applications of justice (*'adl*), proportionality (*al-tanāsuh*), and the appropriateness of sanctions to the offence (*al-jazā' min jins al-'amal*). Disclosure obligations embody the principles of honesty (*ṣidq*) and trustworthiness (*amānah*), while effective sanctions help prevent the illegitimate exploitation of genetic resources and traditional knowledge (*ghasb*) and promote the public interest (*maṣlaḥah 'āmmah*). Based on these findings, the article proposes a post-treaty hybrid enforcement model combining differentiated enforcement, inter-institutional verification, and graduated sanctions. This model offers a proportionate approach by avoiding both normative symbolism without coercive force and automatic patent revocation. The article contributes a comparative typology of sanction design and its institutional consequences, while extending origin-disclosure scholarship through a Shari'ah-based analysis of justice and equitable benefit-sharing across diverse legal systems.

Keywords: Biopiracy; Disclosure of Origin; Hybrid Enforcement; Patent Law.

INTRODUCTION

The commercialisation of genetic resources has become a key foundation of contemporary innovation in pharmaceuticals, biotechnology, and agriculture.¹ However, as biological materials and associated traditional knowledge are integrated into the global innovation chain, the issues that arise concern not only incentives for discovery but also the origin of materials, the legitimacy of access, and the sharing of benefits.^{2,3} It is within this context that the debate over disclosure of origin takes on an increasingly central significance.⁴ Furthermore, this issue has also begun to receive attention from a normative perspective of justice, including within the framework of Shari'ah principles that emphasise honesty (*sidq*), justice (*adl*), and the prohibition against taking rights without permission (*ghashb*).

Recent scholarship has increasingly examined the disclosure-of-origin requirement as an institutional mechanism for reconciling intellectual property protection with biodiversity conservation and equitable benefit-sharing. Within the framework of the Convention on Biological Diversity (CBD) and the Nagoya Protocol, disclosure of origin is widely regarded as a governance instrument intended to enhance transparency in the use of genetic resources, facilitate compliance with access and benefit-sharing (ABS) obligations, and reduce the risk of biopiracy.⁵ Nevertheless, previous studies acknowledge that the effectiveness of disclosure obligations depends not only on their formal recognition but also on the legal consequences of non-compliance. While some scholars argue that disclosure should become a substantive patentability

¹ Sarmad Dalaf Hanoosh et al., "Patent Protection for Artificial Intelligence: Contemporary Legal Challenges and Regulatory Perspectives," *Nusantara: Journal of Law Studies* 5, no. 2 (2026): 937–965, <https://doi.org/10.66325/nusantaralaw.v5i2.322>.

² Syabbul Bachri et al., "A Benefit-Based Reconstruction of Contemporary Copyright Inheritance in Indonesian Islamic Law," *MIL.Rev: Metro Islamic Law Review* 5, no. 2 (2026): 1205–1223, <https://doi.org/10.32332/milrev.v5i2.13719>.

³ Nina Nurani, Apriwandi Apriwandi, and Hafied Noor Bagja, "Intellectual Property Rights Law Reform Based on Maqāṣid Al-Sharī'ah as a Model for Green Business-Based Creative Industry Protection to Support Sustainable Development," *De Jure: Jurnal Hukum Dan Syar'iah* 18, no. 1 (2026): 1–32, <https://doi.org/10.18860/j-fsh.v18i1.40840>.

⁴ Jacob Golan et al., "Benefit Sharing: Why Inclusive Provenance Metadata Matter," *Frontiers in Genetics* Volume 13-2022 (2022), <https://www.frontiersin.org/journals/genetics/articles/10.3389/fgene.2022.1014044>.

⁵ Michael Heinrich et al., "Access and Benefit Sharing Under the Nagoya Protocol—Quo Vadis? Six Latin American Case Studies Assessing Opportunities and Risk," *Frontiers in Pharmacology* Volume 11-2020 (2020), <https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2020.00765>.

requirement, others consider it primarily an administrative mechanism supporting biodiversity governance.^{6,7}

The existing literature has also examined different national approaches to implementing disclosure obligations. India is frequently cited as a jurisdiction that integrates disclosure requirements into patent validity through opposition and revocation mechanisms. Brazil adopts a different approach by embedding disclosure obligations within its biodiversity and ABS regulatory framework, emphasising administrative compliance and benefit-sharing rather than automatic patent invalidation.⁸ Switzerland, meanwhile, emphasises transparency and traceability by requiring disclosure while generally avoiding automatic consequences for patent validity.⁹ Indonesia has incorporated disclosure obligations into Article 26 of Law No. 13 of 2016 following its ratification of the Nagoya Protocol; however, previous studies consistently note that operational enforcement mechanisms and sanctions remain insufficiently developed.^{10,11} Although these jurisdiction-specific studies provide valuable doctrinal analyses, they generally examine each legal system independently and rarely compare how different sanction models influence institutional effectiveness, legal certainty, and equitable benefit-sharing.

Another growing body of scholarship investigates the relationship between intellectual property rights, genetic resources, and traditional knowledge. These studies emphasise that effective protection of traditional knowledge requires more than recognising ownership claims; it also requires institutional mechanisms to ensure transparency, traceability, and equitable benefit-sharing throughout the innovation process.¹² Accordingly, disclosure of origin has been

⁶ Andreas W Ebert et al., “Critical Review of the Increasing Complexity of Access and Benefit-Sharing Policies of Genetic Resources for Genebank Curators and Plant Breeders—A Public and Private Sector Perspective,” *Plants*, 2023, <https://doi.org/10.3390/plants12162992>.

⁷ Hanna Schebesta, “The Potential of Private Standards for Valorizing Compliance with Access and Benefit Sharing Obligations of Genetic Resources and Traditional Knowledge,” *Agronomy*, 2021, <https://doi.org/10.3390/agronomy11091823>.

⁸ Heinrich et al., “Access and Benefit Sharing Under the Nagoya Protocol—Quo Vadis? Six Latin American Case Studies Assessing Opportunities and Risk.”

⁹ Eugenia Huguenin-Elie, “Sustainability and Intellectual Property in Switzerland BT - Sustainability Objectives in Competition and Intellectual Property Law,” ed. Pranvera Këllezi, Pierre Kobel, and Bruce Kilpatrick (Cham: Springer Nature Switzerland, 2024), 369–86, https://doi.org/10.1007/978-3-031-44869-0_20.

¹⁰ Fitri Rini Ariyesti et al., “The Systematic Review of the Functionality of Intellectual Property Rights in Indonesia,” *Journal of Public Affairs* 22, no. 2 (May 1, 2022): e2482, <https://doi.org/https://doi.org/10.1002/pa.2482>.

¹¹ Dewi Sulistianingsih and Raden Muhammad Arvy Ilyasa, “The Impact of the TRIPS Agreement on the Development of Intellectual Property Laws in Indonesia,” *Indonesia Private Law Review* 3, no. 2 (2022): 77–88, <https://doi.org/10.25041/iplr.v3i2.2579>.

¹² Maui Hudson et al., “Indigenous Peoples’ Rights in Data: A Contribution toward Indigenous Research Sovereignty,” *Frontiers in Research Metrics and Analytics* Volume 8-2023 (2023),

positioned as an important instrument to prevent the unauthorised appropriation of genetic resources and indigenous knowledge.¹³ However, most previous research concentrates on the normative justification for disclosure obligations rather than systematically evaluating how different sanction designs affect compliance behaviour, patent administration, and biodiversity governance across jurisdictions.¹⁴

From another perspective, studies integrating Islamic legal principles with intellectual property law remain relatively limited. Existing Islamic legal scholarship generally discusses intellectual property in relation to the principles of justice (*'adl*), trustworthiness (*amanah*), prevention of unlawful appropriation (*ghashb*), and public interest (*maslahah*).¹⁵ However, these discussions seldom address disclosure-of-origin obligations under patent law or evaluate whether different sanction models are consistent with Shari'ah principles of proportionality (*al-tanāsub*) and commensurability between violations and sanctions (*al-jazā' min jins al-'amal*). Consequently, the intersection between comparative patent law, biodiversity governance, and Islamic legal reasoning remains insufficiently explored.¹⁶

Accordingly, three important gaps remain in the current literature. First, previous studies predominantly analyse disclosure obligations or ABS mechanisms separately without systematically comparing how different jurisdictions design sanctions for non-compliance. Second, existing comparative studies rarely examine how variations in sanction models shape the relationship among patent law, biodiversity governance, and institutional enforcement. Third, limited attention has been devoted to examining these comparative legal models through the normative framework of Shari'ah principles. Addressing these gaps, this study develops a comparative analysis of India, Brazil, Switzerland, and Indonesia to examine how different sanction designs influence the effectiveness of disclosure obligations while simultaneously evaluating their consistency with

<https://www.frontiersin.org/journals/research-metrics-and-analytics/articles/10.3389/frma.2023.1173805>.

¹³ Frank Irikefe Akpoviri, Syarul Nataqain Baharum, and Zinatul Ashiqin Zainol, "Digital Sequence Information and the Access and Benefit-Sharing Obligation of the Convention on Biological Diversity," *NanoEthics* 17, no. 1 (2023): 1, <https://doi.org/10.1007/s11569-023-00436-3>.

¹⁴ Ebert et al., "Critical Review of the Increasing Complexity of Access and Benefit-Sharing Policies of Genetic Resources for Genebank Curators and Plant Breeders—A Public and Private Sector Perspective."

¹⁵ Suriyati Salim, "Islamic Perspectives on Intellectual Property Rights and the Fashion Industry in Malaysia," *Journal of Contemporary Islamic Studies (JCIS)* 11, no. Issue2 (2025): 1–16, <https://doi.org/10.24191/jcis.v11i2.1>.

¹⁶ Ani Yumarni et al., "The Meaning of 'Amānah' and 'Trust' in the Appointment of Nāzhir in Indonesian Endowment Regulations," *Al-'Adalah* 20, no. 1 (2023): 115–136, <https://doi.org/10.24042/adalah.v20i1.14517>.

<https://doi.org/10.66325/nusantaralaw.v5i2.357>

the principles of justice (*'adl*), proportionality (*al-tanāsub*), and public interest (*maslahah*) in Islamic law.

This article addresses that gap through three main contributions. First, this article positions sanctions for non-compliance *with disclosure of origin* as a point of intersection between patent law, biodiversity governance, and administrative law, while evaluating them within the framework of Shari'ah principles. Thus, the issue of *disclosure* is not merely a technical matter but an instrument of justice with ethical and normative dimensions.

Second, this article develops a comparative typology of three sanction models, namely: (i) a strong patent sanction model that links non-compliance to patent validity; (ii) a biodiversity compliance model that emphasises administrative mechanisms and ABS regulations; and (iii) an administrative transparency model that treats *disclosure* as a formal obligation with limited consequences. In this context, Indonesia is positioned as a declarative *outlier* that acknowledges disclosure obligations but lacks an effective sanction design. This typology is then analysed from a Shari'ah perspective to assess the extent to which each model reflects the principles of justice, proportionality (*tamāzun*), and public interest.

Third, this article proposes a hybrid enforcement model as a more proportionate alternative to the two extremes: normative symbolism without coercive power and automatic patent revocation. This hybrid model is designed to integrate administrative sanctions, corrective mechanisms, and, under certain conditions, sanctions affecting patent validity, while reflecting Shari'ah principles of graduated justice, prevention of harm, and the balance between legal certainty and public interest. Thus, the contribution of this article is not only descriptive-comparative but also prescriptive-normative in offering a direction for legal reform that is fairer and more contextually appropriate for Indonesia.

This article examines the issue through a comparative analysis of India, Brazil, Switzerland, and Indonesia. These four jurisdictions were selected not to represent the full range of global variations, but to capture four contrasting regulatory configurations: India represents a model that links disclosure to the integrity and validity of patents; Brazil places it within an integrated biodiversity compliance regime; Switzerland emphasises an administrative transparency approach; while Indonesia reflects a declaratory model that acknowledges disclosure obligations but has not yet established clear enforcement consequences. This comparative analysis is then enriched by a normative evaluation based on Shari'ah principles.

This study addresses three main questions. First, how do these four jurisdictions define the obligation to disclose genetic resources in patent law? Second, what sanctions are available for non-compliance, and through what institutional mechanisms are these sanctions enforced? Third, how are variations

in the design of these sanctions assessed from the perspective of Shari'ah principles, particularly regarding justice, public interest, and the prevention of exploitation, and what lessons can be drawn to strengthen Indonesia's legal system?

With this focus, this article seeks to shift the debate from a description of differences in rules to an analysis of the institutional and normative consequences of different sanction design choices. The main value of this article lies in its effort to demonstrate that sanction design not only determines the effectiveness of disclosure of origin as an anti-biopiracy instrument but also determines the extent to which the patent law system aligns with the principles of justice in Shari'ah. The structure of this article is as follows. Following the introduction, this article identifies research gaps and its contributions, outlines a theoretical framework that integrates patent law and Shari'ah principles, presents a comparative methodology, presents the results of a comparison of four jurisdictions, discusses the implications from the perspectives of international law and Shari'ah, and concludes with recommendations for a more just, proportional, and contextual hybrid enforcement model for Indonesia.

METHOD

This article employs normative-doctrinal legal research combined with comparative legal analysis.¹⁷ The doctrinal approach is used to examine legislation, international instruments, and academic literature that regulate or interpret the obligation to disclose the origin of genetic resources in patents. The comparative approach is employed not merely to compile an inventory of norms, but to assess how variations in sanction design yield different institutional consequences in jurisdictions with contrasting regulatory stances.¹⁸ The selection of jurisdictions was made purposefully based on the variety of regulatory models to be examined. India was chosen because it links disclosure to patent validity through mechanisms of rejection, opposition, and revocation. Brazil was chosen because it places disclosure within the framework of biodiversity compliance and access and benefit-sharing. Switzerland was chosen because it demonstrates a model of administrative transparency that does not rely on automatic patent invalidation. Indonesia was chosen because it has recognised disclosure obligations in its Patent Law but has not yet established a coherent sanctions framework. Thus, the four jurisdictions serve as ideal-typical contrasts for

¹⁷ Elfi Haris et al., "Legal Protection of Trademark Holders Against Imported Goods: A Contextual Framework under Islamic Economic Law," *Jurnal Ilmiah Mizani* 12, no. 2 (2025): 680–695, <https://doi.org/10.29300/mzn.v12i2.9064>.

¹⁸ Stefan Theil, "Carefully Tailored: Doctrinal Methods and Empirical Contributions," *Oxford Journal of Legal Studies* 45, no. 4 (2025): 1047–1075, <https://doi.org/10.1093/ojls/gqaf029>.

assessing the spectrum of sanctions designs, not as a statistical sample intended to represent the entire legal system of the world.¹⁹

The study relies exclusively on secondary legal materials. Primary legal materials consist of international legal instruments, including the Convention on Biological Diversity (CBD), the Nagoya Protocol on Access and Benefit-Sharing, the WIPO Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge, national patent legislation, biodiversity legislation, implementing regulations, and official legal documents from the selected jurisdictions. Secondary legal materials include peer-reviewed journal articles, academic books, legal commentaries, policy reports, and international organisational publications discussing patent law, genetic resources, traditional knowledge, biodiversity governance, disclosure of origin, and Shari'ah legal principles. These materials were collected through a comprehensive literature review using internationally recognised academic databases and official legal repositories to ensure the relevance and reliability of the sources.

Data collection was conducted through documentary research. Legal documents and academic literature were systematically identified, screened, and reviewed for relevance to the research questions. The collected materials were subsequently classified into several analytical categories, namely: (1) legal basis for disclosure obligations; (2) relationship between patent law and the Access and Benefit-Sharing (ABS) regime; (3) types and severity of sanctions for non-compliance; (4) institutional mechanisms responsible for enforcement; and (5) implications for patent validity, legal certainty, transparency, and equitable benefit-sharing. Using identical analytical categories across all jurisdictions ensured the consistency and comparability of the analysis.

The analysis was conducted in four stages. First, identifying disclosure requirements and their legal sources in each jurisdiction. Second, the classification of sanction types and their place within the legal framework of patent law or biodiversity law. Third, the evaluation of the implications of these sanction choices on fairness, administrative feasibility, and benefit-sharing. Fourth, the synthesis of the comparison results into a conceptual typology, which was then used to formulate a hybrid enforcement model for Indonesia.

To address the Shari'ah dimension of this study, the comparative legal findings were further examined through a normative Islamic legal analytical framework. The analysis employed several established principles of Islamic jurisprudence (*uṣūl al-fiqh*) and *maqāṣid al-shari'ah*, particularly the principles of justice (*'adl*), trustworthiness (*amānah*), proportionality (*al-tanāsub*), the correspondence between violations and sanctions (*al-jazā' min jins al-'amal*),

¹⁹ Christian Boulanger, "The Comparative Sociology of Legal Doctrine: Thoughts on a Research Program," *German Law Journal* 21, no. 7 (2020): 1362–1377, <https://doi.org/10.1017/glj.2020.80>.

prevention of harm (*dar'u al-mafāsīd*), protection of property (*ḥifẓ al-māl*), and public interest (*maṣlaḥah 'āmmah*). Rather than treating these principles as theological doctrines, they were used as normative analytical criteria for evaluating whether different sanction models promote fairness, accountability, proportionality, and equitable benefit-sharing in the governance of genetic resources and traditional knowledge.

To enhance the credibility and trustworthiness of the findings, several validation strategies were employed. Source triangulation was undertaken by comparing provisions contained in international treaties, national legislation, judicial and administrative documents, and academic literature. Doctrinal verification was also conducted by examining whether interpretations of legal provisions were consistently supported by authoritative legal scholarship and official legal sources. In addition, the Shari'ah analysis was validated through cross-referencing classical Islamic legal principles with contemporary scholarly discussions on Islamic intellectual property law and *maqāṣid al-shari'ah*, thereby ensuring that normative interpretations remained consistent with both established jurisprudential principles and contemporary legal discourse.

The limitations of this study must be emphasised. This article focuses on normative and institutional design, not on empirical measurements of all inspection or litigation practices in every country. Therefore, the article's claims are analytical and typological: it explains how sanction models are designed and what institutional consequences are most likely to arise, without claiming to have measured the full range of implementation variations. These limitations actually open up further research examining how sanction design choices function in the practice of inspections, disputes, and benefit-sharing governance.

RESULTS AND DISCUSSION

A Comparative Model of Sanctions for Non-Disclosure

A comparative analysis shows that patent disclosure rules regarding genetic resources differ not merely in their technical wording. These rules reflect fundamental choices regarding the relationship between patent law, biodiversity governance, and state administration. Thus, the key question is no longer whether disclosure of origin should be mandatory, but rather how the design of sanctions allocates the risk of non-compliance, divides responsibilities among institutions, and affects the credibility of enforcement. These differences can be summarised in the following comparative matrix, which shows that the strength of sanctions is determined not only by the presence or absence of disclosure obligations, but also by the relationships among patent law, biodiversity law, and administrative enforcement capacity.

Table 1. Comparative Matrix of Legal Basis, Disclosure Design, and Legal Consequences

Jurisdiction	Primary Legal Basis	Disclosure design and types of sanctions	Comparative Implications
India	Indian Patents Act 1970, specifically Section 10(4)(d)(ii); national biodiversity regime	Disclosure of source and geographical origin is part of patent validity requirements. Non-compliance may trigger rejection, opposition, or revocation under certain conditions.	Strongest patent sanction model; high deterrent effect, but requires interagency coordination and a higher burden of proof.
Brazil	Brazilian Patent Law (Law No. 9,279/1996); Brazilian Biodiversity Law No. 13,123/2015	Disclosure is linked to compliance with access and benefit-sharing (ABS). The primary sanctions include administrative sanctions, fines, and consequences related to biodiversity compliance.	Biodiversity compliance model; consistent with resource sovereignty, but effectiveness depends on the state's monitoring capacity.
Switzerland	Swiss Patent Act, specifically Article 49a (amendment 2008)	Disclosure serves primarily for administrative transparency and traceability. Failure generally does not automatically invalidate a patent, but it may trigger corrections or administrative consequences.	Administrative transparency model; maintains the stability of the patent system, but has relatively lower deterrent power against biopiracy.
Indonesia	Law No. 13 of 2016 on Patents, specifically Article 26; Law No. 11 of 2013 on the ratification of the Nagoya Protocol	Disclosure is already recognised as a normative requirement for inventions related to genetic resources and/or traditional knowledge, but operational sanctions and verification	Declaratory outlier; the principle is recognised, but a sufficiently robust and coordinated enforcement framework has not yet been established.

mechanisms	remain
weak.	

Source: Author's interpretation

Table 1 shows that the most significant differences across jurisdictions do not lie in the rhetoric of disclosure, but rather in whether non-compliance translates into a risk to patent validity, a risk of administrative non-compliance, or merely a corrective obligation. It is these differences that subsequently shape the types of incentives applicants face, the level of burden borne by patent offices, and the likelihood of achieving more tangible benefit-sharing. At the international level, these differences are not surprising. The debate over patent disclosure unfolds within a fragmented regulatory landscape, where biodiversity law, international intellectual property law, and national administrative law interact without being fully harmonised.²⁰ The process of drafting the latest treaty underscores this fragmentation: the treaty recognises disclosure as an international interest, yet leaves significant room for states to choose their own designs for sanctions and enforcement.²¹ Consequently, recent literature views disclosure not as an established doctrine, but as a constantly evolving interface between intellectual property, access and benefit-sharing, and regulatory proportionality.²²

India: Disclosure as a Requirement for Patent Validity

India is the clearest example of a jurisdiction that links disclosure to the integrity of patent administration and patent validity. The legal basis is primarily found in the Indian Patents Act 1970 (The Patents Act, 1970, n.d.) as amended in 2002 and 2005, specifically Section 10(4)(d)(ii), which requires applicants to disclose the source and geographical origin of biological material used in the invention. In cases involving biological resources from India, applicants must also comply with the prior informed consent regime under the national biodiversity framework, including involving the National Biodiversity Authority. The legal consequences of non-compliance in India are relatively severe. Failure to disclose the origin correctly can serve as grounds for rejection of an application, opposition by third parties, and even revocation of a granted patent if it is later found that the disclosure was incorrect, incomplete, or misleading. Therefore, disclosure in India is not merely an administrative formality, but rather

²⁰ Ebert et al., "Critical Review of the Increasing Complexity of Access and Benefit-Sharing Policies of Genetic Resources for Genebank Curators and Plant Breeders—A Public and Private Sector Perspective."

²¹ Heinrich et al., "Access and Benefit Sharing Under the Nagoya Protocol—Quo Vadis? Six Latin American Case Studies Assessing Opportunities and Risk."

²² Schebesta, "The Potential of Private Standards for Valorizing Compliance with Access and Benefit Sharing Obligations of Genetic Resources and Traditional Knowledge."

a component of patent validity discipline and a tangible anti-biopiracy mechanism.

India has adopted the most stringent sanction model in response to its long-standing experience with biopiracy, including the well-known patent disputes involving turmeric, neem, and basmati rice. These experiences prompted the Indian government to strengthen the link between the *disclosure of origin* requirement and patent validity, allowing non-compliance to result in patent refusal, pre- and post-grant opposition, or patent revocation. Consequently, India's sanctions framework is primarily designed to achieve a strong deterrent effect rather than merely to promote administrative transparency. However, the strength of the Indian model also places high demands on institutional coordination. When patent examiners, biodiversity authorities, and third-party objection mechanisms do not operate in harmony, the burden of proof and compliance costs can increase. Nevertheless, India remains the clearest example of a strong patent sanctions model, as disclosure is treated as a requirement that can affect the very survival of the patent itself.

Brazil: Disclosure as Biodiversity Compliance

Brazil has adopted a different but equally rigorous approach. Disclosure obligations in Brazil do not stand solely as a doctrine of patent validity but are embedded within a broader biodiversity compliance framework. The normative basis rests on the Brazilian Patent Law (Law No. 9,279/1996) and primarily on the Brazilian Biodiversity Law No. 13,123/2015, which requires the utilisation of genetic resources to be subject to the principles of access, administrative compliance, and benefit-sharing. Brazil has developed a regulatory model that positions the *disclosure of origin* requirement as an integral component of the Access and Benefit-Sharing (ABS) regime. As one of the world's megadiverse countries with abundant genetic resources, Brazil places greater emphasis on regulating access to genetic resources and ensuring the equitable sharing of benefits than on using patent revocation as the primary enforcement mechanism. Consequently, administrative sanctions and compliance mechanisms within the biodiversity governance framework assume a more prominent role in ensuring adherence to disclosure obligations.

Under the Brazilian model, applicants who use genetic resources are required to disclose the origin of those resources and comply with access and benefit-sharing procedures. Violations of these obligations typically result in administrative sanctions, fines, or other compliance consequences under the biodiversity regime. In certain circumstances, the use of genetic resources obtained unlawfully can also raise serious issues regarding the legitimacy of patent claims, as the invention is tainted by non-compliance with the access regime. The strength of the Brazilian model lies in its institutional coherence: patents are embedded in biodiversity governance rather than treated as a standalone element.

Its weakness is that its effectiveness depends heavily on interagency coordination, the state's oversight capacity, and the quality of integration between the patent office and the authorities responsible for access to genetic resources. Typologically, Brazil is best classified as a biodiversity compliance model.

Switzerland: Disclosure as Administrative Transparency

Switzerland has adopted a more moderate approach, positioning the disclosure-of-*origin* requirement primarily as an instrument of administrative transparency. This approach is closely linked to Switzerland's position as one of the world's leading centers of innovation and pharmaceutical industries, where the patent system relies heavily on legal certainty. Consequently, preserving the stability of the patent system is regarded as equally important as enhancing transparency regarding the origin of genetic resources. Switzerland is a prime example of an approach focused on administrative transparency. The legal basis for this is found in the Swiss Patent Act, specifically Section 49a as amended in 2008, which requires applicants to disclose the sources of genetic resources or traditional knowledge used in the invention. If the origin of the genetic resources is not known with certainty, the applicant must at least specify the source from which the material was obtained, such as a gene bank, botanical garden, or research institution.

Unlike in India, a breach of disclosure obligations in the Swiss system does not automatically invalidate a patent. The more common consequences are administrative sanctions, fines, or a requirement to correct the information in the application documents. Thus, disclosure serves primarily as a tool for traceability, information correction, and bureaucratic transparency in patent administration. The appeal of the Swiss model lies in its stability and predictability. However, if penalties remain lenient and detection rates remain low, disclosure can devolve into a low-cost ritual. Therefore, Switzerland represents a model of administrative transparency: strong in terms of information, but more limited as a hard-hitting preventive tool against the concealment of origins.

Indonesia: Declaratory Disclosure without Strong Consequences

Indonesia has incorporated language requirements into its patent law, specifically through Article 26 of Law No. 13 of 2016 on Patents. This provision requires that if an invention relates to or derives from genetic resources and/or traditional knowledge, the origin of such resources must be clearly stated in the description of the patent application. Systemically, this norm must also be read in conjunction with Law No. 11 of 2013, which ratifies the Nagoya Protocol, so that patent transparency is ideally connected to the principles of access and fair benefit-sharing. Nevertheless, Indonesia's enforcement framework remains limited. There are no explicit provisions establishing failure to disclose as an automatic ground for patent invalidation; robust mechanisms for verifying the

origin of genetic resources are not yet in place; and the procedural relationship between patent examiners and the authority responsible for the management of genetic resources has not yet been sufficiently institutionalised. Therefore, the Indonesian model is best understood as a declaratory outlier: disclosure norms are recognised, but their legal enforceability remains weak.

For a megabiodiverse country like Indonesia, this situation is problematic. Article 26 of the Patent Law has established a normative foundation against biopiracy, but without differentiated sanctions, cross-agency review mechanisms, and a clearer link to the ABS regime, these obligations risk remaining merely symbolic declarations. The main challenge is no longer whether disclosure should be maintained, but rather how to transform it into a legal mechanism that can be verified and enforced proportionately. Unlike the other three jurisdictions, Indonesia remains in a transitional phase of regulatory development. While the *disclosure of origin* requirement has been formally incorporated into its Patent Law, the supporting enforcement framework, inter-institutional coordination, and mechanisms for verifying the origin of genetic resources remain underdeveloped. Consequently, the disclosure obligation operates primarily as a declaratory legal requirement rather than an effective and operational enforcement mechanism.

Disclosure Rules within the Complexity of the Regime

These comparative findings are best understood through the theory of regime complexity. Genetic resources are not governed by a single coherent legal framework, but rather by several regimes that partially overlap patent law, biodiversity law, trade law, the governance of traditional knowledge, and domestic administrative law.²³ Each regime defines the issues differently. Consequently, the disclosure obligation is neither purely a patent norm nor purely a biodiversity norm. It is a hybrid rule operating at the intersection of multiple legal systems, which explains both its appeal and its instability.²⁴

A significant development in the international legal regime occurred with the adoption of the *WIPO Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge* in 2024. The Treaty establishes the obligation of Member States to incorporate disclosure-of-origin requirements into their patent systems to enhance transparency and prevent the misappropriation of genetic resources and associated traditional knowledge. However, the Treaty does not harmonise the sanctions to be imposed for non-compliance with these disclosure obligations. Instead, it leaves Member States with the discretion to design enforcement mechanisms in accordance with their respective legal systems and

²³ Ebert et al., “Critical Review of the Increasing Complexity of Access and Benefit-Sharing Policies of Genetic Resources for Genebank Curators and Plant Breeders—A Public and Private Sector Perspective.”

²⁴ Schebesta, “The Potential of Private Standards for Valorizing Compliance with Access and Benefit Sharing Obligations of Genetic Resources and Traditional Knowledge.”

institutional capacities. This regulatory flexibility explains why diverse sanction models persist across jurisdictions, as illustrated by the approaches adopted in India, Brazil, Switzerland, and Indonesia. This is why the concept of equitable sharing takes different doctrinal forms across various jurisdictions. India interprets equitable sharing through the lens of sovereignty and prevention. Brazil interprets it through the framework of integrated biodiversity governance. Switzerland interprets it through the prism of transparency and administrative feasibility. Indonesia recognises the principle but has not yet clearly defined its enforcement framework.

From a Shari'ah perspective, this situation underscores the need to integrate legal principles (*takamul al-ahkam*) to prevent various legal regimes from operating in a fragmented manner and resulting in injustice.²⁵ The disclosure obligation serves as an instrument to maintain a balance (*tawāzun*) between the rights of innovators and those of genetic resource holders, while also preventing unauthorised appropriation (*ghashb*). Therefore, variations in the design of sanctions reflect not only institutional choices but also the level of commitment to the principle of justice (*'adl*) and the protection of collective rights.²⁶ The findings indicate that differences in sanction design are not merely variations in legislative drafting, but rather reflect differences in public policy orientation and the level of institutional development across jurisdictions. From the perspective of Regime Complexity Theory, these differences represent a logical consequence of the overlap among multiple legal regimes governing genetic resources, including patent law, biodiversity law, international trade law, and the Access and Benefit-Sharing (ABS) regime.²⁷ Consequently, each jurisdiction adopts the enforcement mechanisms that best align with its national interests, administrative capacity, and broader development priorities.

These findings extend the arguments advanced by Heinrich et al.²⁸ and Ebert et al.,²⁹ who contend that the complexity of genetic resource governance makes

²⁵ Agustianto Agustianto et al., "Special Intellectual Property Protection for Traditional Cultural Expressions: Rectifying Broad Legal Approaches," *Nurani: Jurnal Kajian Syari'ah Dan Masyarakat* 24, no. 1 (2024): 37–46, <https://doi.org/10.19109/nurani.v24i1.21807>.

²⁶ Nita Triana, "Menggagas Hak Kekayaan Intelektual Perspektif Hukum Islam Ke Dalam Hukum Nasional," *Al-Manahij: Jurnal Kajian Hukum Islam* 12, no. 2 (2018): 177–192, <https://doi.org/10.24090/mnh.v12i2.1747>.

²⁷ Qingfeng Luo and Xi Zhao, "Intellectual Property Protection Intensity and Regional Technological Innovation Structure: Based on the Perspective of Economic Complexity Theory," *Heliyon* 10, no. 21 (November 15, 2024), <https://doi.org/10.1016/j.heliyon.2024.e39964>.

²⁸ Heinrich et al., "Access and Benefit Sharing Under the Nagoya Protocol—Quo Vadis? Six Latin American Case Studies Assessing Opportunities and Risk."

²⁹ Ebert et al., "Critical Review of the Increasing Complexity of Access and Benefit-Sharing Policies of Genetic Resources for Genebank Curators and Plant Breeders—A Public and Private Sector Perspective."

international harmonisation difficult because each country operates within a distinct institutional configuration. Accordingly, the variation in sanction models should not be interpreted as evidence of weakness within the international legal regime, but rather as an adaptive response to the characteristics and institutional realities of different national legal systems.

Global Environmental Law and the Redistribution of Legal Attention

From a global environmental law perspective, disclosure obligations are important because they compel innovation governance to acknowledge that the utilisation of genetic resources is embedded in ecological and social history, rather than arising in isolation. Disclosure obligations serve not only as instruments of transparency but also as initial mechanisms for affirming the relationship between innovation, the origins of resources, and claims to global justice.³⁰ This is important not only for transparency but also for global justice. Contemporary studies on governance that is sensitive to indigenous peoples and their origins argue that source information must remain visible because benefit-sharing becomes far more difficult when data, samples, and knowledge are detached from their community context.³¹ Thus, disclosure obligations serve as a prerequisite for accountability, but their effectiveness depends heavily on how they are enforced through appropriately designed sanctions.

However, disclosure alone does not guarantee justice. Recent literature has become increasingly skeptical that disclosure of the country of origin alone is sufficient to protect genetic resources or traditional knowledge if it is not embedded within broader enforcement and benefit-sharing frameworks.³² Without effective enforcement mechanisms—whether through administrative sanctions, corrective measures, or consequences for patent validity—such obligations risk becoming merely symbolic norms, lacking enforceability. This situation underscores that justice depends not only on the formal recognition of obligations but also on their effective implementation. The principle of honesty (*ṣidq*) demands transparency in disclosure, while the principles of justice (*'adl*) and the public interest (*maṣlahah 'āmmah*) demand sanctions capable of preventing exploitation and ensuring a fair distribution of benefits. Without proportional (*al-tanāsuh*) and effective sanctions, the obligation of *disclosure of origin* will not be able

³⁰ Paul Robbins et al., “Sovereign Genes: Wildlife Conservation, Genetic Preservation, and Indigenous Data Sovereignty,” *Frontiers in Conservation Science* Volume 4-2023 (2023), <https://www.frontiersin.org/journals/conservation-science/articles/10.3389/fcosc.2023.1099562>.

³¹ Hudson et al., “Indigenous Peoples’ Rights in Data: A Contribution toward Indigenous Research Sovereignty.”

³² Akpoviri, Baharum, and Zainol, “Digital Sequence Information and the Access and Benefit-Sharing Obligation of the Convention on Biological Diversity.”

to prevent harm (*mafsadah*) in the form of the unauthorised appropriation (*ghasb*) of genetic resources.

Therefore, within a global environmental legal framework integrated with Shari'ah principles, the key question is no longer whether disclosure is required, but rather how sanctions for non-compliance should be designed to strike a balance between transparency, legal certainty, and distributive justice. This is where the relevance of comparative analysis becomes crucial, as variations in sanction design across various jurisdictions demonstrate the extent to which disclosure obligations truly function as instruments of justice, rather than mere administrative formalities.

The findings of this study also support the perspective of Global Environmental Law (GEL), which posits that environmental protection is no longer the exclusive domain of environmental law but should be integrated across other legal fields, including patent law.³³ Within this framework, the disclosure-of-origin requirement serves as a legal mechanism that links innovation protection with ecological responsibility and distributive justice. The findings further indicate that the effectiveness of this mechanism depends largely on the degree of integration between the patent system and biodiversity governance. These results confirm the argument of Hudson et al.³⁴ that transparency regarding the origin of genetic resources is a prerequisite for the effective implementation of benefit-sharing. However, this study extends that argument by demonstrating that transparency alone is insufficient. Rather, the design of sanctions constitutes the critical factor in determining whether disclosure of origin can translate transparency into legal accountability and equitable benefit-sharing.

Sanctions, Proportionality, and the Post-2024 Treaty Environment

A comparative analysis reveals three main approaches. First, the Indian model demonstrates that strong sanctions—such as application rejection, *opposition*, and *revocation*—have a high deterrent effect against non-compliance. However, the effectiveness of this model depends heavily on institutional coordination capacity and strict standards of proof. Second, the Brazilian model emphasises integration with the biodiversity regime, thereby strengthening substantive compliance. However, its success depends on the system's ability to verify and integrate data effectively. Third, the Swiss model demonstrates that an administrative transparency approach can maintain the stability of the patent system, but risks reducing disclosure obligations to a mere formality if not supported by adequate sanctions or consistent enforcement.

³³ Robbins et al., “Sovereign Genes: Wildlife Conservation, Genetic Preservation, and Indigenous Data Sovereignty.”

³⁴ Hudson et al., “Indigenous Peoples’ Rights in Data: A Contribution toward Indigenous Research Sovereignty.”

From the Shari'ah perspective, the principle of al-'adl (justice) does not necessarily require the imposition of the most severe sanctions; rather, it requires sanctions that are proportionate to the nature and gravity of the violation. Accordingly, the automatic revocation of a patent for every instance of non-compliance does not always reflect justice, particularly where the violation is merely administrative and does not affect the substantive validity of the invention. Conversely, where an applicant intentionally conceals the origin of genetic resources in order to obtain exclusive rights unlawfully, the imposition of more severe sanctions is consistent with the principle of al-jazā' min jins al-'amal, which requires that the sanction correspond to the nature and seriousness of the wrongful act. The principle of ghasb also provides a normative basis for recognising that the unauthorised appropriation of economic benefits derived from genetic resources or traditional knowledge without the consent of their legitimate holders constitutes an unlawful usurpation of others' rights. Accordingly, the disclosure of origin requirement should not be understood merely as an administrative obligation but also as a legal instrument to prevent the unlawful appropriation of genetic resources and associated traditional knowledge. Furthermore, the concept of *maṣlaḥah* (public interest) positions the protection of genetic resources as an essential component of safeguarding the public good. In this context, an effective sanctioning regime should not only deter violations but also ensure the equitable distribution of benefits to the communities that are the legitimate custodians of genetic resources and traditional knowledge.

Based on this, a hybrid sanctions architecture emerges as the most promising approach. This model combines several key elements: (1) disclosure obligations during the patent application process; (2) a structured interagency verification mechanism; (3) differentiation of violations based on the degree of fault, intent, and materiality of the information; and (4) a graduated spectrum of sanctions, ranging from administrative corrections, financial penalties, and suspension of examination, to consequences regarding patent validity in cases of material and intentional violations. This phased approach aligns with the principle of justice in Shari'ah, which emphasises balance and the prevention of harm (*dar'u al-mafāsid*) without neglecting the promotion of benefits (*jalb al-maṣāliḥ*). Thus, sanctions serve not only as a tool for law enforcement but also as an instrument to maintain the integrity of the system and protect the rights of stakeholders, including communities that own genetic resources and traditional knowledge.³⁵

Conceptually, these findings confirm that the design of sanctions is a key variable in understanding the relationship between *patent governance* and *biodiversity*

³⁵ Triana, "Menggagas Hak Kekayaan Intelektual Perspektif Hukum Islam Ke Dalam Hukum Nasional."

governance. It is at this point that effectiveness, legitimacy, and administrative feasibility converge. Within the Shari'ah framework, this convergence also represents an effort to achieve substantive justice through legal mechanisms that are proportional, accountable, and oriented toward the common good.³⁶ These findings extend the concept of regulatory proportionality by demonstrating that regulatory effectiveness depends on the legal system's ability to calibrate sanctions according to the severity of the violation, rather than adopting a *one-size-fits-all* approach.

Implications for Indonesia

The hybrid enforcement model proposed in this study is not intended to combine different legal systems mechanically; rather, it represents a synthesis of the strengths of each regulatory model. From India, it adopts a sanction mechanism with a strong deterrent effect against biopiracy. From Brazil, it incorporates the integration of the patent system with the Access and Benefit-Sharing (ABS) regime, ensuring that disclosure obligations are closely linked to benefit-sharing mechanisms. From Switzerland, it adopts an administrative transparency approach that preserves legal certainty and the stability of the patent system. Accordingly, the hybrid model offers a balanced framework that reconciles effective law enforcement, innovation protection, legal certainty, and distributive justice, making it more suitable for the Indonesian context than adopting any single regulatory model in its entirety.

Indonesia stands at a regulatory crossroads. On the one hand, Article 26 of Law No. 13 of 2016 stipulates that genetic resources and/or traditional knowledge relevant to an invention must be disclosed. On the other hand, the absence of clear operational consequences leaves Indonesia bearing the worst of both worlds: shouldering the symbolic burden of disclosure without reaping the compliance benefits of a regime that can actually be enforced. To make the policy argument more actionable, these comparative findings can be translated into a phased, proportional reform agenda for Indonesia, summarised in the following table.

Table 2. Indonesia's Reform Agenda for a Post-Treaty Hybrid Enforcement Model

Reform Agenda	Substance of the Proposal	Normative rationale	Expected impact
Differentiation of the	Distinguishing between	Proportionality is only possible if the	Sanctions become fairer,

³⁶ Bernard Nainggolan and Agus Joko Pramono, "LEGAL PROTECTION OF INTELLECTUAL PROPERTY FOR DIGITAL WORKS BY UTILIZING EMERGING TECHNOLOGIES," *Jurnal Hukum UNISSULA* 41, no. 4 (2025): 897–942, <https://doi.org/10.26532/jh.v41i4.40811>.

severity of violations	administrative negligence, incomplete disclosure, intentional concealment.	law distinguishes between the severity of non-compliance.	more predictable, and easier to defend legally.
Inter-agency verification	Establishing data exchange and verification between the Patent Directorate, ABS/biodiversity authorities, and relevant technical ministries.	Disclosure is effective only if it does not stop at a unilateral declaration by the applicant.	Improving traceability of origin and closing the gap between patent law and biodiversity law.
Calibration of sanctions	Prioritise mandatory corrections, suspension of inspections, administrative fines, or specific compliance consequences; revocation is reserved as an extraordinary measure for serious violations.	Avoiding extremes: symbolism and automatic invalidation.	two pure and Creating a more realistic hybrid post-treaty enforcement model for Indonesia.
Implement ation and evidentiary guidelines	Developing consistent inspection guidelines, standards of proof of origin, and disclosure formats.	Without technical guidelines, the provisions of Article 26 are difficult to apply uniformly.	Promoting consistency in inspections, legal certainty, and post-treaty institutional readiness.

Source: Author's interpretation

Table 2 ensures that the proposed recommendations remain within the parameters generally accepted in academic literature and policy practice: they do not advocate for an overly absolute automatic revocation of patents, nor do they stop at weak normative symbolism. Thus, the proposed reform direction is proportionate, institutionally implementable, and consistent with the

comparative framework analysed. From a Shari'ah perspective, this approach aligns with the principles of balance (*tawāzūn*) and proportionality (*al-tanāsūb*), which require that legal responses be commensurate with the severity of the violation. A more credible Indonesian model requires at least four major reforms. First, the law must clearly distinguish between administrative negligence, materially incomplete disclosures, and intentional or bad-faith concealment. This differentiation is important because not all forms of non-compliance warrant the same sanctions. Within the Shari'ah framework, this reflects the principle of proportionality between the act and the sanction (*al-jazā' min jins al-'amal*) as well as substantive justice (*'adl*).

Second, Article 26 of the Patent Law needs to be procedurally linked to the national biodiversity institution, so that patent examiners have access to verification mechanisms in certain categories of cases. This integration is essential to ensure that disclosure obligations do not end with a unilateral declaration but can be objectively verified. From a Shari'ah perspective, this relates to the principles of trust and accountability in resource management. Third, institutional verification must be strengthened through operational coordination among patent offices, *access and benefit-sharing* authorities, and, where available, traditional knowledge databases. Without such mechanisms, the obligation *to disclose origin* risks losing its practical significance. Strengthening this verification aligns with the principles of honesty (*ṣidq*) and the prevention of harm (*dar'u al-mafāsid*), as it enables early detection of potential misuse of genetic resources.

Fourth, sanctions need to be calibrated gradually. Administrative corrections alone are insufficient to deter. Therefore, a broader spectrum of sanctions is required, including financial penalties, suspension of examinations, the obligation to provide proof of origin, and specific consequences regarding the status of the application in cases of material violations. This approach reflects the principle of the public interest (*maṣlahah' āmmah*) while maintaining the overall stability of the patent system.

These reforms must also be viewed within a broader framework—namely, the obligations *regarding access and benefit-sharing* following the ratification of the Nagoya Protocol—so that transparency in the patent system is not treated separately from biodiversity governance. This integration is essential to ensure that the benefits derived from the utilisation of genetic resources are distributed fairly to those entitled to them. With this reform agenda, Indonesia need not fully adopt a model of strict sanctions like India's nor stick to a minimalist approach like Switzerland's. A more realistic position is to establish a middle-ground regime based on a hybrid model: strong enough to prevent biopiracy and promote *benefit-sharing*, yet still proportionate and manageable by the national patent administration. This approach aligns with the principles of balance and justice in Shari'ah.

Compared with other steps, this step will also strengthen Indonesia's position in international debates. As a country with a wealth of biodiversity, Indonesia's credibility will increase if disclosure requirements within its patent system are not merely declarative but become part of a compliance system that is measurable, verifiable, and aligned with the principle of equitable benefit-sharing. From a Shari'ah perspective, this reflects efforts to achieve socio-ecological justice through effective legal mechanisms oriented toward the common good.

CONCLUSION

This study demonstrates that the effectiveness of the disclosure-of-origin requirement in patent law is determined not merely by the existence of the disclosure obligation itself, but primarily by the design of sanctions governing the consequences of non-compliance. The comparative analysis of India, Brazil, Switzerland, and Indonesia reveals that each jurisdiction has developed a distinct enforcement model reflecting its policy orientation, institutional capacity, and the relationship between patent law and genetic resource governance. From a scientific perspective, this study contributes by demonstrating that sanction design is an institutional variable that links patent law, biodiversity governance, and benefit-sharing mechanisms. It further advances the literature by integrating Shari'ah principles—*'adl*, *ṣidq*, *al-tanāsuh*, *ghashb*, and *maṣlahah*—as a normative framework for evaluating the proportionality and fairness of sanction models across jurisdictions. For Indonesia, these findings suggest that legal reform should move beyond maintaining Article 26 as a declaratory provision toward establishing an operational and integrated enforcement regime. A hybrid model combining differentiated violations, inter-agency verification, and a graduated spectrum of sanctions offers a balanced approach that accommodates institutional capacity while promoting deterrence, justice, and patent system stability.

This study is limited by its normative and comparative legal approach, which focuses on legislation, international legal instruments, and academic literature without examining the practical implementation of sanction models through patent examination practices, judicial decisions, or institutional enforcement. Accordingly, future research should combine normative analysis with empirical approaches, such as case studies, judicial decision analysis, and interviews with patent examiners and Access and Benefit-Sharing (ABS) authorities. Further studies are also needed to assess the implementation of the 2024 WIPO Treaty on Intellectual Property, Genetic Resources and Associated Traditional Knowledge and to evaluate the effectiveness of the proposed hybrid enforcement model in strengthening the protection of genetic resources,

traditional knowledge, and equitable benefit-sharing across different jurisdictions.

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CONFLICT OF INTEREST

The authors declare that there are no financial, professional, personal, or institutional conflicts of interest that could have influenced the conduct, interpretation, or publication of this research.

AI USE STATEMENT

The authors used artificial intelligence (AI)-assisted tools solely to improve the clarity, grammar, language quality, and readability of the manuscript. AI tools were not used to generate research data, conduct legal analysis, interpret findings, or formulate the study's conclusions. All intellectual content, legal interpretation, analysis, and final responsibility for the manuscript remain entirely with the authors.

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