

The Climate Technology Divide: Can Human Rights Redefine the Role of Intellectual Property in Technology Transfer?

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Abstract

Technology plays a critical role in mitigating and adapting to climate change, yet developing countries still face significant legal barriers to accessing climate technologies. Although international instruments, including the UNFCCC and the Paris Agreement, recognise the importance of technology transfer, the relevant obligations are weakly operationalised and uptake of available technologies in developing and least-developed countries remains limited. Climate technology transfer is shaped by several factors, including the stakeholders involved and whether the technology is under intellectual property (IP) protection.

IP rights are central to questions around technology transfer, as private entities in high-income countries typically hold key patents, control commercialisation terms, and can limit access through licensing conditions. Commentators argue that protections under the TRIPS Agreement further constrain the ability of developing states to acquire, adapt, and innovate upon existing technologies. These tensions reflect a fragmented international legal architecture in which transfer obligations under climate law are not in harmony with the proprietary protections under the international IP regime. This article argues that the international IP system requires a principled reinterpretation that better reflects public interest and human rights concerns to address the climate technology divide.

Adopting a doctrinal and interdisciplinary approach, it traces how climate treaties and their institutional mechanisms seek to facilitate technology transfer, then evaluates the assumptions about patent protection and the effectiveness of TRIPS flexibilities, including compulsory licensing. Building on emerging scholarship, the article advances a rights-based approach that foregrounds the human right to a healthy environment and the right to benefit from science and its applications as interpretative tools for reshaping IP rules in line with climate justice, and argues that improving access to climate technologies in developing countries depends on integrating these perspectives into the interpretation and development of IP law.

Keywords: climate technologies, technology transfer, intellectual property, international environmental law, fragmentation, human rights.

Introduction

Climate change constitutes an interlocking and complex global challenge with rapidly intensifying impacts ranging from extreme weather and agricultural disruption to economic instability and public health crises. For instance, climate change is projected to increase food inflation in Europe by 50% by 2035¹ and intensify the spread of climate-sensitive diseases.² These impacts are, however, unevenly distributed with developing and least-developed countries (**LDCs**) often bearing disproportionate burdens due to their vulnerabilities and limited technological capacity.³ Climate technologies help reduce greenhouse gas

¹ M Kotz and others, 'The Impact of Global Warming on Inflation: Averages, Seasonality and Extremes' (2022) 2821 ECB Working Paper Series 1.

² UN News, 'Spike in Dengue Cases Due to Global Warming, Warns WHO' (21 July 2023).

³ MK Zaman, 'The TRIPS Patent Protection Provisions and Their Effects on Transferring Climate Change Technologies to LDCs and Poor Developing Countries: A Critical Appraisal' (2013) 3 Asian Journal of International Law 137.

(GHG) emissions (eg. solar and wind energy) and enhance resilience to climate impacts (eg. coastal protection infrastructure).⁴ However, their development, ownership, and control remain concentrated in high-income developed countries, leaving LDCs dependent on external technology transfer (TT). While studies confirm that climate stabilisation targets are achievable through a portfolio of existing and emerging technologies,⁵ the limited uptake of available technologies in developing countries reflects a persistent divide in access between the Global North and South.⁶

International environmental law (IEL) has sought to address this divide by embedding TT in the climate treaty regime. The main climate treaties recognise that facilitating access to climate technologies in developing countries is essential for global climate action, yet, their language reflects collective discord over how to realise this objective.⁷ Article 4(5) United Nations Framework Convention on Climate Change (UNFCCC) and Article 10 Paris Agreement establish obligations for developed states to promote technology development and transfer. The Paris Agreement further emphasises the link between TT and sustainable development.⁸ Together, these provisions frame equitable access to climate technologies as a means of achieving sustainable development and climate justice. However, they remain indeterminate, with no shared understanding of how TT should be defined, operationalised, or evaluated. In practice, these provisions rely on institutional mechanisms that lack the mandate, representation and financial capacity to address the underlying barriers, particularly those rooted in innovation policy and trade rules.

Transfer of technologies depends on many interrelated factors, including the development stage of technology, the stakeholders involved, and whether the technology is under intellectual property (IP) protection. IP rights (IPRs), particularly patents, play an ambivalent role in this process, as private actors in developed countries often hold the relevant patents, control commercialisation terms, and can impose restrictive licensing conditions.⁹ By setting the standards for protection of these rights, the international IP system influences the pathways through which technologies are disseminated. Past climate negotiations, however, reveal the absence of meaningful engagement with IP dimensions, including within the institutional TT mechanisms under climate treaties.¹⁰ Thus, without proper integration of IP considerations, the IEL regime alone cannot overcome the climate technology divide.

Although the TRIPS Agreement contains provisions that recognise public interest and the needs of LDCs, it was not designed with climate imperatives in mind, and its relationship with climate obligations remains contested and under-theorised. From a doctrinal perspective, this raises a fundamental question for IP law: can the current international IP system accommodate climate TT without undermining its internal logic? The IP system's approach is often justified on the basis that strong patent protection incentivises innovation and facilitates access to new technologies, but this assumption becomes more unstable considering the different responsibilities and capabilities of states in responding to climate change. Recent studies challenge the preconception that strong patent protection necessarily leads to successful

⁴ World Resources Institute, 'IPCC Report 2022: Climate Impacts, Adaptation and Vulnerability' (WRI, 2022).

⁵ S Chuffart-Finsterwald, 'Environmental Technology Transfer and Dissemination Under the UNFCCC: Achievements and New Perspectives' (2014) 26 *Environmental Claims Journal* 239.

⁶ S Traerup and others, 'Technology Transfer for Climate Mitigation and Adaptation: Analysing Needs and Development Assistance Support in Technology Transfer Processes (Policy Brief)' (UNEP Copenhagen Climate Centre 2022) 5.

⁷ CP Carlarne and JD Colavecchio, 'Balancing Equity and Effectiveness: The Paris Agreement & the Future of International Climate Change Law' (2019) 27 *NYU Environmental Law Journal* 107.

⁸ Article 10(5) Paris Agreement.

⁹ A Brown, 'Intellectual Property and Climate Change' in R Dreyfuss and J Pila (eds), *The Oxford Handbook of Intellectual Property Law* (1st edn, OUP 2018) 977.

¹⁰ E Perot, 'Technology Transfer, Climate Change and the Developing Countries: The Difficulties Posed By Green Patents' (2023) 18(5) *Journal of Intellectual Property Law & Practice* 400.

TT.¹¹ Notably, studies indicate that while patents incentivise climate innovation, they can also restrict access to new climate solutions.¹²

A growing body of literature notes how the lack of consensus on the complex interconnections between IP and climate change has hindered global diffusion of climate technologies,¹³ and how this is exacerbated by the fragmentation of international law which refers to the development of treaties within separate frameworks, resulting in disconnected legal systems.¹⁴ Nevertheless, research also identifies opportunities for greater synergy between IEL and IP law.¹⁵ Several scholars advocate for a systemic reinterpretation of the IP system to align it with climate justice and human rights (HRs) concerns.¹⁶ This leads to another question explored in this article: how can HRs provide a framework for reinterpreting IP rules in the context of climate TT?

The environment is not expressly protected in foundational HRs documents,¹⁷ like the UDHR.¹⁸ It was only in 2022 when the UN General Assembly finally recognised a human right to a healthy environment in a non-binding resolution,¹⁹ strengthening the normative foundations for rights-based approaches. Furthermore, scholars including Bouwer,²⁰ and Bodimeade and Deane²¹ advocate for a proper articulation of the human right to enjoy the benefits of scientific progress and its applications. These approaches offer a normative vocabulary for reframing access to climate technologies as a matter of HRs and state obligations rather than mere policy recommendations. This view is particularly appealing as it offers a conceptual bridge across IP, IEL, and HRs while preserving IP law's function of balancing private rights and innovation incentives with public interests.

This article maintains a trifold interdisciplinary focus on the intersections between IP, IEL and HRs to address three interrelated questions: (i) how these frameworks can support climate TT; (ii) whether a reinterpretation of IP rules is needed; and (iii) how HRs approaches can inform such reinterpretation to better support climate technology access in the Global South. The article proceeds in three sections. Section 1 examines TT obligations and the relevant institutional mechanisms under climate treaties. Section 2 evaluates the TRIPS regime's potential to support climate TT, challenging the prevailing assumptions around patent protection and the effectiveness of TRIPS flexibilities. Section 3 addresses fragmentation and advances a rights-based reinterpretative approach, concluding that supporting climate technology access and transfer in developing countries depends on integrating HRs perspectives into the interpretation and development of IP rules within the broader architecture of international law.

¹¹ M Rimmer, 'The Paris Agreement: Intellectual Property, Technology Transfer, and Climate Change' (2018), in Rimmer M (ed), 'Intellectual Property and Clean Energy: The Paris Agreement and Climate Justice' (Springer 2018) 60.

¹² K Raiser, H Naims and T Bruhn, 'Corporatization of the Climate? Innovation, Intellectual Property Rights, and Patents for Climate Change Mitigation' (2017) 27 Energy Research & Social Science 1.

¹³ Rimmer (n 11) 33.

¹⁴ N Perrone and N Glens, 'Technology Transfer and Climate Change: A Transnational Law Analysis' (2022) 13 Transnational Legal Theory 280.

¹⁵ R Saidane, 'Balancing Obligations to Develop Climate Change Technologies with IP and Trade Objectives: An Evaluation of the Systemic Integration of the Paris Agreement into TRIPS' (2024) 55 IIC 1055.

¹⁶ C Zhou, 'Can Intellectual Property Rights Within Climate Technology Transfer Work for the UNFCCC and the Paris Agreement?' (2019) 19 International Environmental Agreements: Politics, Law and Economics 107.

¹⁷ J Fraser and L Henderson, 'The Human Rights Turn in Climate Change Litigation and Responsibilities of Legal Professionals' (2022) 40 Netherlands Quarterly of Human Rights 3.

¹⁸ Universal Declaration of Human Rights 1948 (UDHR).

¹⁹ UNHRC Resolution 48/13, U.N. Doc. A/HRC/RES/48/13.

²⁰ K Bouwer, 'Insights for Climate Technology Transfer from International Environmental and Human Rights Law' (2018) 23 Journal of Intellectual Property Rights 7.

²¹ C Bodimeade and F Deane, 'Evolving Theory of IP Rights: Promoting Human Rights in the Agreement on Trade-Related Aspects of Intellectual Property Rights' (2023) 18 Journal of Intellectual Property Law & Practice 603.

1: International Environmental Law and Climate Technology Transfer

Climate change is the planet's overall response to increased GHG concentrations and other climate-forcing factors like aerosols and deforestation. Unlike 'global warming', the term 'climate change' encompasses a wide range of impacts, many of which can harm human health.²² Scientific evidence indicates that climate change is accelerating due to human activities, and reports project severe hazards if global warming exceeds 1.5°C.²³ States have acknowledged their common interest in effectively responding to climate change,²⁴ as this global challenge requires urgent international action regarding mitigation and adaptation.²⁵ Accordingly, the UNFCCC attempts to stabilise GHG concentrations,²⁶ and the Paris Agreement aims to limit temperature increases to well below 2°C, with periodic reviews to consider lowering it to 1.5°C.²⁷

As recognised by the Intergovernmental Panel on Climate Change (IPCC), technology plays a central role in this context.²⁸ The mechanisms for development and transfer of climate technologies should therefore be assessed in their ability to support environmental objectives.²⁹ The IPCC defines climate TT as the exchange of know-how, experience and equipment for climate change mitigation and adaptation among various stakeholders.³⁰ Accordingly, TT involves not just hardware or software, but also access to knowledge and socio-economic support required for the effective use of technologies.³¹ Importantly, TT is embedded in IEL as a set of legal obligations under climate treaties. This section examines these obligations under the UNFCCC and Paris Agreement, alongside the institutional mechanisms established to support their implementation.

1.1. Technology Transfer Obligations under International Climate Law

The international transfer of climate technologies is primarily governed by the UNFCCC and the Paris Agreement, both of which establish differentiated obligations for states based on principles of equity and common-but-differentiated responsibilities (CBDRs). Article 4 UNFCCC sets out general commitments for all parties to cooperate in promoting and facilitating TT, including support for enabling legal systems and market frameworks.³² Moreover, Article 4(5) places specific responsibilities on developed countries to 'take all practicable steps to promote, facilitate and finance' the transfer of climate technologies to developing countries, in line with their historical responsibilities. Article 4(7) reinforces this obligation by linking any future commitments of developing countries to the effective fulfilment of transfer obligations by the developed countries,³³ implying that non-compliance with TT provisions conflicts with the purpose of the UNFCCC and may constitute a material breach.³⁴ Furthermore, Article 4(9) requires all parties to prioritise the specific vulnerabilities of LDCs when providing climate finance and transferring technology.

While developing countries face no compulsory emission reduction targets under the UNFCCC, they are expected to improve domestic capacity for climate action and create conducive environments for technology inflows, particularly through foreign investment.³⁵ This implies that states are also expected to

²² J Sarnoff (ed), 'Research Handbook on Intellectual Property and Climate Change', (Edward Elgar 2016) 11 & 17.

²³ IPCC, Sixth Assessment Report for Working Group II (2022), and the Synthesis Report (2023).

²⁴ Paris Agreement, Preamble, para 5.

²⁵ Raiser, Naims and Bruhn (n 12) 1 & 2.

²⁶ Article 2 UNFCCC.

²⁷ Article 2 Paris Agreement.

²⁸ Raiser, Naims and Bruhn (n 12) 1 & 2.

²⁹ Ibid 2.

³⁰ IPCC, 'Methodological and Technological Issues in Technology Transfer: Summary for Policymakers' (Special Report of Working Group III, CUP 2000) 3.

³¹ Zaman (n 3) 142.

³² Perrone and Glens (n 14) 274.

³³ Sarnoff (n 22) 39.

³⁴ Zhou (n 16) 109.

³⁵ Perrone and Glens (n 14) 274.

support the transfer and financing of privately-owned climate technologies, but the use of soft language such as 'promote' and 'facilitate' weakens the binding force of these obligations.³⁶ Nevertheless, progress on climate TT remained limited for almost a decade, raising questions about the adequacy of legal measures taken in the UNFCCC.

Before the Paris Agreement, the dominant narrative held that the UNFCCC had established a relatively soft framework of vague obligations directed mainly at developed states, while many developing and newly industrialised states resisted assuming equal obligations. The Kyoto Protocol,³⁷ as a set of secondary norms under the UNFCCC, is an expression of this trend.³⁸ The Protocol restated the importance of TT,³⁹ and identified it as a component of parties' climate actions.⁴⁰ Article 10(c) restated the UNFCCC's basic TT obligations, with emphasis on cooperation among states, private actors, and international organisations.

However, the Protocol's impact was undermined by a lack of international consensus, most notably, the United States never ratified it.⁴¹ While the general view has been that the Kyoto Protocol ceased to apply following the expiry of its second commitment period in 2020,⁴² recent developments illustrate that it remains relevant. Notably, the International Court of Justice (ICJ) has affirmed that all three climate treaties (UNFCCC, Kyoto Protocol and Paris Agreement) operate in tandem, and that the Protocol remains part of the applicable law.⁴³

The Paris Agreement marked a structural shift by requiring mitigation and adaptation actions from all parties in the period after 2020,⁴⁴ and embedding TT more centrally within the climate regime. Unlike its predecessor, the Paris Agreement provides a broad legal framework addressing all key elements of the UNFCCC (mitigation, adaptation, finance, technology transfer, and capacity-building) while leaving specific modalities to be determined by the parties.⁴⁵ Article 2(2) reinforces this shift by linking climate action to equity and the principle of CBDRs.⁴⁶

More significantly, Article 10 Paris Agreement establishes a standalone, comprehensive basis for international cooperation on climate-related technologies. Article 10(1) sets out a shared long-term vision, recognising technology development and transfer as essential to mitigation and adaptation goals.⁴⁷ Article 10(2) further mandates strengthened cooperation on innovation, development, and dissemination of climate technologies, including balanced financial support for developing countries. Moreover, Article 11 underscores the importance of capacity-building, requiring all parties supporting such efforts to report their activities and ensure proper institutional mechanisms are in place to implement the Agreement.⁴⁸

Despite the strong language of obligations, these provisions lack specificity about how they are to be accomplished. For instance, although Article 10(6) mandates financial support for developing countries, the lack of further direction about what is actually required, renders it as a general ambition rather than a binding obligation.⁴⁹ Moreover, despite acknowledging the importance of TT in addressing the climate

³⁶ Ibid 274.

³⁷ Kyoto Protocol to the United Nations Framework Convention on Climate Change 1997 (**Kyoto Protocol**).

³⁸ M Bothe, 'International Climate Change Policy after Doha' (2014) 44 *Environmental Policy and Law* 116.

³⁹ Chuffart-Finsterwald (n 5) 247.

⁴⁰ Article 3(14) Kyoto Protocol.

⁴¹ Brown (n 9) 6.

⁴² ICJ, *Obligations of States in Respect of Climate Change* (Advisory Opinion, 23 July 2025), 32-33, Para 66.

⁴³ Ibid 46 & 47, Para 120.

⁴⁴ M Azam, 'Are the UNFCCC Paris Agreement and the TRIPS Agreement Facilitating Access to and Transfer of Climate Technologies for the LDCs?' (2021) 18 *Manchester Journal of International Economic Law* 333.

⁴⁵ A Zahar (ed), 'Research Handbook on the Law of the Paris Agreement' (Edward Elgar Publishing 2024) 21.

⁴⁶ P Dupuy and J Viñuales, 'International Environmental Law' (2nd edn, CUP 2018) 189.

⁴⁷ Zahar (n 45) 180.

⁴⁸ Article 11(4) and 11(5) Paris Agreement.

⁴⁹ Zahar (n 45) 180.

technology divide,⁵⁰ the Paris Agreement remains silent on IPRs, leaving the tensions regarding technology ownership and access unresolved.⁵¹ While the Agreement offers a more inclusive framework than the Kyoto Protocol, its transformative potential ultimately depends on the effective operation of its cooperative mechanisms. The next sub-section considers the institutional mechanisms established to support these commitments.

1.2. Institutional Mechanisms for Climate Technology Transfer

The international climate regime has established a set of institutional mechanisms intended to promote the development and transfer of climate technologies in developing countries.⁵² Among these mechanisms, the Technology Mechanism, established in 2010, comprises the Technology Executive Committee (**TEC**) and the Climate Technology Centre and Network (**CTCN**), with distinct but complementary roles. The TEC provides policy recommendations, oversees the preparation of technology needs assessments and provides synthesised analyses of global policies to support equitable TT.⁵³ It develops and promotes proposals through collaboration with diverse stakeholders and UNFCCC bodies.⁵⁴ However, its composition reflects a structural imbalance with fragmented Global South representation across members, and it has limited leverage or resources to influence policies on trade, IPRs, finance, or other systemic barriers to TT.⁵⁵ Strengthening the representation of developing countries within the TEC is essential to align its institutional governance with climate justice implications.

While the TEC operates primarily at the policy level, its recommendations require an operational counterpart. This role is fulfilled by the CTCN, which provides technical assistance to developing countries for implementing climate technologies. The CTCN manages support requests, accelerates TT through collaboration and knowledge exchange.⁵⁶ It coordinates a global network of national, regional, sectoral, and international technology centres and entities,⁵⁷ and has supported the adoption of new technologies, mainly through pre-feasibility and feasibility studies, and engages countries via nationally designated entities.⁵⁸ Nevertheless, some mandate overlap appears between the CTCN Advisory Board and the TEC, suggesting a potential for stronger collaboration.⁵⁹ Their collaboration could be enhanced, for instance, by integrating the TEC's expertise into the preparation of technical assistance requests.

The Paris Agreement advances technology outcomes both substantively and procedurally. Substantively, it adopts a holistic approach to the technology cycle, emphasising innovation and early-stage deployment. Procedurally, it strengthens the role of the UNFCCC's Technology Mechanism, operationalised through the Technology Framework which was adopted at the 2018 Katowice Conference.⁶⁰ Scholars note that, while the Paris Agreement did not alter the Technology Mechanism established only five years earlier, it contains significant changes to the substance and process of UNFCCC technology governance,⁶¹ and

⁵⁰ M Rimmer, 'Beyond the Paris Agreement: Intellectual Property, Innovation Policy, and Climate Justice' (2019) 8(7) *Laws* 4.

⁵¹ Sarnoff (n 22) 39.

⁵² S Minas, 'The Paris Agreement's Technology Framework and the Need for Transformational Change' (2020) 14 *Carbon & Climate Law Review* 241.

⁵³ Bower (n 20) 10.

⁵⁴ Zahar (n 45) 35.

⁵⁵ *Ibid* 35.

⁵⁶ UNFCCC, Decision 1/CP.16, The Cancun Agreements: Outcome of the work of the Ad Hoc Working Group on Long-Term Cooperative Action under the Convention (Report of the Conference of the Parties on its sixteenth session, Addendum, Part Two: Action taken by the Conference of the Parties, FCCC/CP/2010/7/Add.1, adopted 15 March 2011), 20, Para 123.

⁵⁷ Bower (n 20) 10.

⁵⁸ Climate Technology Centre and Network (CTCN), 'CTCN Progress Report 2020 – Technology Support' (CTCN, 2020).

⁵⁹ Zahar (n 45) 35 & 36.

⁶⁰ Minas (n 52) 241.

⁶¹ *Ibid* 241.

embeds technology provisions in unprecedented detail compared to earlier climate treaties.⁶² As mentioned, Article 10 Paris Agreement signifies the first dedicated technology article in the UNFCCC regime. Notably, Article 10(3) provides that the 'Technology Mechanism established under the Convention shall serve this Agreement'. This provision elevates the Technology Mechanism to treaty level in the UNFCCC normative hierarchy, making it a permanent feature of the Paris architecture.⁶³ Article 10(4) Paris Agreement reaffirms and expands the Technology Mechanism's role by introducing a Technology Framework to guide its work.⁶⁴ The Framework aims to achieve 'transformational change' by enhancing innovation, capacity-building, and collaboration with financial mechanisms in the climate treaty regime.⁶⁵

Alongside these formal technology bodies, other institutions also seek to facilitate technology dissemination in vulnerable countries, including the LDCs Expert Group (**LEG**), which is an advisory body to LDCs, established in 2001.⁶⁶ It prepares two-year rolling work programmes, in line with its mandate to provide technical guidance and support for national adaptation plans, programmes of action, capacity-building, and access to funding.⁶⁷ The Group meets twice a year and reports annually to the Supervisory Body for Implementation under a standing agenda item, 'matters relating to the LDCs'.⁶⁸ Although the LEG is not part of the formal Technology Mechanism, its work fosters enabling environments that facilitate climate technology deployment in LDCs.

Overall, these institutional arrangements reveal a mixed record. They have introduced some conceptual advances consistent with the Paris Agreement and shaped the work of UNFCCC technology bodies, yet their tangible impact remains limited. The ambition for 'transformational change' reflects a growing dissatisfaction with global climate responses, but this has yet to translate into sustained operational outcomes.⁶⁹ Although progress has been made in obtaining bureaucratic and advisory support for developing countries,⁷⁰ the overall progress of the Technology Mechanism remains insufficient,⁷¹ as it continues to be constrained by structural imbalances in representation, inadequate financing, and restrictive IP rules that keep essential technologies beyond developing countries' reach. As there is a need to situate climate technologies within broader debates on green innovation and the international IP and trade systems,⁷² scholars advocate for an IP mechanism to support development and transfer of climate technologies and complement the mechanisms under climate treaties.⁷³ The next section explores the TRIPS regime's potential in this context.

⁶² Ibid 245.

⁶³ Ibid 245.

⁶⁴ Rimmer (n 11) 59.

⁶⁵ Zahar (n 45) 180.

⁶⁶ UNFCCC, Decision 29/CP.7, Establishment of a least developed countries expert group (FCCC/CP/2001/13/Add.4), 14.

⁶⁷ UNFCCC, Decision 16/CP.24, Least Developed Countries Work Programme (FCCC/CP/2018/10/Add.2), 7.

⁶⁸ Zahar (n 45) 26.

⁶⁹ Minas (n 52) 254.

⁷⁰ Azam (n 44) 337.

⁷¹ Bouwer (n 20) 10.

⁷² Rimmer (n 11) 36.

⁷³ Rimmer (n 50) 1.

2: Intellectual Property Law and Climate Technology Transfer

IPRs play a central role in shaping the development, ownership, and transfer of climate technologies, and are therefore critical to addressing the climate technology divide.⁷⁴ Their importance is amplified by the strategic value of technology in international trade relations, particularly when used as a bargaining chip.⁷⁵ Despite continued debates on innovation policy and equitable access to climate technologies, developed countries have largely resisted a substantive articulation of IP's role in supporting TT.⁷⁶ Nevertheless, there is growing recognition that an international IP system capable of supporting global climate objectives through effective TT is indispensable to meaningful climate action.⁷⁷

The TRIPS Agreement, which sets out minimum IP protection standards,⁷⁸ does not address climate change directly; however, it provides that states can restrict patent protection if an invention's commercial exploitation contradicts 'ordre public' or morality, with this stated to include delivering 'serious prejudice to the environment'.⁷⁹ Furthermore, while TRIPS prioritises commercial interests, it also contemplates to some extent, the relevance of public interests and the importance of TT to LDCs. Arguably, the TRIPS framework contains some normative space to accommodate climate-related objectives.

Concerns about IP protection and access to climate technologies go as far back as the parallel debates over access to medicines which led to the Doha Declaration.⁸⁰ Several proposals have been made seeking to facilitate climate TT through utilising the 'public interest' principle under Articles 7 and 8, TT obligations under Articles 66 and 67, and flexibilities like compulsory licenses (**CLs**). Commentators have also called for adopting a declaration specific to climate technologies, and even rethinking the TRIPS itself.⁸¹ This section examines the role of IP system in climate TT, challenging the prevailing assumptions around patent protection and the effectiveness of TRIPS flexibilities.

2.1. IP Protection and the Patent Dilemma in Global Climate Change

In recent years, scholarship at the intersection of IP and climate change has expanded, focusing on the role of patents, designs, trademarks, copyrights and trade secrets) in shaping access to climate technologies.⁸² Within this literature, debates increasingly concentrate on patents, given their influence over commercialisation and pricing.⁸³ This article therefore focuses on patent protection, because patents play a central role in the debates over IP and climate TT. Their relevance is further underscored by the prevalence of patent disputes over climate technologies,⁸⁴ and by their widespread use as indicators of TT in both legal and empirical studies.⁸⁵

While patents can incentivise innovation, they can also render technologies unaffordable for developing countries. Empirical studies indicate an 'IP divide' between developed and developing countries,⁸⁶ with

⁷⁴ A Brown, 'Intellectual Property, Climate Change and Technology: Managing National Legal Intersections, Relationships and Conflicts' (Edward Elgar 2019) 13 & 14.

⁷⁵ Bodimeade and Deane (n 21) 604.

⁷⁶ Rimmer (n 11) 35 & 53.

⁷⁷ Ibid 61.

⁷⁸ Zhou (n 16) 113.

⁷⁹ Article 27(2) TRIPS.

⁸⁰ WTO General Council, Implementation of Paragraph 6 of the Doha Declaration on the TRIPS Agreement and Public Health: Decision of the General Council (30 August 2003).

⁸¹ M Azam, 'The TRIPS Agreement Revisited –Time to Open-Up Climate Technologies for Least Developed Countries' (2022) 27 Journal of Intellectual Property Rights 111.

⁸² Brown (n 74) 13 & 14.

⁸³ Azam (n 44) 329.

⁸⁴ Rimmer (n 50) 2.

⁸⁵ A Dechezleprêtre, M Glachant and Y Ménière, 'What Drives the International Transfer of Climate Change Mitigation Technologies? Empirical Evidence from Patent Data' (2013) 54 Environmental & Resource Economics 164.

⁸⁶ JB Biddle, 'Intellectual Property Rights and Global Climate Change: Toward Resolving an Apparent Dilemma' (2016) 19(3) Ethics, Policy & Environment 304 & 305.

many scholars arguing that stringent patent protection enables monopoly pricing and functions as a barrier to TT and affordable access.⁸⁷ For example, patent data show that between 2010 and 2015, low-income countries received virtually no transfers of patented climate technologies, even in areas like coastal protection, agriculture, and water management, where these countries are particularly vulnerable.⁸⁸

This tension has been described as the ‘patent dilemma in global climate change’.⁸⁹ Similar problems appear in the intersection of IP and health law, where patents are argued to impede access to essential medicines in developing countries.⁹⁰ Yet, the climate dilemma presents additional justice considerations, because the climate change to which developing countries have to respond is caused mainly by human activity in developed, industrialised nations.⁹¹ In general, this debate boils down to two perspectives: developing states advocating weaker IP protection to facilitate access, and developed states arguing for stronger protection to encourage innovation.⁹²

Much of the early literature on patents and climate technologies often assumed patents have a positive impact on innovation.⁹³ On this basis, optimists contend that stronger protection ensures legal security for foreign investment, and thus a globally-harmonised high level of protection benefits even, and particularly, developing countries.⁹⁴ While the World Trade Organisation (**WTO**) and World Intellectual Property Organisation (**WIPO**) generally align with this view,⁹⁵ its underlying preconceptions have long been challenged for their weak empirical grounds. Recent studies reveal mixed and context-dependent outcomes,⁹⁶ with some suggesting that stringent patent protection can discourage climate TT by increasing licensing costs, restricting the commercialisation of climate technologies, and obstructing follow-on research.⁹⁷

Accordingly, pessimists argue that global standards of IP protection were introduced too early on too high levels, and a lower level of protection in developing countries will have little negative impact on global innovation.⁹⁸ Moreover, the relationship between patent stringency and TT is contingent on factors such as market size, absorptive capacity and institutional development of recipient countries.⁹⁹ Empirical support for the optimist position also appears concentrated in countries with relatively strong developmental capacity.¹⁰⁰ This further reflects the results of Athreye’s study on climate TT to LDCs from 2008-2018, in comparison to results of an earlier study from 1995-2007.¹⁰¹ Her findings reveal not only that strong IPRs no longer have the same effects as before,¹⁰² but also that supporting climate TT to developing countries requires a different set of policies compared to high-income economies.¹⁰³

⁸⁷ Ibid 301 & 302.

⁸⁸ A Dechezleprêtre and others, 'Invention and Global Diffusion of Technologies for Climate Change Adaptation: A Patent Analysis' (2020) World Bank, (World Bank website, June 2020), 7, 13 & 26.

⁸⁹ Biddle (n 86) 301.

⁹⁰ Rimmer (n 50) 9 & 17.

⁹¹ Biddle (n 86) 302.

⁹² Perot (n 10) 400.

⁹³ Raiser, Naims and Bruhn (n 12) 7.

⁹⁴ A Peukert, 'Intellectual Property and Development: Narratives and Their Empirical Validity' (2017) 20(2) Journal of World Intellectual Property 10.

⁹⁵ S Bannerman, 'The World Intellectual Property Organization and the Sustainable Development Agenda' (2020) 122 Futures 102586, 3.

⁹⁶ S Athreye and others, 'Intellectual Property Rights and the International Transfer of Climate Change Mitigating Technologies' (2023) 52 Research Policy 104819, 3 & 4.

⁹⁷ Raiser, Naims and Bruhn (n 12) 1, 3 & 6.

⁹⁸ Peukert (n 94) 10.

⁹⁹ Athreye and others (n 96) 2.

¹⁰⁰ Raiser, Naims and Bruhn (n 12) 4.

¹⁰¹ Dechezleprêtre, Glachant and Ménière (n 85) 163.

¹⁰² Athreye and others (n 96) 16.

¹⁰³ Ibid 1.

Put differently, a highly-protective patent system may do little in developing economies where financial markets are underdeveloped and financing for research and development is insufficient.¹⁰⁴ Overall, the correlation between protection stringency and TT is not linear, but can be represented as an inverted U-curve, indicating the need for a balanced level of protection to foster both innovation and socio-economic development.¹⁰⁵ Ultimately, a balanced approach to patent protection is required, as the presumption that stringent protection best serves both innovation incentives and access to climate technologies does not withstand empirical scrutiny.

2.2. TRIPS Regime and Climate Technology Transfer

Economic benefits of climate technologies continue to accrue largely to developed countries, despite the fact that climate change affects developing nations more severely.¹⁰⁶ Climate technologies serve both economic and environmental functions, with the latter giving them a public nature that justifies their special treatment under the international IP system.¹⁰⁷ Addressing the climate technology divide therefore requires a meaningful response from IP law. While some scholars advocate for such a response to be embedded within the UNFCCC framework,¹⁰⁸ this forum may not be appropriate to regulate IP. Instead, UNFCCC may facilitate climate TT by shaping how IP rules under TRIPS are interpreted and applied.¹⁰⁹ TRIPS has its own set of provisions with potential relevance for climate TT, although critics contend that they have not proven effective.¹¹⁰

As an international treaty, TRIPS must be interpreted in light of its 'context and objectives',¹¹¹ including those articulated in Articles 7 and 8. These provisions seek to balance competing North–South interests, a balance that has often been overshadowed by the commercial priorities emphasised in the TRIPS preamble.¹¹² Article 7 aims to offset IP protection by socio-economic welfare and technology dissemination to achieve a 'balance of rights and obligations', while allowing some flexibility in implementation of the TRIPS.¹¹³ Article 8(1) further allows members to adopt measures to protect public health and promote public interests in vitally-important sectors, and Article 8(2) permits the prevention of IPRs abuse while ensuring the adopted measures are consistent and necessary when deviating from TRIPS standards.¹¹⁴ Together, these provisions provide interpretative space to align IP protection with broader concerns of HRs and climate justice.

Moreover, TRIPS contains explicit TT provisions, though these are often considered to reflect a 'best endeavour' nature, without imposing binding obligations on developed parties.¹¹⁵ Article 66(2) requires developed countries to create incentives for their enterprises and institutions to transfer technology to

¹⁰⁴ C Correa, X Seuba and A Yusuf (eds), 'Intellectual Property and Development: Understanding the Interfaces' (Springer 2019) 133.

¹⁰⁵ Peukert (n 94) 14.

¹⁰⁶ M Sajid, Y Zhang and L Janjua, 'Breaking Barriers: Assessing Technology Transfer for Climate-Resilient Development' (2024) 33 *Environmental Technology & Innovation* 103471, 2.

¹⁰⁷ Zhou (n 16) 117.

¹⁰⁸ Rimmer (n 50) 18.

¹⁰⁹ Zhou (n 16) 118.

¹¹⁰ Azam (n 81) 107.

¹¹¹ This reasoning is based on Article 31(1) Vienna Convention on the Law of Treaties 1969, which requires that the ordinary meaning of the treaty terms must be derived 'in their context and in the light of [the treaty's] object and purpose'.

¹¹² Bodimeade and Deane (n 21) 611 & 612.

¹¹³ O Olatunji, 'Going It Alone or Acting as a Collective? Evaluating the East African Community Policy on Implementing TRIPS Obligations' (2024) 68 *Journal of African Law* 20 & 21.

¹¹⁴ *Ibid* 21.

¹¹⁵ V Gupta, D Jadhav and B Ronald, 'Transfer of ESTs in International Law: A Climate Justice Approach' (2024) 26 *Environmental Law Review* 130.

LDCs on agreed terms.¹¹⁶ It leaves the decision to transfer to local institutions, without mandating that such transfer necessarily occur.¹¹⁷ Furthermore, Article 67 requires developed parties to provide 'technical and financial assistance' to developing parties and LDCs to facilitate the implementation of TRIPS.¹¹⁸ These discretionary provisions¹¹⁹ have failed to establish a clear obligation for developed parties to assist LDCs with effective financial and technical support.

TRIPS also incorporates a range of flexibilities intended to balance innovation and trade policies with sustainable development for LDCs. However, the freedom afforded to Global South perspectives is limited due to restrictions and complexity of these mechanisms.¹²⁰ Whether TRIPS offers sufficient flexibility to support climate TT largely depends on one's position in the IP optimism–pessimism debate. As mentioned, optimists argue that stronger IPRs do not significantly hinder access in developing countries and thus view TRIPS as sufficiently flexible.¹²¹ Pessimists, however, advocate for more relaxed protection and view TRIPS as a regime of very strict protections, lacking the flexibility needed for developing countries.¹²² Nevertheless, among the existing flexibilities, CLs have attracted the most attention in the debates on climate TT.

CLs are often justified by public need, particularly when government intervention is required to counter monopolistic practices or ensure access to essential technologies in the public interest.¹²³ This mechanism enables access to essential technologies while also considering remuneration for patent-holders and their exclusive rights against other non-licensed parties. It allows governments to use a patent (directly or through a sub-contractor) without the owner's consent for non-commercial purposes.¹²⁴ Under TRIPS, parties can grant CLs if specific conditions and procedures are met. Notably, their national authorities should determine the grounds on which CLs are granted.¹²⁵ Furthermore, they should meet all the conditions listed in Article 31, including a prior attempt for voluntary licensing which can be waived in cases of 'national emergency' or 'other circumstances of extreme urgency', or against anti-competitive behaviour.¹²⁶ TRIPS does not limit the grounds for CLs, which means WTO-members are free to determine the justifying reasons for granting CLs.¹²⁷

However, a significant limitation is that CLs should be authorised only to address domestic needs. This reduces the potential of CLs in addressing major crises, since products manufactured under CLs cannot be imported to poorer countries, including those lacking the capacity required to manufacture products themselves. This became a substantial issue in the debates over access to medicines. As a solution, the Doha model was adopted in 2017,¹²⁸ to help drug-deprived countries access essential medicines through a special mechanism of CLs for import/export.¹²⁹ Article 31(bis) and the Annex were introduced to mitigate the shortcomings of Article 31(f), ie. that manufactured products shall be used predominantly to

¹¹⁶ EM Igbokwe, 'The TRIPS Technology Transfer and Pharmaceutical Innovation: Shifting focus to capacity building in least developed countries' (2025) *Intellectual Property Quarterly* 31.

¹¹⁷ *Ibid* 35.

¹¹⁸ Azam (n 44) 342.

¹¹⁹ For instance, commentators have mentioned that article 66(2) mandates developed parties to provide incentives without clarifying the nature and scope of those incentives, or a standard way to evaluate their effectiveness. See: Azam (n 44) 340.

¹²⁰ Brown (n 9) 961.

¹²¹ K Maskus, 'Differentiated Intellectual Property Regimes for Environmental and Climate Technologies' (OECD Publishing 2010) 7.

¹²² Zaman (n 3) 146.

¹²³ *Ibid* 153.

¹²⁴ Sarnoff (n 22) 75.

¹²⁵ K-J Ni, 'Legal Aspects (Barriers) of Granting Compulsory Licenses for Clean Technologies in Light of WTO/TRIPS Rules: Promise or Mirage?' (2015) 14 *World Trade Review* 713.

¹²⁶ Zaman (n 3) 153.

¹²⁷ Ni (n 125) 713.

¹²⁸ WTO, 'WTO Members Welcome Entry into Force of Amendment to Ease Access to Medicines' (30 January 2017).

¹²⁹ Zaman (n 3) 153.

supply domestic market.¹³⁰ Consequently, in the context of pharmaceuticals, this limitation does not apply to LDCs.¹³¹

Several commentators seek to justify the application of CLs to climate TT, either by stretching the existing TRIPS provisions¹³² or advocating for a declaration like the Doha model.¹³³ Although CLs have proven somewhat useful as a leveraging tool in negotiations with patent-holders,¹³⁴ they reveal that TRIPS does not properly consider the contextual differences of LDCs.¹³⁵ CLs do not address the limited capacity and technological deficiencies in LDCs, nor do they typically cover any know-how that could instead be transferred through voluntary licensing.¹³⁶ Regarding pharmaceuticals, Article 31(bis) mechanism has also failed, even during the COVID-19 pandemic,¹³⁷ due to its high implementation costs and procedural constraints.¹³⁸ These issues clearly surfaced when the mechanism was used by Rwanda and Canada in 2008, the only instance of its implementation in the last two decades.¹³⁹

Arguably, the effectiveness of CLs in promoting climate TT is questionable, as CLs would be meaningless in countries where a particular technology is not patented or where manufacturing capacity is insufficient.¹⁴⁰ Although jumping to the conclusion that CLs for climate technologies is an illusory option may be premature, it is perplexing to see so much effort to assert application of CLs to climate technologies, since they have already been tested and proven ineffective in the context of pharmaceuticals, where there was a declaration.¹⁴¹ Evidently, the TRIPS regime can benefit from a normative reorientation. Given the urgency of climate change and the distributive implications of climate TT, HRs offer a promising interpretative framework for rethinking TRIPS, a possibility explored in the next section.

¹³⁰ Olatunji (n 113) 37.

¹³¹ Article 2(a)(ii) TRIPS Annex.

¹³² Zhou (n 16) 115.

¹³³ Rimmer (n 50) 9.

¹³⁴ Zaman (n 3) 158.

¹³⁵ D Gervais (ed), 'Intellectual Property, Trade and Development' (2nd edn, OUP 2014) 100.

¹³⁶ *Ibid* 109.

¹³⁷ C Garrison, 'Never Say Never - Why the High Income Countries that opted-out from the Art. 31bis WTO TRIPS system must urgently reconsider their decision in the face of the Covid-19 pandemic' (8 Apr 2020).

¹³⁸ These procedural constraints include among other things, the complex provisions of eligibility, quantity, labelling, etc. See: G Ghidini and V Falce (eds), 'Reforming Intellectual Property' (Edward Elgar 2022) 36.

¹³⁹ Zaman (n 3) 157.

¹⁴⁰ Azam (n 81) 116.

¹⁴¹ Maskus (n 121) 25.

3: Human Rights and Climate Technology Transfer

Many studies support the developing countries' claim that the IP system, in its current form, stands as a barrier to climate TT and is not in harmony with core IEL principles of equity and CDBRs.¹⁴² Achieving harmonisation, however, remains difficult due to the fragmentation between IEL, IP and HRs frameworks, which further complicates addressing global issues that require an urgent technological response. Fragmentation is often attributed to the lack of structural factors, such as a global legislator or court, or a unified approach. Arguably, the absence of a comprehensive legal approach to climate TT is more the result of political choices by technology-exporting countries and multinational corporations, rather than a question of legal theory.¹⁴³ Nevertheless, greater alignment between the three frameworks may help counteract the lack of political will that continues to impede equitable access to climate technologies.

As discussed in earlier sections, neither the climate treaty regime nor the TRIPS has thus far succeeded in enabling effective TT in a balanced way. Therefore, scholars advocate for reconsidering the intersections towards a better integration of HRs perspectives into both regimes for a unified and effective approach.¹⁴⁴ The current disconnect between these regimes should not preclude the IP system from having the necessary capacity to foster such integration in future.¹⁴⁵ Accordingly, this section examines the relevance of HRs at the intersection of IEL and IP, analysing how a rights-based approach to green innovation policy can help mitigate fragmentation and better align the international IP system with climate justice and equity considerations.

3.1. Human Right to a Healthy Environment and Access to Climate Technologies

As environmental factors like climate change can affect the enjoyment of fundamental rights,¹⁴⁶ interests in the role of HRs within the broader environmental paradigm are expanding. The modern understanding of the relationship between HRs and IEL is rooted in early soft-law instruments, particularly the Stockholm and Rio declarations, and their focus on environmental protection with an anthropocentric approach.¹⁴⁷ However, this relationship is far from straightforward, considering the disconnect between the two frameworks.¹⁴⁸ On one hand, certain environmental rights with HRs dimensions have been recognised internationally, including substantive rights to water and sanitation, and procedural rights under the Aarhus Convention, including access to environmental information, public participation in decision-making, and access to justice.¹⁴⁹ On the other hand, HRs treaties do not expressly protect the environment.¹⁵⁰

To address this issue, a rights-based approach has evolved to 'green' the existing HRs treaties in a way that considers an implied 'environmental human right',¹⁵¹ relying for instance, on the rights to 'health', 'adequate living standards', and 'life' under instruments like ICESCR,¹⁵² CRC,¹⁵³ and ICCPR.¹⁵⁴ This has

¹⁴² Rimmer (n 11) 60.

¹⁴³ Perrone and Glens (n 14) 280 & 282.

¹⁴⁴ Rimmer (n 11) 36.

¹⁴⁵ Bodimeade and Deane (n 21) 610.

¹⁴⁶ B Lewis, 'Human Rights and Environmental Wrongs: Achieving Environmental Justice through Human Rights Law' (2012) 1 *International Journal for Crime, Justice and Social Democracy* 65.

¹⁴⁷ Dupuy and Viñuales (n 46) 358.

¹⁴⁸ A Boyle, 'Human Rights and the Environment: Where Next?' in B Boer (ed), 'Environmental Law Dimensions of Human Rights' (1st edn, OUP 2015) 201.

¹⁴⁹ Dupuy and Viñuales (n 46) 375.

¹⁵⁰ Only two binding treaties contain a right to a healthy environment. These include two regional HRs treaties, namely the African Charter on Human and Peoples' Rights 1981 (**African Charter**), and the Additional Protocol to the American Convention on Human Rights in the area of Economic, Social and Cultural Rights 1988 (**San Salvador Protocol**). See: D Anton and D Shelton, 'Environmental Protection and Human Rights' (1st edn, CUP 2011) 145.

¹⁵¹ *Ibid* 135.

¹⁵² International Covenant on Economic, Social and Cultural Rights 1966 (**ICESCR**), articles 11 & 12.

¹⁵³ Similar provisions can be found in articles 24 & 27 of the Convention on the Rights of the Child 1989 (**CRC**).

¹⁵⁴ International Covenant on Civil and Political Rights 1966 (**ICCPR**), article 6(1).

led to some promising results including recognition of the right to a healthy environment in several jurisdictions,¹⁵⁵ interpreting an environmental human right to ensure climate action by UN treaty-bodies like CESCR¹⁵⁶ and CEDAW,¹⁵⁷ and the development of an extensive environmental jurisprudence under the current HRs frameworks.¹⁵⁸

Accordingly, international tribunals like the UN Human Rights Committee have reviewed the relationship between environmental degradation and HRs in several cases,¹⁵⁹ including *Portillo Cáceres*¹⁶⁰ and *Daniel Billy*.¹⁶¹ Similarly, the jurisprudence of regional HRs tribunals in the Americas and Africa align with the rights-based approach, considering the relevant leading cases including *Awasi Tingni*¹⁶² and *SERAC*¹⁶³. Moreover, in Europe, where most rights-based climate cases appear,¹⁶⁴ a recent successful case, namely *KlimaSeniorinnen*,¹⁶⁵ marks the first time an international HRs court has linked the protection of HRs to states' mitigation obligations, thereby clarifying the deep connections between HRs and climate law.¹⁶⁶

Arguably, climate TT can be framed within the mentioned HRs perspectives since the importance of technology diffusion and transfer has been recognised to debates over climate justice.¹⁶⁷ A rights-based approach working towards capacity-building in LDCs can also promote sustainable development and climate technology access and transfer.¹⁶⁸ While a declaration or protocol could be an appropriate instrument for articulating the still-controversial notion of an environmental human right,¹⁶⁹ a rights-based approach to TT can help achieve the required balance concerning the anticipated response to climate change in IP law.¹⁷⁰

3.2. Human Rights and Intellectual Property

Debates over HRs and sustainable development reveal deep connections between climate change, HRs and IP law. The TRIPS Agreement introduced a new era of IP law characterised by the globalisation of high standards for IP protection. Such integration of worldwide processes raises HRs concerns due to its disproportionate impacts on the Global South. Nevertheless, TRIPS also made it easier to evaluate the

¹⁵⁵ Currently, more than 100 states have adopted the right to a healthy environment in their domestic law. See: J Knox and N Tronolone, 'Environmental Justice as Environmental Human Rights' (2024) 57 *Vanderbilt Journal of Transnational Law* 159.

¹⁵⁶ Committee on Economic, Social and Cultural Rights (**CESCR**), Statement: Climate Change and the International Covenant on Economic, Social and Cultural Rights, para. 6, UN Doc. E/C.12/2018/1 (31 October 2018).

¹⁵⁷ Committee on the Elimination of Discrimination Against Women (**CEDAW**), General Recommendation No. 37 on the Gender-Related Dimensions of Disaster Risk Reduction in the Context of Climate Change, UN Doc. CEDAW/C/GC/37 (13 March 2018), para 14.

¹⁵⁸ Knox and Tronolone (n 155) 159.

¹⁵⁹ A Savaresi and J Auz, 'Climate Change Litigation and Human Rights: Pushing the Boundaries' (2019) 9 *Climate Law* 244.

¹⁶⁰ *Portillo Cáceres v Paraguay*, UNHRC, CCPR/C/126/D/2751/2016, 25 July 2019.

¹⁶¹ *Daniel Billy and others v Australia* (Torres Strait Islanders Petition), UNHRC, CCPR/C/135/D/3624/2019, 23 September 2022.

¹⁶² *Mayagna (Sumo) Awasi Tingni Community v Nicaragua* [2001] Judgment 31 August 2001, (Inter-American Court of Human Rights).

¹⁶³ *Social and Economic Rights Action Center (SERAC) and Center for Economic and Social Rights (CESR) v Nigeria* (Communication No. 155/96), Judgment 27 October 2001, African Commission on Human and Peoples' Rights.

¹⁶⁴ J Hartmann and M Willers, 'Protecting Rights through Climate Change Litigation before European Courts' (2022) 13(1) *Journal of Human Rights and the Environment* 91.

¹⁶⁵ *Verein KlimaSeniorinnen Schweiz and Others v Switzerland* (Application no. 53600/20) Judgment 9 April 2024 (ECtHR, Grand Chamber).

¹⁶⁶ C Blattner, 'European Ruling on Climate and Rights Is a Game Changer' (2024) 628 *Nature* (London) 691.

¹⁶⁷ International Council on Human Rights Policy (2016) 'Beyond technology transfer: protecting human rights in a climate-constrained world', in: Sarnoff (n 22) 126-157.

¹⁶⁸ Lewis (n 146) 70.

¹⁶⁹ Boyle (n 148) 201 & 206.

¹⁷⁰ Brown (n 9) 985.

impact of IPRs on HRs by refining the scope and normative content of socio-economic rights that were previously unclear.¹⁷¹

There are emerging IP theories that promote HRs alongside protection of property rights.¹⁷² However, the commercial focus of TRIPS based on property rights not only overlooks the rights of all stakeholders impacted by innovation and technology but also ignores the responsibilities that should accompany IPRs.¹⁷³ The failure of TRIPS in supporting the rights of technology users has long been criticised, including by the Human Rights Sub-commission in Resolution 2000/7,¹⁷⁴ where various conflicts between the TRIPS regime and HRs were identified, particularly in areas related to technology access and transfer in developing countries. This affirms that the relevance of IP protection to HRs is generally clear and continues to be the subject of various UN discussions.

Although the IP system primarily seeks to promote innovation and trade in technology, it should also ensure that the benefits of scientific development are fairly shared among communities.¹⁷⁵ However, arguments based on HRs implications of climate TT often face objections from developed countries. Notably, high-income industrialised countries contend that the lack of climate TT under the current IP system is mainly due to demand-side barriers and that developing countries must enhance their capacity to absorb new technologies.¹⁷⁶ Thus, without alternative coordinated approaches, the interplay between IP, climate change and HRs remains controversial in practice.¹⁷⁷

In response to these problems, many scholars argue for better use of the human right to science and benefit-sharing, recognised under UDHR and ICSECR as ‘the right to enjoy the benefits of scientific progress and its applications’.¹⁷⁸ This right incorporates two interdependent rights¹⁷⁹ and is already gaining attention, particularly in debates on how to facilitate access to renewable energy.¹⁸⁰ Recognition of this right can meaningfully contribute to climate TT, yet the scope and outcomes of its realisation remain underdeveloped.¹⁸¹

Nevertheless, since benefit-sharing emphasises the agency of recipients in TT, this right is characterised by a pro-sharing, fair and equitable view, which resonates well with the environmental principles in climate law.¹⁸² Furthermore, this approach does not discard the international IP system’s logic but reorients its balance, ensuring that it evolves to support, rather than hinder climate technology access and transfer.

3.3. How Human Rights Can Enable Intellectual Property for Climate Technology Transfer

The accelerating pace and scale of climate change demand the rapid diffusion of climate technologies to developing countries. Yet, the international IP system faces a legitimacy crisis due to existing gaps that

¹⁷¹ Bodimeade and Deane (n 21) 610.

¹⁷² Ibid 606.

¹⁷³ Ibid 613.

¹⁷⁴ UN Commission on Human Rights Sub-Commission on the Promotion and Protection of Human Rights, Resolution 2000/7 (17 August 2000).

¹⁷⁵ Bodimeade and Deane (n 21) 607.

¹⁷⁶ Dechezleprêtre, Glachant and Ménière (n 85) 162.

¹⁷⁷ Sarnoff (n 22) 345.

¹⁷⁸ Article 27 of UDHR and article 15(1)(b) of ICSECR guarantee the right to enjoy the benefits of scientific progress and its applications.

¹⁷⁹ Bodimeade and Deane (n 21) 606.

¹⁸⁰ Bouwer (n 20) 7.

¹⁸¹ Ibid 12.

¹⁸² Benefit-sharing can be regarded as a dimension of the right to science, but it has mainly been studied as a tool for equity in international biodiversity law with regard to bioprospecting and the use of natural resources. See: Bouwer (n 20) 12.

hinder climate TT.¹⁸³ Although IP law is theoretically grounded in a balance between private rights and public interests, the overall thrust of the TRIPS regime remains the promotion of technological development through commercial incentives. Since the climate challenge leaves few options but to transform the system for technology development and diffusion,¹⁸⁴ a growing body of scholarship calls for a re-evaluation of the IP system and reconsideration of the IP balance within and beyond the TRIPS framework.¹⁸⁵

The international IP system contains normative dimensions capable of supporting HRs, considering its unique negotiation history.¹⁸⁶ Accordingly, scholars argue that rethinking the IP balance entails reconsidering the role of HRs in innovation policy to ensure that essential technologies remain accessible for all communities.¹⁸⁷ Nevertheless, under the current frameworks, if conflicts between IP and climate law arise, IPRs generally prevail.¹⁸⁸ A more integrated approach, one that recognises environmental HRs and addresses the broader implications of IP protection, would allow climate TT to play a more substantive role in protecting HRs. In such a scenario, the IP system could strike a proper balance between private and public interests and ensure HRs are not adversely affected.¹⁸⁹ Then, as the Special Rapporteur suggests, if IPRs and HRs were in conflict, HRs would prevail.¹⁹⁰

As illustrated in this section, a consequence of the fragmentation between IEL, IP and HRs, is that the disconnects between these regimes tend to reinforce one another. For instance, the historical absence of an explicitly recognised environmental human right constrains the articulation of climate obligations within HRs discourse, and limits the scope for reorientation of the IP system based on public interest. Conversely, recognition of an environmental human right can strengthen the non-binding commitments under the IEL framework¹⁹¹ and reinforce the rule of law.¹⁹² Such a recognition can also connect the various branches of international law and ease their fragmentation.¹⁹³ Nevertheless, a rights-based approach requires making a case for an environmental human right, and showing that upholding that right requires climate TT.¹⁹⁴

Various arguments support the claim that an obligation concerning climate TT from developed countries to the Global South is entailed by HRs.¹⁹⁵ The human right to benefit from scientific progress and its applications provides a particularly promising normative framework for reframing climate technology access.¹⁹⁶ It allows climate TT to be understood as a component of states' duties to ensure equitable benefit-sharing and access to scientific advances.¹⁹⁷ Nevertheless, the right to science has remained relatively unexamined in academic discourse, often described as obscure and neglected in its

¹⁸³ C Castaldi and others, 'Are Intellectual Property Rights Working for Society?' (2024) 53 *Research Policy* 104936, 1.

¹⁸⁴ D Shabalala, 'Intellectual Property, Climate Change and Development' (2016) 8(1) *WIPO Journal* 71.

¹⁸⁵ Rimmer (n 50) 1.

¹⁸⁶ Bodimeade and Deane (n 21) 610.

¹⁸⁷ Brown (n 74) 189.

¹⁸⁸ Brown (n 9) 990.

¹⁸⁹ Bodimeade and Deane (n 21) 613.

¹⁹⁰ Special Rapporteur in the Field of Cultural Rights, 'The Impact of Intellectual Property Regimes on the Enjoyment of Right to Science and Culture' (2023).

¹⁹¹ D Shelton, 'Human Rights and the Environments: Jurisprudence of Human Rights Bodies' (2002) 32 *Environmental Policy and Law* 166.

¹⁹² Dupuy and Viñuales (n 46) 367.

¹⁹³ V Köböl-Benda, 'The Current Status of the Right to the Environment at the Global International Law' (2022) 20 *Opolskie Studia Administracyjno-Prawne* 118.

¹⁹⁴ Sarnoff (n 22) 140.

¹⁹⁵ *Ibid* 140.

¹⁹⁶ Bower (n 20) 16.

¹⁹⁷ Bodimeade and Deane (n 21) 607.

interpretation. As a result, it has received limited articulation in the many decades since its introduction into the international HRs discourse.¹⁹⁸

In 2009, the Venice Statement on the right to science and benefit-sharing marked the first international expert discussion in this context.¹⁹⁹ It examined the content of the right to include non-discriminatory enjoyment of the benefits of science through the transfer of technologies.²⁰⁰ The Venice Statement also urged that applying HRs, particularly the right to science, to the IP regime can help ensure that science and technology policy serves human needs alongside economic prosperity.²⁰¹ Recognition of this right can give weight to equitable access claims particularly with regard to priority needs, such as health, food security, and environmental protection.²⁰² Moreover, this right offers an interpretative lens through which existing obligations under climate treaties and TRIPS can be understood and implemented. In particular, it supports reading TRIPS Articles 7, 8, 66 and 67 in a manner that foregrounds public interest considerations and facilitates technology diffusion to developing countries.

Overall, rights-based approaches offer several advantages in addressing the climate technology divide. They provide a normative framework capable of reshaping how states' environmental commitments, including TT obligations, are understood.²⁰³ They can help fill the gaps by creating an avenue to address instances of HRs violations in an environmental context,²⁰⁴ and ensure the implementation of climate obligations through HRs tribunals, courts and enforcement mechanisms.²⁰⁵ Moreover, they facilitate locating where technologies are most useful and are needed most urgently, making it easier for LDCs' needs to be prioritised as a matter of international policy.²⁰⁶ More importantly, they can create a space for reframing the unsustainable dynamic that has largely characterised the debate over climate TT for decades.²⁰⁷

Nevertheless, rights-based approaches are not without limitations. They often lack binding legal force and may struggle to address structural problems that extend beyond individual rights violations. As climate change does not result from the mere actions of certain individuals or groups, attempts to establish causal relations between persons or groups of persons and the victims of climate impacts are therefore epistemically problematic.²⁰⁸ A HRs-based approach does not clarify how to deal with technology dependency, which may worsen due to climate change. If technology remains concentrated in developed countries, access to climate technologies for vulnerable communities will continue to be dependent on the politics of foreign states, international organisations, and commercial incentives.²⁰⁹

¹⁹⁸ Ibid 607.

¹⁹⁹ United Nations Educational, Scientific and Cultural Organisation (UNESCO), *The Right to Enjoy the Benefits of Scientific Progress and Its Applications*, 2009, (Venice Statement), 7.

²⁰⁰ Ibid 13.

²⁰¹ Bodimeade and Deane (n 21) 607.

²⁰² Bower (n 20) 13.

²⁰³ Lewis (n 146) 70 & 71.

²⁰⁴ Savaresi and Auz (n 159) 249.

²⁰⁵ Lewis (n 146) 71.

²⁰⁶ Sarnoff (n 22) 127 & 132.

²⁰⁷ Rimmer (n 50) 3.

²⁰⁸ I Boran, 'Two Concepts of Wrongful Harm: A Conceptual Map for the Warsaw International Mechanism for Loss and Damage' (2017) 20 *Ethics, Policy & Environment* 202.

²⁰⁹ Perrone and Glens (n 14) 267.

Conclusion

This article critically examined the potential of the international IP system to address the climate technology divide, adopting a trifold interdisciplinary focus on the intersections between IEL, IP and HRs. It followed the emerging scholarship seeking to conceptualise climate TT through a more integrated engagement with relevant international legal frameworks.²¹⁰ Accordingly, Section 1 provided the relevant context by examining how the IEL framework supports technology access in developing countries. It reviewed TT obligations under climate treaties and assessed the main institutional mechanisms designed to promote equitable access and transfer of climate technologies.

Section 2 examined the role of the IP system in facilitating climate TT, challenging the prevailing assumptions around the stringency of patent protection. It analysed proposals seeking to support climate TT through the IP system and evaluated key TRIPS provisions concerning the obligations of developed countries to assist LDCs with financial and technical support. It also highlighted the limitations of the IP system in responding to global challenges when a coordinated technological response is required. As mentioned, empirical evidence suggests not only that strong IPRs no longer have the same effects as before, but also that supporting climate TT to developing countries requires a specialised set of innovation policies. The section evaluated whether TRIPS is flexible enough to support climate TT, and considered the possibility for a declaration like the Doha model in a climate context. It concluded that mechanisms such as CLs remain largely ineffective in countries without an adequate level of development. Nevertheless, lessons from the debates on IP and public health offer valuable insights for advancing parallel discussions on how TRIPS can foster greater institutional coherence and to support climate TT.

Section 3 addressed the theoretical gaps within and beyond the IP system that manifest in the fragmentation between the three relevant international frameworks, hindering a unified and effective approach to climate TT. The section then examined how a rights-based approach to environmental protection can clarify the connections between HRs and climate policy, advocating for greater utilisation of the right to a healthy environment and to the right to science and benefit-sharing. It argued that an explicitly recognised environmental human right can connect the various branches of international law, and advocated for a more systematic integration of HRs perspectives into both IEL and IP contexts. Despite its limitations, the IP system can still contribute meaningfully to addressing the technological divide in mitigating and adapting to climate change, provided that its links with HRs are revitalised.

The article sought to highlight the fact that legal factors, particularly IPRs, remain significant obstacles to climate TT. However, the shortcomings in access to climate technologies cannot be resolved through IP reform alone. Notwithstanding the gaps within the IP system and the fragmentation of international frameworks, effective climate TT to developing countries faces practical barriers such as financial costs of transferring climate technologies²¹¹ and lack of infrastructure and human resources that enable deployment and absorption of these technologies.²¹² As this article focused primarily on theoretical and normative gaps, it is important to note that these practical barriers are often exacerbated by legal factors, including stringent protection standards under the TRIPS regime.²¹³ Nevertheless, viewing IPRs as the only or main barrier to climate TT and relying on short-term strategies like CLs within the restrictive framework of TRIPS, are among perceptions that can be challenged.²¹⁴

Evidently, both the Paris Agreement and TRIPS will require closer scrutiny to assess their effectiveness in enabling climate TT. The central idea of this study was that there is a growing need for reconsideration of the international IP system to achieve a proper balance between IP protection and public interests. As advocated throughout this paper, a re-evaluation of the IP balance requires greater integration of rights-

²¹⁰ Bower (n 20) 16.

²¹¹ Sajid, Zhang and Janjua (n 106) 9.

²¹² Gupta, Jadhav and Ronald (n 115) 117.

²¹³ Zaman (n 3) 146.

²¹⁴ See: Maskus (n 121) 3; and, Ni (n 125) 701.

based perspectives to ensure that technological innovation benefits all communities, particularly the most vulnerable. This approach aligns with the need to differentiate between countries based on their development level, and draws on the lessons that can be learned from the debates on IP and public health. HRs approaches and in particular, the rights to a healthy environment and to the benefits of science can play an effective role in climate TT discussions, as they can link all three branches of IP, IEL and HRs within the broader framework of international law by providing for a reinterpretation of IP rules in the context of climate change. The international IP system can therefore be guided by these perspectives towards a newly envisaged balance, demonstrating maturity and true compromises in the public interest.

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