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Accelerating and Enhancing Inter-State Climate Technology Transfer: The Potential Value of a Benefit Sharing Approach.

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Accelerating and Enhancing Inter-State Climate Technology Transfer: The Potential Value of a Benefit Sharing Approach.

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The facilitation of inter-state technology transfer under the international climate regime is a deeply complex challenge and significant concerns with the scale and scope of implementation efforts to date persist. This paper proposes that the application of the legal concept of fair and equitable benefit-sharing, as an alternative way of framing technology transfer obligations, could inform and strengthen state action in this respect. An examination of the shared rationales and objectives behind benefit-sharing and climate technology transfer – namely the operationalisation of equity, pursuit of sustainable development and protection of human rights – demonstrates the pertinence of the concept to the climate technology transfer context and how a benefit-sharing frame could bridge gaps between different interpretations of these ambiguous themes. This understanding thereafter enables a deeper assessment of the procedural and substantive implications of applying a benefit-sharing frame to climate technology transfer obligations, emphasising the importance of concerted dialogue, genuine partnership-building and the protection of developing States. A better focus on needs assessments and collaborative action could in turn facilitate more effective and sustainable climate technology transfer outcomes by raising political ambition, encouraging greater diversification of approaches and emphasising the importance of capacity-building initiatives

¹ Marc Fleurbaey et al, 'Sustainable Development and Equity' in O.Edenhofer et al (eds), *Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the 5th Assessment Report of the IPCC* (CUP 2014) 302.

² United Nations Framework Convention on Climate Change 1771 UNTS 107, Art. 4.1(c).

³ The Paris Agreement in UNFCCC Decision 1/CP.21, *Adoption of the Paris Agreement* (29 January 2016) UN Doc FCCC/CP/2015/10/Add.1, Annex, Arts.10.1 &10.2.

1. Introduction

Despite long-standing recognition of the important role of technology development and transfer in reducing global greenhouse gas emissions and enhancing climate resilience, states have been slow in practice to implement their obligations under the international climate change regime to support this process.¹ Having formed a cornerstone feature of the cooperative action expected of states since the inception of the 1992 United Nations Framework Convention on Climate Change (UNFCCC),² the promotion of technology development and transfer was reiterated by the Paris Agreement as crucial to achieving its mitigation and adaptation goals, with states committing thereunder to strengthen cooperative action through the Technology Mechanism.³ For the world's developing and least-developed countries, where technology deficits and vulnerability to climate change's impacts are most pronounced, inward climate technology flows into energy, transport, industry, water and other sectors are particularly essential to enable implementation of mitigation and adaptation action, and pursuit of or transitions to low-carbon development pathways.⁴ But technology transfer is inherently a deeply complex endeavour and lack of consensus on how to do it most effectively has held back overall implementation efforts.⁵ Analyses in particular raise concerns about political will to dedicate resources, overreliance on market-based approaches and neglect of supportive capacity-building. But the serious ambition gap between states' initial commitments and the Paris Agreement's long-term goal⁶ underlines the fact that timeframes for action are becoming critical and it's essential that technology development and transfer efforts are accelerated and improved.

In seeking to elucidate and give more direction to the content of states' technology development and transfer obligations under the climate regime, scholarly study has begun to explore the potential application of the legal concept of fair and equitable benefit-sharing as a framing tool. This is a concept identified by Morgera as an open-textured and evolutionary form of global law, providing fertile ground for diffusion

⁴ UNFCCC (n2) Art.4.5; Intergovernmental Panel on Climate Change, *IPCC Special Report: Methodological and Technological Issues in Technology Transfer – Summary for Policy Makers* (IPCC 2000) 3.

⁵ Heleen de Coninck and Ambuj Sagar, 'Technology Development and Transfer (Article 10)' in D.Klein et al(eds), *The Paris Agreement on Climate Change: Analysis and Commentary* (OUP 2017) 276.

⁶ United Nations Environment Programme, *Emissions Gap Report 2019* (UNEP 2019) p.xiii.

across different spheres of international environmental law.⁷ It's undergone considerable development within other regimes, primarily biodiversity law, human rights law and law of the sea in respect of management of natural resources.⁸ Now, although the climate treaties make no reference to it, there are growing interpretations of technology transfer itself as a form of benefit-sharing, supported by shared themes of equity, sustainable development and human rights.⁹ By harnessing these resonating rationales, it's argued that benefit-sharing principles could be deployed in order to strengthen participatory and collaborative practices in implementing technology transfer, empower less powerful state voices, and foster more equitable and effective outcomes as a result.¹⁰

This paper largely builds on existing work spearheaded by Morgera, Savaresi and Bouwer¹¹ by drilling more deeply into the relevance and value of applying fair and equitable benefit-sharing to inter-state technology transfer obligations under the international climate regime, offering new perspectives and insights. It should be noted that this paper doesn't address the multitude of ways in which climate technology development and transfer occurs through private investment channels outwith the climate regime, or the role that domestic policy has to play. While these dimensions are incredibly important in feeding into global technology transfer, this paper's focus is more narrowly concerned with state interventions to facilitate and accelerate horizontal technology flows between states in exercise of their obligations under the UNFCCC and the Paris Agreement. Also, given the early stages of existing empirical research in this area and lack of practical application to date, the arguments put forward necessarily remain fairly abstract based on conceptual studies of benefit-sharing, and thus are primarily intended to contribute to the theoretical groundwork being laid for further research and practical actualisation.

Section 2 begins by examining the inherent complexities of climate technology development and transfer through analysis of both institutional and academic literature, identifying core aspects that are critical to its

success and where existing implementation issues under the UNFCCC arise. Section 3 then considers the legal concept of benefit-sharing as defined in the academic literature, examining why its normative components and roots resonate within the field of climate change, particularly technology transfer, and how these synergies might draw out new perspectives on state duties. Section 4 continues this discussion to theoretically reflect on the possible ways in which, if used as a framing tool, benefit-sharing may inform both the procedural and substantive content of states' technology transfer obligations, fostering more effective, sustainable and equitable outcomes. In particular, it's argued that a benefit-sharing lens could emphasise the role of needs assessments and collaborative projects, while prompting enhanced ambition, more diversified approaches, and greater attention to capacity-building. Section 5 will conclude with a realistic reflection on the fact that, while benefit-sharing remains conceptually abstract, underdeveloped and misused in many respects, it holds significant transformative potential and thus warrants further consideration and research.

2. Technology Development and Transfer under the UNFCCC

2.1. A Holistic Understanding of Technology Development and Transfer

The obligation on states under Article 4.5. of the UNFCCC '*to take all practicable steps to promote, facilitate and finance*' technology development and transfer is theoretically underpinned by a long-standing and well-established recognition of the multidimensional and evolutionary nature of technological innovation. Technology is commonly characterised within academic and institutional UNFCCC dialogue as having three dimensions: (a) hardware (e.g. physical equipment, products), (b) software (e.g. operational know-how, skill, experience, data, industrial tech-

⁷ Elisa Morgera, 'The Need for an International Legal Concept of Fair and Equitable Benefit-Sharing' (2016) 27(2) EJIL 353, 360 & 381.

⁸ Elisa Morgera, 'Under the Radar: The Role of Fair and Equal Benefit-Sharing in Protecting and Realising Human Rights Connected to Natural Resources' (2019) 23:7 International Journal of Human Rights 1098, 1098.

⁹ Morgera, 'An International Legal Concept' (n7) 374; Elisa Morgera, 'Conceptualising Benefit-Sharing as the Pursuit of Equity in Addressing Global Environmental Challenges' BENELEX Working Paper No.1 (SSRN 2014) 18.

¹⁰ Kim Bouwer, 'Insights for Climate Technology Transfer from International Environmental and Human Rights Law' (2018) 23(1) JIPR 7, 16.

¹¹ Ibid; Morgera, 'An International Legal Concept' (n7); Morgera, 'Conceptualising Benefit-Sharing' (n9); Annalisa Savaresi and Kim Bouwer, 'Equity and Justice in Climate Change Law and Policy: A Role for Benefit-Sharing' in Tahseen Jafry(ed), *Routledge Handbook of Climate Justice* (Routledge 2018) at 128; Annalisa Savaresi, 'The Emergence of Benefit-Sharing Under the Climate Regime: A Preliminary Exploration and Research Agenda' BENELEX Working Paper No.3 (SSRN 2014).

niques, managerial processes), and (c) orgware, being the ownership and institutional arrangements of the organisation or community in which hardware and software are deployed (e.g. organisational infrastructure, economic and policy frameworks).¹² These different dimensions assemble as interdependent components of a system that can differ in significance and relationship on a case-by-case basis, evolving through different stages of a technology lifecycle.¹³ Rather than novel invention, technological innovation is more often constituted by incremental, cumulative progress and adaptive developments in these different dimensions to fit new contexts and conditions, a process which can be non-linear and unpredictable, shaped by interactive networks of stakeholders, experts, market players, decision-makers and end users.¹⁴ In this sense, some conceptualise technology as a component of wider socio-technical systems.¹⁵

Adhering to this inclusive and holistic take, the Intergovernmental Panel on Climate Change (IPCC) has defined technology transfer under the climate regime as 'a broad set of processes covering the flows of know-how, experience and equipment for mitigating and adapting to climate change amongst different stakeholders.'¹⁶ This may include vertical movement of technologies from development through to commercialisation stages, as well as horizontal spatial relocation and diffusion.¹⁷ The IPCC also describes it as being inclusive of 'the process of learning to understand, utilize and replicate the technology, including the capacity to choose it and adapt it to local conditions and integrate it with indigenous technologies'.¹⁸ Emerging from these extremely broad conceptualisations, technological development and transfer (hereinafter simply referred to as 'technology transfer') is properly understood as a

multifaceted and deeply complex process that incorporates many actors and factors, the facilitation and acceleration of which may be pursued through numerous and diverse avenues.

2.2. Institutional Framework: the Technology Mechanism

The institutional device tasked to deal with technology transfer under the UNFCCC is the Technology Mechanism (TM). Established in 2010, the TM has a broad and extensive mandate designed to accelerate action at all stages of the technology lifecycle in support of mitigation and adaptation action.¹⁹

The policy branch is headed by the Technology Executive Committee (TEC), acting as a central forum for discussion and analysis to produce balanced policy recommendations. It's composed of 20 expert members elected by the conference of the parties (COP) representing a spread of countries in different stages of development and to date, its main activities have included the orchestration of thematic dialogues, publication of policy briefs and signalling priority areas to the COP.²⁰

The implementation branch is headed by the Climate Technology Centre and Network (CTCN) which became operational in 2013. The core function of the Centre is to 'facilitate a network of national, regional, sectoral and international technology networks, organisations and initiatives', with members across a diverse range of expertise, disciplines and interests.²¹ As well as creating a forum for information exchange through its knowledge management system and facilitating capacity-building through partnership oppor-

¹² Ivan Nygaard and Ulrich Elmer Hansen, 'The Conceptual and Practical Challenges to Technology Categorisation in the Preparation of Technology Needs Assessments' (2015) 131 Climatic Change 371, 374; UNFCCC Subsidiary Body for Scientific and Technological Advice, *Mapping Climate Technology Development and Transfer Activities and Initiatives Under and Outside the Convention Relevant to the Implementation of the Paris Agreement* (21 October 2016) UN Doc No. FCCC/SBSTA/2016/INF.9, para.174.

¹³ Ivan Nygaard and Ulrich Elmer Hansen, *Overcoming Barriers to the Transfer and Diffusion of Climate Technologies*, TNA Guidebook Series (UNEP DTU 2015) 5.

¹⁴ David Ockwell and Robert Byrne, 'Improving Technology Transfer Through National Systems of Innovation: Climate Relevant Innovation-System Builders' (2016) 16.7 Climate Policy 836, 838; Heleen de Coninck and Ambuj Sagar, 'Making Sense of Policy for Technology Development and Transfer' (2014) 15.1 Climate Policy 1, 2; Heleen de Coninck and Daniel Puig, 'Assessing Climate

Change Mitigation Technology Interventions by International Institutions' (2015) 131 Climatic Change 417, 418.

¹⁵ Frank Geels, *Technological Transitions and System Innovations, A Co-Evolutionary and Socio-Technical Analysis* (Edward Elgar 2005) 1.

¹⁶ IPCC (n4) 3.

¹⁷ David Ockwell et al, 'Key Policy Considerations for Facilitating Low Carbon Technology Transfer to Developing Countries' (2008) 36 Energy Policy 4104, 4105.

¹⁸ IPCC (n4) 3.

¹⁹ 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* (15 March 2011) UN Doc. FCCC/CP/2010/7/Add.1, para.113-117.

²⁰ Ibid para.121; Heleen de Coninck & Ambuj Sagar, *Technology in the 2015 Paris Climate Agreement and Beyond*, International Centre for Trade and Sustainable Development Issue Paper No.42 (ICTSD 2015) 3.

²¹ UNFCCC Decision 1/CP.16 (n19) para.123.

tunities, it coordinates the delivery of technical assistance to developing countries who make specific requests. By February 2021, the CTCN reported that they'd completed just over 100 technical assistance interventions.²²

2.3. Central Themes and Guiding Principles

The Technology Framework text adopted by the COP in 2018 provides strategic overarching guidance to the TM, setting out the principles it should be guided by and identifying central themes of action.²³ This guidance aligns with surrounding institutional dialogue and academic literature, which repeatedly draws attention to some fundamental and interconnected considerations recognised as critical to ensuring successful implementation of climate technology transfer

2.3.1. Local Conditions and Development Needs

Unique local needs and conditions determine the specific opportunities and priorities for technology transfer in different jurisdictions. Such needs and conditions are evolutionary and can vastly vary between and within states across social, economic, ecological and technological spectrums, necessitating different technology transfer devices, approaches or areas of focus in order to optimise the benefits of implementation and increase chances of success.²⁴

Importantly, local needs and conditions also dictate the sustainable development background against which climate action must be considered. In developing countries in particular, balancing climate and development needs essentially goes to the very heart of climate debate and policy.²⁵ The Paris Agreement emphasises the *'intrinsic relationship that climate change actions, responses and impacts have with equitable access to sustainable development and*

eradication of poverty' and repeatedly recognises these broader goals as the regime's fundamental context.²⁶ Therefore, although development and climate action are often seen to be at odds with one another, the Paris Agreement challenges this view by asking states to strategically align the two.²⁷ It supports the contention that the global need to transition to low-carbon economies and climate-resilient futures means prioritisation of eco-innovation and green growth should underpin sustainable development.²⁸ But it also anchors a simultaneous understanding that socio-economic development and poverty eradication are overriding interests of developing nations.²⁹ Thus, an integral objective of technology transfer is to prevent states pursuing, becoming dependant on, or being locked into unsustainable development pathways, by making alternatives accessible.³⁰

The need to tailor technology transfer action to local needs and development contexts is supported under the UNFCCC architecture through Technology Needs Assessments (TNAs), which are overseen by the TEC and whereby countries are assisted to conduct assessments of their own technology needs, priorities and deployment barriers.³¹ TNAs are intended to be integrated with broader sustainable development planning processes and guide decision-making.³²

2.3.2. Enabling Environments and Capacity Building

The creation of 'enabling environments' is a fundamental and long-recognised dimension of accelerating technology transfer under the UNFCCC. These are the broad range of institutional, regulatory and political framework conditions that surround and support all stages of the technology lifecycle.³³ Closely interwoven with this is the notion of capacity-building, a

²² Climate Technology Centre and Network, 'Technical Assistance, Request Visualisations Dashboard'. Available at <<https://www.ctc-n.org/technical-assistance/request-visualizations>> (accessed 24 March 2021).

²³ UNFCCC Decision 15/CMA.1, *Technology Framework under Article 10, paragraph 4, of the Paris Agreement* (19 March 2019) UN Doc FCCC/PA/CMA/2018/3/Add.2, Annex.

²⁴ Charikleia Karakosta, 'A Holistic Approach for Addressing the Issue of Effective Technology Transfer in the Frame of Climate Change' (2016) 9 *Energies* 503, 504.

²⁵ Coninck and Sagar, 'Making Sense of Policy' (n14) 3.

²⁶ Paris Agreement (n3) preambular para.8, Art.2.1, 4.1 & 10.1.

²⁷ Francesco Sindico, 'Paris, Climate Change, and Sustainable Development' (2016) 6(1-2) *Climate Law* 130, 141.

²⁸ David Ockwell et al, *Enhancing Developing Country Access to Eco-Innovation: The Case of Technology Transfer and Climate Change in a Post-2012 Policy Framework*, OECD Environment Working Papers No.12 (OECD 2010) 20; Fleurbaey et al (n1) 293.

²⁹ UNFCCC (n2) Art. 4.7.

³⁰ Fleurbaey et al (n1) 312.

³¹ UNFCCC Decision 4/CP.7, *Development and Transfer of Technologies* (21 January 2002) UN Doc. FCCC/CP/2001/13/Add.1, Annex, para.3-6.

³² James Haselip et al, *TNA Step by Step: A Guidebook* (UNEP DTU Partnership 2019) 7.

³³ Nygaard and Hansen, *Overcoming Barriers* (n13) 9; IPCC (n4) 5.

cross-cutting issue across the climate regime.³⁴ Enabling environments and capacity-building are emphasised by the Technology Framework as a key thematic action area.³⁵ Elements of enabling environments include national macroeconomic conditions (e.g. trade policy, tax regimes, commercial laws), human, organisational and institutional capacity (e.g. government agencies, personnel, industry associations), research and technological capacity (e.g. research programmes, academic centres, testing facilities, IPR regimes), and social and cultural factors (e.g. outreach campaigns, education policies).³⁶ Barriers to technology transfer manifest where aspects of enabling environments are underdeveloped or unaccommodating. For example, high import duties or lack of subsidies could disincentivise investment.³⁷ Deficiencies in organisational knowledge or skilled personnel may limit the stability and longevity of development initiatives.³⁸ And shortages in administrative resources could inhibit analysis of local needs.³⁹ Removal of capacity barriers and enabling environments are therefore key to implementation of technology transfer and state progression to higher levels of technological sophistication.⁴⁰

Enabling environments and capacity-building are particularly key in facilitating technological innovation, as increased innovation capacity enables suitable adaptation of climate technologies to local conditions and better absorption.⁴¹ Moreover, by becoming innovators in their own right, developing countries are empowered to break cycles of dependence and pursue economic growth and broader sustainable development objectives.⁴² In this respect, studies and institutional dialogue increasingly stress the important role of national systems of innovation (NSIs), which are the unique and complex networks of actors that feed into innovation processes, including businesses, universities, investors, NGOs and governments. These actors interact and influence one another in ways that

can either motivate or stifle innovation, both on national levels but also within international channels through market, social and political relationships. Innovation studies identify that differences in the nature and speed of technological progress are inherently linked to NSIs, and under-functioning or disconnected key institutional entities therefore could slow or obstruct evolutionary innovation processes that depend on NSI feedback loops.⁴³ On the other hand, policy interventions and capacity-building that create new actors within NSIs or enhances their activity and connections can have a powerful impact on uptake and diffusion of climate technologies.⁴⁴

2.3.3. Collaborative Approaches

Technology transfer has been described as inherently an interactive process of learning and collaboration, rather than simply a unidirectional provision of resources.⁴⁵ Where collaborative approaches are employed, better understanding of local needs, conditions and priorities of states can be fostered, thereby more organically and efficiently guiding innovation, adaptation of technologies and transfer in response.⁴⁶ Furthermore, collaborative approaches are in themselves a means of information-sharing and capacity-building, offering opportunities for less developed states where markets are unestablished to build capabilities through the interactive learning that occurs by working with more technologically advanced institutions or those with different experience.⁴⁷ Such collaboration can take various forms depending on the circumstances, differing in actors involved, temporal scope, technical focus, organisational configuration, funding sources and geographic coverage.⁴⁸ They also need not necessarily be led by those based in the Global North, and there can be added value in horizontal information and technology flows between states in the Global South.⁴⁹

³⁴ Paris Agreement (n3) Art.11; Crispin d'Auvergne and Matti Nummelin, 'Capacity Building (Article 11)' in Daniel Klein et al(eds), *The Paris Agreement on Climate Change: Analysis and Commentary* (OUP 2017) 278.

³⁵ Technology Framework (n23) para.4.

³⁶ Nygaard and Hansen, *Overcoming Barriers* (n13) 10.

³⁷ Damilola Olawuyi, 'From Technology Transfer to Technology Absorption: Addressing Climate Technology Gaps in Africa' (2017) 36:1 JENRL 61, 77.

³⁸ Ibid 76.

³⁹ Ibid 72.

⁴⁰ Coninck & Sagar, *Technology in the 2015 Paris Climate Agreement* (n20) 12; Miria Pigato et al, *Technology Transfer and Innovation for Low-Carbon Development* (World Bank Group 2020) p.xviii.

⁴¹ Ockwell et al, *Eco-Innovation* (n28) 20.

⁴² Ibid; Paris Agreement (n3) Art.10.5.

⁴³ Ockwell and Byrne (n14) 837, 839, 842, 847; Andrew Watkins et al, 'National Innovation Systems and the Intermediary Role of Industry Associations in Building Institutional Capacities for Innovation in Developing Countries: A Critical Review of the Literature' (2015) 44 Research Policy 1407, 1408.

⁴⁴ Ockwell and Byrne (n14) 847; Coninck & Sagar, *Technology in the 2015 Paris Climate Agreement* (n20) 13.

⁴⁵ Pigato et al (n40) p.xvii.

⁴⁶ Coninck & Sagar, 'Article 10'(n5) 271.

⁴⁷ Ibid; David Ockwell, Ambuj Sagar & Heleen de Coninck, 'Collaborative Research and Development (R&D) For Climate Technology and Transfer and Uptake in Developing Countries: Towards a Needs Driven Approach' (2014) 131 Climate Change 401, 402, 404.

⁴⁸ Ockwell, Sagar & Coninck (n47) 408.

⁴⁹ Ibid 411.

The Paris Agreement has reinforced the importance of collaboration, with Article 10 expressly requiring states to strengthen cooperative action and stressing in particular the research and development (R&D) stages of the technology lifecycle.⁵⁰ There is potential therefore for the CTCN to play an increasingly key role in its facilitation of international networking and partnerships.⁵¹

2.4. Ongoing Implementation Gaps and Weaknesses

Despite progressions in research and practice over the course of the existence of the UNFCCC, technology transfer's complex and systemic nature means that effective implementation remains a huge challenge. Continued knowledge gaps, scarcity of resources and polarised political viewpoints leave a distinct lack of progress in a number of areas. In particular, weak political will, over-reliance on market-based approaches and lack of emphasis on capacity-building are identified as persistent interrelated issues, perpetuating each other in many respects.

2.4.1. Lack of Political Will and Ambition

States have historically been slow to ramp up their technology transfer efforts and there's general concern that, while progress is moving in the right direction, the scale of state ambition continues to lag behind what the urgency of the climate challenge requires.⁵² Demonstrations of the shortcomings in dedicated time and resources can be seen in various places. For example, relative to its important and extensive mandate, the CTCN suffers from modest and precarious funding, depending heavily on voluntary contributions from developed states and regional organisations. As a result, there are concerns about its ability to fulfil its potential.⁵³ The Subsidiary Body for Scientific and Technological Advice (SBSTA) has also identified considerable shortcomings in access to financial support for projects and national mitigation actions.⁵⁴ Although, according to a recent World

Bank report, existing and commercially proven technologies could already achieve a huge proportion of the emission reductions needed to meet the Paris Agreement's mitigation objectives, uptake of such technologies in low-income countries remains low because, ultimately, not enough is being done by governments to facilitate their transfer at sufficient rates.⁵⁵

Going forward, the Paris Agreement on the one hand could be viewed as providing promise in accelerating ambition through its long-term temperature goal, which sets an ambitious 'direction of travel' for the global community.⁵⁶ This could propel technology transfer efforts over time, in conjunction with Article 10's reinforcement of the importance of the role of technology transfer and states' commitment thereunder to strengthen cooperative action.⁵⁷ However others argue that its soft law elements and reliance on self-determined Nationally Determined Contributions (NDCs) of states may do little to translate theoretical ambition into practice. In making their commitments, including in respect of technology transfer, states are to be guided by the principle of common but differentiated responsibilities and respective capabilities ('the CBDR principle') and what they accordingly consider to be their 'highest possible ambition'.⁵⁸ But although transparency requirements and five-yearly global stocktakes to assess collective progress are designed to keep states accountable and set normative expectations, the Paris Agreement is to a significant extent relying on states' own interpretations of how the CBDR principle applies.⁵⁹ This approach has been described as putting differentiation 'firmly in the realm of practical politics' and may allow states to limit the scope or intensity of their proposed actions since they aren't being held to anything specific.⁶⁰ Moreover, the risk of scaled down and uneven ambition is heightened where states' self-determined efforts don't live up to the expectations of others.⁶¹

These general concerns become compounded in respect of technology transfer, given there are no

⁵⁰ Paris Agreement (n3) Art.10.2, 10.5.

⁵¹ Coninck & Sagar, 'Article 10'(n5) 272.

⁵² Matthieu Glachant and Antoine Dechezleprêtre, 'What Role for Climate Negotiations on Technology Transfer?' (2016) 17.8 Climate Policy 962, 969; Coninck & Sagar, 'Article 10'(n5) 276.

⁵³ Coninck & Sagar, 'Article 10'(n5) 261; Matthew Rimmer, 'Beyond the Paris Agreement: Intellectual Property, Innovation Policy, and Climate Justice' (2019) 8.7 Laws, 8.

⁵⁴ SBSTA (n12) para.285-286.

⁵⁵ Pigato et al (n40) p.ix.

⁵⁶ Lavanya Rajamani, 'Ambition and Differentiation in the 2015 Paris Agreement: Interpretive Possibilities and Underlying Politics' (2016) 65 ICLQ 493, 496 & 501.

⁵⁷ Paris Agreement (n3) Art.10.2.

⁵⁸ Ibid Art.4.2 & 4.3.

⁵⁹ Ibid Art.13 &14; Rajamani (n56) 502.

⁶⁰ Rajamani (n56) 514; Robert O'Keohane and Michael Oppenheimer, 'Paris: Beyond the Climate Dead End through Pledge and Review?' (2016) 4.3 Politics and Governance 142, 142.

⁶¹ Peter Lawrence and Michael Reder, 'Equity and the Paris Agreement: Legal and Philosophical Perspectives' (2019) 31.3 Journal of Environmental Law 511, 511.

clearly identifiable collective goals.⁶² On the one hand, flexibility may be desirable given technology transfer's complexity but, confusingly, Article 10.1 states the importance of 'fully realising' technology development and transfer without any indication of what this means.⁶³ Moreover, the Agreement's use of softer language in respect of adaptation expectations may do little to compel the transfer of adaptation technologies, and poor linkages between finance and technology transfer provisions sheds no light on the extent to which climate finance should be directed towards technology transfer initiatives.⁶⁴

2.4.2. Lack of Diversification of Approaches

Technology transfer approaches can be categorised along a continuum between those that are market-based and those that aren't. Market-based methods rely on creation of conducive market conditions to indirectly stimulate technology transfer through the private sector. Non-market based 'command and control' approaches are constituted by direct legislative, political and funding decisions.⁶⁵ Depending on the types of goods and services a technology belongs or contributes to and its market relations, this may dictate the suitability of different methods. Consumer and capital goods are highly influenced by the market thus more responsive to market-based approaches, whereas publicly-provided and other non-market goods require direct governmental action. States are thus encouraged to use technology categorisation as a tool of the TNA process to understand technology framework conditions, identify barriers and what mechanisms would be most useful in addressing their needs.⁶⁶

Despite the arguable place for and value in both approaches in different circumstances, many commentators express concern that international policy discussions are overly dominated by the neo-liberal viewpoints of developed countries most likely to be benefactors of technology transfer, strongly favouring market-based incentives at the expense of others.

From this point of view, market mechanisms are assumed to deliver social benefits more efficiently, but critics argue that this narrative is self-serving, driven by profit-motives of influential corporate interests threatened by other command and control avenues.⁶⁷ As a result, discussions on technology transfer may be reduced to pure questions of financing, and carbon reductions to mere tokens detached from the UN-FCCC's goals, drowning out marginalised voices and stifling legitimate debate on the role of markets versus government.⁶⁸

The concern about this preoccupation with market-based approaches is that they're limited in their outcomes, by privileging only hardware elements of more mature capital and consumer goods.⁶⁹ Market mechanisms may be naturally geared towards 'low-hanging fruit', leaving less-profitable but more valuable long-term goals by the wayside, stifling ambitious and diverse innovation by neglecting other technological options and wider systems.⁷⁰ There's also concern that increasingly global and complex carbon markets may be driving further abstraction from environmental logics and, left improperly managed, are vulnerable to systemic failure.⁷¹ Moreover, market mechanisms to a large extent rely upon pre-existing absorptive capacity and hospitable market environments in recipient states. This results in an exploitation of static comparative advantages, unequal flow of benefits and private gains skewed towards emerging economies and industrialised-country firms.⁷² Developing countries that can't offer investors the socio-economic conditions they're looking for are left behind, as market mechanisms alone do little to support capacity-building or transform local contexts to entice investors in the first place.⁷³

Demonstrative of these limitations in practice is the record of the Clean Development Mechanism (CDM), a market device that creates financial incentives for firms to invest in low-carbon projects through sale of emissions credits, which may induce technology transfer. It's by design aimed at the safest and most profitable opportunities, and analysis of the projects

⁶² Rajamani (n56) 504.

⁶³ Coninck & Sagar, 'Article 10'(n5) 264.

⁶⁴ Ibid 266; Rajamani (n56) 502.

⁶⁵ Nygaard and Hansen, 'Technology Categorisation' (n12) 374; James Haselip et al, 'Governance, Enabling Frameworks and Policies for the Transfer and Diffusion of Low Carbon and Climate Adaptation Technologies in Developing Countries' (2015) 131 *Climatic Change* 363, 364.

⁶⁶ Nygaard and Hansen, 'Technology Categorisation' (n12) 374; Nygaard and Hansen, *Overcoming Barriers* (n13) 7.

⁶⁷ Haselip et al (n65) 364; Robert Byrne et al, 'Energy Pathways in Low Carbon Development' in D.Ockwell and

A.Mallett(eds), *Low Carbon Technology Transfer: From Rhetoric to Reality* (Routledge 2012) at 123, 129.

⁶⁸ Haselip et al (n65) 364; Arthur Mol, 'Carbon Flows, Financial Markets and Climate Change Mitigation' (2012) 1 *Environmental Development* 10, 18.

⁶⁹ Haselip et al (n65) 364; Byrne et al (n67) 129; Ockwell et al, *Eco-Innovation* (n28) 33.

⁷⁰ Arthur Mol (n68) 16.

⁷¹ Ibid 18.

⁷² Byrne et al (n67) 136; Ockwell, Sagar & Coninck (n47) 405.

⁷³ Byrne et al (n67) 136; Coninck & Sagar, 'Making Sense of Policy' (n14) 9.

it's been applied to reveals a heavy bias towards a narrow range of relatively matured technology hardwares located in a small number of transitioning economy states, predominantly India and China.⁷⁴ Although this is by no means the only market-based method of technology transfer, it shows how the issues can manifest.

A clear example of the debate on the role of markets and financial incentives being stifled by developed countries can be found in respect of the application of intellectual property rights (IPRs) to climate technologies, which remains deeply contentious. Developed countries generally argue that robust protection and enforcement of IPRs is necessary to stimulate innovation, by instilling confidence in private investors.⁷⁵ On the other hand, developing countries typically see IPRs as a significant barrier to affordable access to low-carbon and climate-resilient technologies. They therefore advocate for greater flexibility and public access through governmental intervention, for example compulsory licencing.⁷⁶ Both viewpoints have merit, but developed countries have fought to keep the topic off the negotiating table altogether, thereby maintaining the status quo. Despite a number of proposals being put forward attempting to bridge divisions in opinion, the Paris Agreement makes no mention of IPRs.⁷⁷

Notwithstanding, there are encouraging signs that the post-Paris regime could start to give greater attention and credence to non-market approaches. The need for this is expressly recognised in Article 6.8 of the Paris Agreement and the SBSTA is undertaking a work programme to consider their implementation and coordination.⁷⁸ However, any concrete outputs of this process are yet to be seen.

2.4.3. Lack of Emphasis on Capacity Building.

Capacity pertaining to technology transfer may include capacity elements of software and orgware dimensions of the technology itself, such as operational and organisational capabilities, as well as various components of enabling environments, including in innovation systems, information management, markets and absorptive capacity.⁷⁹ Yet, despite consistent treaty recognition of the importance of capacity-building, particularly for least-developed countries, state practice persists in ignoring or neglecting this critical aspect of the process.⁸⁰ While there are numerous networking activities geared towards knowledge exchange that have capacity-building value, navigating these many disjointed and overlapping initiatives can be confusing for states.⁸¹ Beyond this, there's a lack of more targeted and direct capacity-building efforts through UN organisations or donor states, which instead continue to be dominated by project-based development initiatives focused on hardware financing, with little apparent consideration for recipient capacity to absorb and govern the technology.⁸²

Some commentators attribute the inattention to capacity-building to a narrow and naive interpretation of technology as merely material equipment, as well as gaps in understanding of technology's complex systemic nature and how it embeds itself into specific contexts.⁸³ Based on these misunderstandings and knowledge gaps, some parties appear to disagree that capacity-building forms part of their transfer obligations at all.⁸⁴ But the reasons are also down to perceived cost and risk of direct capacity-building, along with the difficulties in measuring its impact and tangible returns.⁸⁵ Ensuring that international capacity-building efforts are harmonised with local efforts is a challenge.⁸⁶ Moreover, policymakers may see capacity investments as creating competitive threats to

⁷⁴ Byrne et al (n67) 124, 130, 132 ; Tomilola Eni-Ibukun, 'Climate Justice: The Clean Development Mechanism as a Case Study' in E.J.Hollo et al(eds), *Climate Change and the Law* (Springer 2012) at 225, 229.

⁷⁵ Sanford Gaines, 'International Law and Institutions for Climate Change' in J.Sarnoff(ed), *Research Handbook on Intellectual Property and Climate Change* (Edward Elgar 2016) at 33, 49; Rimmer (n53) 4.

⁷⁶ Rimmer (n53) 4.

⁷⁷ Ibid 5.

⁷⁸ UNFCCC Decision 1/CP.21, *Adoption of the Paris Agreement* (29 January 2016) UN Doc FCCC/CP/2015/10/Add.1, para.39.

⁷⁹ Chen Zhou, 'Enabling Law and Policy Environment for Climate Technology Transfer: From Perspectives of Host Countries' (2019) 12.1 JEAIL 45, 53.

⁸⁰ Coninck & Sagar, *Technology in the 2015 Paris Climate Agreement* (n20) 5; Ockwell et al, *Eco-Innovation* (n28) 8.

⁸¹ Coninck and Puig (n14) 431; SBSTA (n12) para.290.

⁸² Coninck & Sagar, *Technology in the 2015 Paris Climate Agreement* (n20) 2, 6; Ockwell and Byrne (n14) 846; Ockwell et al, *Eco-Innovation* (n28) 8.

⁸³ Haselip et al (n65) 364.

⁸⁴ Coninck & Sagar, *Technology in the 2015 Paris Climate Agreement* (n20) 6.

⁸⁵ Coninck and Puig (n14) 431.

⁸⁶ Coninck & Sagar, *Technology in the 2015 Paris Climate Agreement* (n20) 12.

their domestic firms.⁸⁷ The preoccupation with market-based approaches perpetuates this, given private firms and investors have little to no incentive to assume responsibility for capacity-building.⁸⁸

This enduring lack of international attention to capacity-building impedes effective global technology transfer efforts. Limited capacity prevents recipient states from being able to meaningfully engage in procedural processes that ensure technology transfer actions are well-chosen and executed. In respect of analysis of need, limited resources may restrict states' abilities to conduct reliable information-gathering and monitoring exercises.⁸⁹ Furthermore, it prevents engagement in collaborative activities, since participation has to be underpinned by sufficient baseline capacity.⁹⁰ Without this, collaboration may be less fruitful and least-developed countries may in practice be excluded. We see this reflected in the fact that most collaborative initiatives to date have focused on large emerging economies, with few operational in smaller, low-income countries.⁹¹

The narrow focus on hardware also perpetuates the unhelpful view that transfer is constituted by a discrete, one-off event in providing material components, detached from the critical subsequent stages of diffusion and maintenance.⁹² If imported equipment isn't accompanied and encompassed by the necessary capacity elements to support its absorption and dissemination within the local context, the project may eventually lack stability, longevity, sustainability and impact. Moreover, without a comprehensive strategy for future operation, maintenance and support within a hospitable enabling environment, there's a risk of failure of the receiver state to take ownership of technologies in the long-term.⁹³ Where such issues are anticipated in advance, large scale projects remain high-risk, unfeasible or fail to attract private sector investment. This in turn drives unequal distribution of investment in technology transfer schemes via the market.⁹⁴

All of these factors imply that the international neglect of capacity-building pertaining to technology transfer is either a cause or a symptom of a detachment from the wider sustainable development context of the climate regime, as it's only through strengthening state capabilities, particularly in their

innovation systems, that wider transformative change can be achieved.⁹⁵

3. Benefit Sharing and International Climate Technology Transfer:

3.1. Fair and Equitable Benefit Sharing as an Emerging Legal Concept.

The notion of benefit-sharing is being increasingly deployed within international environmental law. Emerging in various sectors, its most prolific usages and developments are occurring under the international biodiversity regime, the law of the sea and the human rights regime in relation to natural resource management activities such as bioprospecting, conservation and use of traditional knowledge.⁹⁶ Although it remains a relatively underexplored feature of international environmental law, lacking clarity and consistency in many respects, its conceptual and normative evolution and refinement is ongoing as a form of framing device geared towards facilitation of agreement between parties in a range of cooperative settings.⁹⁷ Through an extrapolation and analysis of its common elements across regimes, Morgera proposes a general and broadly applicable definition of benefit-sharing as '*a concerted and dialogic process aimed at building partnership in identifying and allocating economic, socio-cultural and environmental benefits among state and non-state actors, with an emphasis on the vulnerable*'.⁹⁸ Morgera's analysis of benefit-sharing, in particular its inter-state applications, serves as a useful basis and guide for exploration of its diffusion into the international climate regime and application to technology transfer obligations thereunder.

Drilling further into interstate benefit-sharing's function and primary goals, some components come to the fore. Firstly, benefit-sharing is required to be fair and equitable, encapsulating its fundamental goal to balance competing rights and duties, benefits and burdens as they relate to common interests amongst states in a way that is perceived and accepted by those states to be just.⁹⁹ Secondly, benefits should be mutually agreed, identified by their recipients on a case-by-case basis according to what they deem to

⁸⁷ Ockwell et al, *Eco-Innovation* (n28) 18.

⁸⁸ Eni-Ibukun (n74) 247.

⁸⁹ Briana Craft, Stella Gama & Thinley Namgyel, *Least Developed Countries' Experiences with the UNFCCC Technology Mechanism* (IIED 2017) 14.

⁹⁰ Ockwell, Sagar & Coninck (n47) 402.

⁹¹ Coninck & Sagar, 'Article 10'(n5) 272.

⁹² Haselip et al (n65) 364.

⁹³ Olawuyi (n37) 76, 70.

⁹⁴ Eni-Ibukun (n74) 242.

⁹⁵ Ockwell and Byrne (n14) 846.

⁹⁶ Morgera, 'An International Legal Concept' (n7) 353.

⁹⁷ *Ibid* 354, 356.

⁹⁸ *Ibid* 382.

⁹⁹ *Ibid* 380.

be beneficial and may be of any nature, monetary or non-monetary.¹⁰⁰ Technology transfer and capacity-building are already recognised as constituting non-monetary benefits in applicable settings.¹⁰¹ Thirdly, interstate benefit-sharing addresses power asymmetries between sovereign states through its particular focus on protection of the interests of developing countries.¹⁰²

The focus on vulnerable beneficiaries feeds into benefit-sharing's rich procedural dimensions. Encapsulating its very spirit as a partnership-building process, echoing the Rio Declaration's goal of 'equitable global partnership', benefit-sharing requires meaningful participation, good-faith engagement and consensus-building geared towards developing mutual understandings of the nature of the benefits at stake and how they should be shared.¹⁰³ It's also intended to be an iterative practice, moving with evolving circumstances and knowledge to inform decision-making.¹⁰⁴ Importantly, these embedded procedural components are particularly aimed at promoting the participation of less powerful developing countries in a way that allows their voices to be heard and unique needs and alternative understandings to be given equal weight and recognition.¹⁰⁵ These dimensions are best developed within human rights law's intra-state applications of benefit-sharing between states and communities, which can inform inter-state benefit-sharing and underlines the idea that its procedural requirements aren't merely safeguards but intended to set the foundations for transformative collaboration.¹⁰⁶

In drawing together its common strands from different sources, Morgera identifies benefit-sharing as an emerging form of global law constituted by heavily overlapping and mutually connected patterns of norms, providing fertile ground for further cross-fertilisation into other regimes.¹⁰⁷ It's described as 'open-textured and evolutionary', capable of being filled with content by establishing linkages with different international legal subsystems.¹⁰⁸ Having found its most obvious inter-state applications to the allocation of benefits derived from assets characterised as common heritage of humankind, it's more recently appeared in relation to other areas of common concern such as shared watercourses.¹⁰⁹ Now, the concept is

potentially undergoing further diffusion through a building interpretation of technology transfer, financing and capacity-building obligations found in international regimes relating to common concerns of humankind as a certain embodiment of benefit-sharing.¹¹⁰ Although climate treaties make no reference to benefit-sharing, it's already being used as a policy tool in the deployment of intra-state climate response measures such as forest protection and renewable energy developments.¹¹¹ But moreover, its underlying rationales suggest there's ample scope to apply a benefit-sharing lens to states' climate finance and, as explored below, technology transfer obligations under the UNFCCC.

3.2. Synergising Underlying Principles and Rationales

The concept of benefit-sharing is rooted in a number of underlying principles and goals concerning the pursuit of equity, sustainable development and protection of human rights. These three interconnected themes are also significant driving forces behind the climate regime, providing the contextual background to and helping define the parameters of inter-state technology transfer obligations. By examining the intersections of these themes between technology transfer and benefit-sharing, we can see how benefit-sharing can find a foothold. But, given their inherently overarching, ambiguous and flexible nature, making these connections also illuminates how a benefit-sharing lens could, as an alternative way of framing state obligations, assist in offering new perspectives and bridge gaps between different states' understandings of and viewpoints on their relation to technology transfer.

3.2.1. The Meaning of Equity

The term 'equity' is ambiguous, in international law often used synonymously with notions of fairness and justice concerning how interests regarding allocation

¹⁰⁰ Ibid 363, 367; Morgera, 'Under the Radar' (n8) 1106.

¹⁰¹ Morgera, 'An International Legal Concept' (n7) 369; e.g. Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from Their Utilization, UN Doc No. UNEP/CBD/COP/DEC/X/1, Annex para.2(f) and (g).

¹⁰² Morgera, 'An International Legal Concept' (n7) 355.

¹⁰³ Ibid 363; Rio Declaration on Environment and Development 11 ILM 1416, Preamble, Principle 7 & 27.

¹⁰⁴ Morgera, 'An International Legal Concept' (n7) 363.

¹⁰⁵ Ibid 363, 378.

¹⁰⁶ Morgera, 'Under the Radar' (n8) 1099, 1102.

¹⁰⁷ Morgera, 'An International Legal Concept' (n7) 360.

¹⁰⁸ Ibid 381.

¹⁰⁹ Ibid 373.

¹¹⁰ Ibid 374; Morgera, 'Conceptualising Benefit-Sharing' (n9) 18.

¹¹¹ Savaresi (n11) 14; Savaresi and Bouwer (n11) 130.

of goods, rights, duties, benefits and burdens between states, on both inter-generational and intra-generational planes, should be balanced.¹¹²

Under the UNFCCC, equity is enshrined as arguably the core overarching guiding principle of the regime, providing that states should protect the climate system “...for the benefit of present and future generations of humankind, on the basis of equity...”.¹¹³ The Paris Agreement is peppered with multiple references to equity, in respect of overall implementation and more particular provisions relating to mitigation ambition, the global stocktake and human rights connections.¹¹⁴ It’s in operationalisation of equity that the narrower but intricately linked CBDR principle is derived, recognising that an equitable approach to determining state obligations takes into account the diverse circumstances of states, including historic emissions, vulnerabilities, domestic circumstances and capacity.¹¹⁵ This provides the normative background against which political and legal decisions under the climate regime are made, including those relating to levels and forms of technology transfer action.¹¹⁶

The fact that the CBDR principle isn’t broken down into a specific formula means complex questions of justice are left open to state interpretation which, while allowing for dynamic and flexible approaches, also does little to reconcile states’ different notions of equity. The climate regime thus continues to be characterised by entrenched divisions, polarised between developed and developing countries’ perspectives on where emphasis should be placed within different dimensions of the CBDR principle.¹¹⁷ Developed countries place emphasis on capacity and ability to dedicate resources. In contrast, developing countries stress responsibility for historic emissions.¹¹⁸ This is significant, as empirical studies in the field of international relations demonstrate that lack of agreement

on the meaning of equity negatively impacts compliance with and ultimate effectiveness of multilateral environmental agreements.¹¹⁹ In respect of technology transfer specifically, there’s a risk of scaled down and uneven ambition where states’ self-determined efforts don’t live up to others’ notions of equity. Thus, finding ways to bridge these divides is going to be extremely important for future participation in and implementation of the regime.¹²⁰

Benefit-sharing, like the CBDR principle, also functions as an operationalisation of inter-generational and intra-generational equity. Its requirement to be fair and equitable is inherent in its rationale as an instrument to direct the allocation of economic and environmental goods and address various inequalities. But, again similarly to the CBDR principle, it doesn’t prescribe specific solutions, instead remaining open to broad scopes of interpretation.¹²¹ International treaties denoting benefit-sharing obligations leave specific determinations of equity to multilateral or contractual negotiations.¹²² As a result, benefit-sharing concepts are often criticised as being open to manipulation to fit party agendas. Empirical evidence shows that it’s use at intra-state levels can be disingenuous in rhetoric and act as an instrument to drive social and economic injustice by more powerful parties, disguising bribes, entrenching control and undermining social cohesion.¹²³ With regards to multilateral interstate benefit-sharing, there’s a similar risk of exertion of undue influence by donor countries.¹²⁴

Notwithstanding that benefit-sharing and the CBDR principle suffer from related risks, their shared roots in equity means benefit-sharing could nevertheless hold potential in offering new perspectives on interstate climate technology transfer obligations as a complementary framing tool. It’s perhaps inescapable that negotiators tend to invoke perceptions of equity that correspond with their own interests, but a mutually supportive benefit-sharing lens could help to

¹¹² Catherine Redgwell, ‘Principles and Emerging Norms in International Environmental Law: Intra- and Inter-Generational Equity’ in Kevin Grey et al(eds), *The Oxford Handbook of International Climate Change Law* (OUP 2016) at 186, 188.

¹¹³ UNFCCC (n2) Art.3.1.

¹¹⁴ Paris Agreement (n3) preambular para.7, Arts. 2.2, 4.1 & 14.

¹¹⁵ Harald Winkler and Lavanya Rajamani, ‘CBDR&RC in a Regime Applicable to All’ (2014) 14.1 *Climate Policy* 1, 2.

¹¹⁶ Lawrence and Reder (n61) 512.

¹¹⁷ Jeffrey McGee and Jens Steffek, ‘The Copenhagen Turn in Global Climate Governance and the Contentious History of Differentiation in International Law’ (2016) 28 *Journal of Environmental Law* 37, 62.

¹¹⁸ Vegard Tørstad & Håkon Sælen, ‘Fairness in the Climate Negotiations: What Explains Variations in Parties’ Expressed Conceptions?’ (2018) 18.5 *Climate Policy* 642, 644, 649.

¹¹⁹ Lawrence & Reder (n61) 511.

¹²⁰ Ibid.

¹²¹ Morgera, ‘Conceptualising Benefit-Sharing’ (n9) 42, 45; Morgera, ‘An International Legal Concept’ (n7) 380.

¹²² Elisa Morgera, ‘Fair and Equitable Benefit-Sharing: History, Normative Content and Status in International Law’ BENELEX Working Paper No.12 (SSRN 2018) 8.

¹²³ Adrian Martin et al, ‘Just Conservation? On the Fairness of Sharing Benefits’ in Thomas Sikor(ed), *The Justices and Injustices of Ecosystem Services* (Routledge 2013) 168; Morgera, ‘Under the Radar’ (n8) 1098.

¹²⁴ Morgera, ‘An International Legal Concept’ (n7) 369.

narrow the parameters of their interpretations.¹²⁵ In its emphasis of the advantages and positive implications of tackling global challenges, it could encourage parties to think in new ways about the value of common resources and the co-benefits of technology transfer.¹²⁶ It could also serve to strengthen recognition of the legacy of development benefits in wealth, infrastructure and other assets derived by developed countries from their fossil fuel exploitation to date, thus bolstering developing countries' positions on the significance of this factor in application of the CBDR principle.

3.2.2. *The Sustainable Development Context*

While technology transfer must be implemented in line with sustainable development goals, this itself is a malleable concept. It's often summarised as the reconciliation or balance of social, economic and environmental considerations, all of which may be given different weight depending on the specific formulation of the principle in any given context.¹²⁷ Under the Rio Declaration, development is given the status of a right, subject to the qualifications that it's equitable and fulfilled 'in harmony with nature'.¹²⁸ Meanwhile, the Paris Agreement carefully refers to '*equitable access to sustainable development and the eradication of poverty*', which emphasises both intra-generational and inter-generational equity dimensions.¹²⁹

Technology flows are critical to sustainable development, not only given the central role technology can play in facilitating social and economic progress, but also in whether or not a development pathway is environmentally sound and sustainable. However this engages a complex interplay between climate, economic and social goals, which are sometimes clearly aligned, for example in providing clean energy to the rural poor, but sometimes in conflict where more accessible technologies with development value rely on

fossil fuel consumption.¹³⁰ Trade-offs inevitably need to be made in allocating limited resources and although addressing climate change is necessary to ensure sustained development long-term, it often boils down to the complicated question of how to balance this long-term vision with more immediate short-term interests that technological innovation and finance systems tend to be more responsive to.¹³¹ Technology transfer decisions thus must be made with this context in mind and should reduce the need for such trade-offs, by assisting countries to make environmentally-sound choices and move towards sustainable, low-carbon and climate-resilient development models.

The concept of fair and equitable benefit-sharing also has an inherent relationship with sustainable development. Morgera argues that benefit-sharing and sustainable development share the same roots in the era of decolonisation, when developing countries called, under the umbrella of the New International Economic Order, for rights-based approaches to their development and international cooperation for the benefit of the international community at large.¹³² It's the discourses initiated by this movement that provide the relevant background for both sustainable development and benefit-sharing's rationales and objectives.¹³³ The African Commission has stated in the context of human rights law that benefit-sharing is vital to the right to development.¹³⁴ The connection is also made particularly explicit in the 2002 ILA New Delhi Declaration of Principles of International Law Relating to Sustainable Development, which in its preamble refers to sustainable development as 'a matter of common concern' that requires the 'fair distribution of benefits' resulting from 'participation in development'.¹³⁵ Medaglia and Perron-Welch accordingly propose that benefit-sharing is an emerging

¹²⁵ Tørstad & Sælen (n118) 645; Morgera, 'Under the Radar' (n8) 1106.

¹²⁶ Morgera, 'An International Legal Concept' (n7) 380; Thomas Franck, *Fairness in International Law and Institutions* (OUP 1995) 7; Savaresi (n11) 8.

¹²⁷ Ellen Hey, *Advanced Introduction to International Environmental Law* (Edward Elgar 2016) 65; *Gabčíkovo-Nagymaros Project (Hungary v. Slovakia)* (25 September 1997) Judgement, ICJ Rep.1997, p.7, para.140.

¹²⁸ Rio Declaration (n103) Principles 1, 3 & 4; Francesco Francioni, 'From Rio to Paris: What is Left of the 1992 Declaration on Environment and Development?' (2016) 11 *Intercultural Human Rights Law Review* 16, 31.

¹²⁹ Maria Pía Carazo, 'Contextual Provisions (Preamble and Article 1)' in D.Klein et al(eds), *The Paris Agreement on Climate Change* (OUP 2017) 112; Fleurbaey et al (n1) 294.

¹³⁰ Fleurbaey et al (n1) 301; Coninck & Sagar, 'Making Sense of Policy' (n14) 3.

¹³¹ Fleurbaey et al (n1) 287, 293, 300.

¹³² Morgera, 'An International Legal Concept' (n7) 358; United Nations General Assembly, *Declaration on the Establishment of a New International Economic Order* (1 May 1974) UNGA Res 3201.

¹³³ Morgera, 'An International Legal Concept' (n7) 358.

¹³⁴ *Centre for Minority Rights Development (Kenya) and Minority Rights Group International on behalf of Endorois Welfare Council v Kenya* (4 February 2010) African Commission on Human and Peoples' Rights, Case 276/2003, para.294.

¹³⁵ ILA New Delhi Declaration of Principles of International Law Relating to Sustainable Development (2002) ILA Resolution 3/2002, preamble.

principle forming part of international sustainable development law.¹³⁶

On the basis therefore of these inherent synergies between benefit-sharing, the goals of sustainable development and the role of technology, a benefit-sharing lens could find application and serve as an additional tool to understand and stress the long-term context of climate technology transfer. Improved incorporation of decisions into sustainable development policy could consequently lead to more effective decision-making on objects and forms of transfer, by encouraging deeper consideration of their economic, social and environmental dimensions and relative value to each other. In particular, the characterisation of development as a right that requires fair distribution of benefits highlights inequities in development opportunity and bolsters the argument that, if developing states are to be expected to refrain from adopting the carbon-based development models that developed states themselves have already benefited from, developed states must assist these countries in accessing and pursuing low-carbon alternatives.

3.2.3. *Technology as a Human Right*

The relationship between the climate and human rights regimes is increasingly being consolidated, with human rights bodies recognising that environmental harms caused by climate change threaten numerous basic rights such as the right to life, food, water, health, housing and self-determination.¹³⁷ However, human rights references are only tentatively starting to appear in the climate regime. The Paris Agreement's preamble acknowledges that member parties should '*respect, promote and consider their respective obligations on human rights...*', but further references in the operative provisions or Paris Rulebook are only implicit.¹³⁸ This ongoing reluctance to integrate human rights language into the regime is

perhaps due to its real potential to hold states to account, by characterising weak or unmet commitments as human rights violations.

Human rights arguments are typically applied to the duty of states to safeguard the rights of individuals within their own jurisdictions, and there are growing litigation trends in which citizens are successfully holding their own governments to account in respect of domestic climate policy using rights-based arguments.¹³⁹ Extraterritorial obligations on the other hand are more problematic to infer, creating what's been described as 'a missing piece of the puzzle in the human rights and climate change nexus'.¹⁴⁰ Developed countries in particular strongly resist interpretations to this effect, but nevertheless courts are starting to see creative arguments being used to tackle this friction between territorial sovereignty and the aggregate transboundary harm of climate change with some degree of receptivity.¹⁴¹ The human rights focus is thus going to continue to play a bigger role in climate change discourse going forward. While barriers such as standing, causation and enforcement are likely to continue to obstruct successful litigation, strategic lawsuits can still have enormous impact by amplifying broader policy debates.¹⁴² Moreover, co-operative forums primarily geared towards interstate support of human rights protection, such as the Universal Periodic Review under the Human Rights Council, could provide increasingly useful spaces for influence, advocacy and allocation of resources for climate change action on the basis of human rights arguments.¹⁴³

A particular dimension of human rights that may hold growing promise in respect of its implications for transnational technology transfer obligations, with strong connections to benefit-sharing, is the human right to science or, as the Committee on Economic, Social and Cultural Rights (CESCR) recently described it, '*the right to participate in and to enjoy the*

¹³⁶ Jorge Cabrera Medaglia and Frederic Perron-Welch, 'The Benefit-Sharing Principle in International Law' (2019) 14.1 *JILPLP* 62, 62.

¹³⁷ Office of the UN High Commissioner for Human Rights, *Report on the Relationship Between Climate Change and Human Rights* (15 January 2009) UN Doc. A/HRC/10/61; Human Rights Council, *Human Rights and Climate Change* (25 March 2009) UN Doc. A/HRC/10/4.

¹³⁸ Paris Agreement (n3) preambular.

¹³⁹ Annalisa Savaresi and Juan Auz, 'Climate Change Litigation and Human Rights: Pushing the Boundaries' (2019) 9(3) *Climate Law* 244, 250. See for example *The State of the Netherlands v. Urgenda Foundation*, The Hague Court of Appeal (9 October 2018) Case No. 200.178.245/01.

¹⁴⁰ Savaresi & Auz (n139) 255.

¹⁴¹ Christopher Campbell-Durulé and Sumudu Anopama Atapattu, 'The Inter-American Court's Environment and Human Rights Advisory Opinion: Implications for International Climate Law' 8 *Climate Law* 321, 334; Edward Cameron and Marc Limon, 'Restoring the Climate by Realizing Rights: The Role of the International Human Rights System' (2012) 21.3 *RECIEL* 204, 212.

¹⁴² Jacqueline Peel and Hari Osofsky, 'A Rights Turn in Climate Litigation?' (2018) 7(1) *TEL* 37, 66; Cameron & Limon (n141) 218.

¹⁴³ Cameron & Limon (n141) 213.

benefits from scientific progress and its applications.¹⁴⁴ Enshrined in the International Covenant on Economic, Social and Cultural Rights (ICESCR),¹⁴⁵ the right has been recognised for a long time in principle, but in practice has been routinely overlooked. Conceptually therefore, its scope and normative content have remained underdeveloped.¹⁴⁶ In 2012, the CESCR therefore launched a consultative process on the human right to science and its relationship with other rights, producing a general comment on its findings in April 2020.¹⁴⁷ This text dissects the components of the right to science as a multi-layered and multi-dimensional duty that recognises the role of science, including technology derived from scientific knowledge, in its contribution to the wellbeing of humankind and support for other human rights. In this respect, it encompasses elements that include the protection and promotion of rights of access, participation, non-discrimination and prioritisation of the needs of the impoverished and vulnerable.¹⁴⁸

The very language of the right as enshrined in the ICESCR, together with the CESCR's general comment, demonstrates its intersections with the benefit-sharing concept. Morgera characterises the right to science as a form of benefit-sharing itself, focusing in particular on its formulations under biodiversity law and overlapping themes of ensuring the equal opportunity to actively participate in the scientific process and prioritisation of needs and the vulnerable.¹⁴⁹

What this might mean for international climate technology transfer isn't clear, as the right to sharing the benefits of science is, in the same way as other human rights, principally directed only towards the relationship between states and those within their own jurisdictions or effective control.¹⁵⁰ Moreover, states are allowed a wide margin of appreciation in choosing climate policy in balance with other legitimate social interests and available resources.¹⁵¹ But this discretion isn't unlimited and from an extraterritorial perspective, there are a number of components of the right to science that could have implications for inter-state transfer of climate technology. Firstly, the CESCR

¹⁴⁴ CESCR, *General Comment No.25 (2020) on Science and Economic, Social and Cultural Rights Art. 15.1.b, 15.2, 15.3 and 15.4* (7 April 2020) UN Doc. E/C.12/GC/25, para.11.

¹⁴⁵ ICESCR 993 UNTS 3, Art. 15; Elisa Morgera, 'Fair and Equitable Benefit-Sharing at the Cross-Roads of the Human Right to Science and International Biodiversity Law' (2015) 4 *Laws* 803, 806

¹⁴⁶ Morgera, 'Cross-Roads' (n145) 806.

¹⁴⁷ CESCR (n144).

¹⁴⁸ *Ibid* para.17, 37; Human Rights Council, *Report of the Special Rapporteur in the Field of Cultural Rights: the Right to Enjoy the Benefits of Scientific Progress and its*

stresses the proactive nature of the obligation, that states must not only abstain from interfering with the freedom of individuals and institutions' scientific and technological endeavours, but also to take positive steps towards the advancement of science and dissemination of its applications.¹⁵² In other words, it's not enough for states to simply do nothing. Secondly, in recognition of scientific development being a 'common task' of all countries to which they must contribute to the maximum of their available resources, states are subject to a duty of international cooperation.¹⁵³ The CESCR specifically highlights climate change as a transnational risk requiring robust international cooperation.¹⁵⁴ Particular emphasis is also placed on international technological disparities and developing countries, noting that multilateral agreements should enable capacity-building in respect of participation in the sharing of scientific knowledge and benefitting from it, echoing the technology transfer and capacity-building obligations of the Paris Agreement.¹⁵⁵

Admittedly, translating these extraterritorial dimensions of the right to science into fleshed out and enforceable standards is a high hurdle to overcome in any tangible sense. Nevertheless, by viewing inter-state technology transfer obligations through the lens of the right to science, it may serve to underscore its human rights implications, bolstering the growing influence of the human rights regime in climate governance and acting as a bridge of reinforcement between the two.¹⁵⁶

4. The Added Value of Framing Inter-State Climate Technology Transfer Obligations as Benefit Sharing.

The previous section explored and demonstrated why and how the global goals of equity, sustainable development and human rights provide the footholds

Applications (2012) UN Doc A/HRC/20/26, para.26, 43, 68.

¹⁴⁹ Morgera, 'Cross-Roads' (n145) 811.

¹⁵⁰ Savaresi & Auz (n139) 253; Savaresi (n11) 12.

¹⁵¹ John Knox, 'Bringing Human Rights to Bear on Climate Change' (2019) 9(3) *Climate Law* 165, 169; CESCR (n144) para.23, 48.

¹⁵² CESCR (n144) para.14.

¹⁵³ *Ibid* para.48, 77-84.

¹⁵⁴ *Ibid* para.81.

¹⁵⁵ *Ibid* para.79, 83.

¹⁵⁶ Savaresi (n11) 12.

by which benefit-sharing finds resonance with and application to technology transfer obligations under the climate regime. By harnessing these shared directional objectives, we can begin to more deeply consider how the particular constituent elements of the concept of benefit-sharing can specifically inform and enhance inter-state technology transfer in both its procedural dimensions and substantive implementation.

4.1. Procedural Dimensions

The procedural dimensions of benefit-sharing are integral to the concept, inherently recognising the complex subject matters to which it's typically applied which necessitate the reconciliation of diverse interests in landscapes that feature asymmetrical power balances. Effective Implementation of technology transfer under the international climate regime provides a similarly complex challenge, thus requiring a robust procedural framework that can efficiently inform policy choices. Integration of benefit-sharing's procedural normative content into inter-state technology transfer obligations therefore holds the potential to enrich state practice in this regard, particularly in assessment of recipient state needs and conditions and with regards to collaborative practices.

4.1.1. Assessment of Local Technological Needs and Conditions

TNAs provide the procedural apparatus through which states self-identify their technological needs in selected sectors, their priorities, barriers to deployment and diffusion, and develop suitable Technology Action Plans (TAPS).¹⁵⁷ Financial and technical support has been rolled out to states through the Global Environment Facility (GEF) in a number of phases in order to assist developing states to conduct their TNAs and, over time, detailed methodological guidance and reporting templates have been published, developed and refined by institutional bodies based on analysis of best practice.¹⁵⁸ The latest version of this guidance published in 2019 can be credited with taking a wide and flexible approach to how countries might organise and implement a TNA project, while

emphasising the need for broad participation, strategic stakeholder engagement and multi-criteria analyses.¹⁵⁹ Ultimately, the completed process is intended to have a number of outcomes that can inform and streamline technology transfer decisions by feeding into state NDCs, National Adaptation Plans and other strategic planning. This can guide international funding and support, assist implementation of investment projects and inform broader national sustainable development initiatives.¹⁶⁰

The TNA process therefore, in principle, provides a fairly well-guided and inclusive procedural space within which recipient states are guided to produce useful and independent analyses of their technology development and transfer needs and priorities for use as a reference point for policy decisions. From a benefit-sharing standpoint, by drawing out this information the process already echoes the requirement that the sharing of benefits isn't a unidirectional process, but incorporates meaningful participation of recipients in a manner that gives them agency in determining what is of value to them and how benefits should be shared in culturally appropriate and effective ways on a case-by-case basis, depending on the recipients' own understandings, needs and capacities.¹⁶¹ Nevertheless, importing benefit-sharing principles could arguably still strengthen the utilisation and effectiveness of TNAs.

Firstly, a benefit-sharing lens may serve as an argument to bolster financial and technical support for TNAs from multilateral funds. Some countries have yet to complete a TNA while they await GEF assistance and recent studies suggest that their full potential is yet to be rolled out in many countries partly due to scarce resources.¹⁶² For example, many TNAs are poorly integrated into state NDCs or other national plans, lack coverage of certain sectors, or lack the more detailed information that would be needed to actually implement business or investment plans.¹⁶³ As a result, there are still significant gaps in the scope of TNAs and their findings may nevertheless not make their way into useful decision-making forums of either recipient or donor entities. Benefit-sharing principles could potentially inspire the dedication of more resources to overcome these issues, by emphasising

¹⁵⁷ UNFCCC Decision 4/CP.7 (n31) para.3-6; Haselip et al, *TNA Guidebook* (n32) 10.

¹⁵⁸ Erwin Hofman and Wytze van der Gaast, 'Enhancing Ambition Levels in Nationally Determined Contributions – Learning from Technology Needs Assessments' (2018) 8:e311 WIREs Energy and Environment, 10.

¹⁵⁹ Haselip et al, *TNA Guidebook* (n32) 7.

¹⁶⁰ *Ibid* 8.

¹⁶¹ Morgera, 'An International Legal Concept' (n7) 363, 366.

¹⁶² Craft, Gama & Namgyel (n89) 14; Lindy Charlery & Sara Lærke Meltøfte Trærup, 'The Nexus Between Nationally Determined Contributions and Technology Needs Assessments: A Global Analysis' (2019) 19:2 Climate Policy 189, 203.

¹⁶³ Hofman & van der Gaast (n158) 6, 8; Charlery & Trærup, (n162) 201-203.

just how integral TNAs are as the starting point to implementing effective technology transfer within wider sustainable development policy. In other contexts, benefit-sharing stresses the indispensable importance of comprehensive information-gathering stages in underpinning cooperative action, which capture all relevant material to inform parties' understandings of what's at stake and where opportunities lie.¹⁶⁴ This is particularly developed under the Convention on Biological Diversity in respect of proposed developments on indigenous land. Under the non-binding but authoritative Akwé: Kon Guidelines, the conduct of cultural, environmental and social impact assessments that integrate far-reaching considerations affecting the local community is required and seen as a pre-condition to not only the sharing of benefits from such developments, but realising transformative shared development visions.¹⁶⁵ Moreover, international human rights processes involving benefit-sharing have been consistent in requiring the establishment of thorough impact assessments as a safeguard for indigenous and tribal peoples' rights, while increasingly turning to the Akwé: Kon Guidelines for interpretation purposes.¹⁶⁶ TNAs, albeit they are coordinated and led from a different point of view, arguably represent an equivalent or comparable form of these essential information-gathering stages in respect of technology transfer at inter-state level. As suggested by Bouwer, a benefit-sharing lens could thus help to elevate the normative status of TNAs as an essential representation of the understanding of benefits from the beneficiary point of view.¹⁶⁷ In turn, this could strengthen argument for increasing assistance to least-developed states in terms of finance and capacity to produce their TNAs and maximise their impact through proper integration with wider national sustainable development strategies.

Secondly, importing benefit-sharing principles could highlight the need for TNA and TAP outcomes to be more systematically tracked and for their content in the future to be periodically reviewed as a country's needs and conditions evolve over time. Although the TEC does offer guidance for countries to voluntarily share their experiences, there's no clear mechanism for monitoring and evaluation steps to be taken beyond the initial two year assessment period, and thus no reliable system through which implementation successes and failures can be reflected on and lessons accordingly learned internally or among

states.¹⁶⁸ There's also no clear guidance given with regards to how TNAs might be reviewed and revised in the future in response to changing local landscapes. But benefit-sharing requires iterative processes, rather than one-off exercises, that respond to changing perceptions of benefit.¹⁶⁹ Examples of this general requirement being operationalised can be found in biodiversity and human rights contexts, for example the duty to conduct post-project monitoring as part of impact assessments, and guidelines prescribing that processes to obtain free, prior and informed consent of indigenous and local communities are 'ongoing arrangements'.¹⁷⁰ Thus, a benefit-sharing lens could encourage TEC development of and support for monitoring and review processes of TNAs in order to respond to changing state circumstances.

Finally, it's relevant to note that intra-state benefit-sharing notions could potentially inform the domestic-level TNA procedure itself in fairly and equitably producing an accurate representation and reconciliation of local interests, needs and conditions, and producing TAPs on that basis. Although intra-state level processes are beyond the scope of this paper, it's worth bearing in mind for the purposes of this discussion given the circularity of the process, the influence of TNA conclusions on international level technology transfer decision-making and how this permeates back down to the distribution of the benefits derived therefrom at local level. Benefit-sharing principles on that plane could be employed to ensure broad and good-faith stakeholder engagement that gives a voice to and prioritises vulnerable members of society, indigenous and other local groups.

4.1.2. Expanding and Improving Collaborative Approaches

Enhanced collaborative working between states is already emphasised as an essential feature of international technology transfer under the Paris Agreement and the Technology Framework, particularly in respect of innovation.¹⁷¹ This recognition therefore already provides a solid foundation to embrace the very nature of the concept of benefit-sharing as a dialogic

¹⁶⁴ Morgera, 'Under the Radar' (n8) 1109.

¹⁶⁵ Ibid 1110; Akwé: Kon Voluntary Guidelines for the Conduct of Cultural, Environmental and Social Impact Assessment (2004) CBD Decision VII/16C, Annex.

¹⁶⁶ Morgera, 'Under the Radar' (n8) 1109.

¹⁶⁷ Bouwer (n11) 14.

¹⁶⁸ Hofman & van der Gaast (n158) 6, 8.

¹⁶⁹ Morgera, 'An International Legal Concept' (n7) 363; Morgera, 'Under the Radar' (n8) 1107.

¹⁷⁰ Morgera, 'Under the Radar' (n8) 1111, 1112; Mo'otz Kuxtal Voluntary Guidelines (2016) CBD Decision XIII/18, Annex, para.8.

¹⁷¹ Paris Agreement (n3) Art.10.2, 10.5; Technology Framework (n23) para.19.

process.¹⁷² However, the application of benefit-sharing principles could arguably further stimulate and improve the collaboration envisaged and encouraged under the climate regime.

Firstly, benefit-sharing could help to accelerate an extension of technology transfer cooperative initiatives into thus far largely neglected areas. There's still a limited scope of public sector inter-state collaborative initiatives currently taking place involving developing countries and, instead, most existing bilateral and plurilateral cooperative programs focus on large and emerging economies. Action also tends to focus on the downstream side of the technology lifecycle rather than earlier stage R&D, and mitigation technologies rather than adaptation technologies.¹⁷³ But benefit-sharing's fundamental emphasis on the essential need for and value of cooperative partnership-building could help encourage states and the CTCN to pursue the expansion of collaborative action into these areas.

Secondly, fair and equitable benefit-sharing encapsulates in principle a very rich form of collaboration which isn't expressly articulated in the climate regime. Interpretive guidance from biodiversity and human rights law underscores a duty of inclusive, good-faith, genuine partnership-building targeted at ensuring that mutual understandings are reached, appropriate sharing methodologies are accordingly achieved and that the benefits distributed are of value to their recipients.¹⁷⁴ It also encompasses a requirement that more vulnerable or less powerful parties in particular are given a meaningful seat at the table and that their viewpoints are given equal respect and due consideration, which should foster trust, good relations and intercultural spaces.¹⁷⁵ Admittedly, how to specifically implement these requirements remains fairly abstract in practice,¹⁷⁶ but conceptualising technology transfer as benefit-sharing could in theory flesh out what exactly true collaboration means and entails, how it might look and what it should achieve, through reference to these general principles and benchmarks. It could also serve to legitimise resistance against the more powerful developed states from the Global North being the main driving forces behind action and ultimate decision-makers in collab-

orative forums, thus avoiding outcomes being influenced by these states' own interests and weighted towards their own conceptions of equity.

With these core features of the process in mind, benefit-sharing's fundamental focus on collaboration could also stimulate valuable further research into the best methods of collaboration, what works, what doesn't and why. Ockwell, Sagar and Coninck have stressed a need for more empirically grounded and systematic thinking on the issue in respect of R&D in particular, given the numerous configurations of collaboration and policy options that are possible. They've also noted there are few examples of more permanent technology transfer collaborative forums rather than narrower projects, and speculated whether longer-term initiatives can offer more sustained and needs-based benefits to developing nations.¹⁷⁷ For example, some academics have advocated for the development of regional Climate Innovation Centres (CICs) that would focus on building innovation ecosystems around low-carbon energy technologies.¹⁷⁸ Benefit-sharing's requirement for continuing and iterative processes, rather than one-off exercises, could certainly help to bolster support for and further research into this idea.¹⁷⁹

4.2. Substantive Dimensions – Addressing Implementation Weaknesses

The ultimate purpose of deep and robust procedural processes is that they lead to more effective and equitable outcomes. Thus, with the above in mind, paired with benefit-sharing's substantive objectives and conditions, application of a benefit-sharing frame to technology transfer obligations could go some way towards addressing the existing implementation gaps within the climate regime as discussed above in section 2.4. Namely, it could propel political will and ambition, encourage diversification of approaches and increase capacity-building efforts.

4.2.1. Driving Political Will and Ambition

Section 2.4.1 discussed general concerns regarding overall state ambition to dedicate resources to international climate technology transfer, as well as why

¹⁷² Morgera, 'An International Legal Concept' (n7) 363; Bouwer (n11) 15.

¹⁷³ Ockwell, Sagar & Coninck (n47) 407; Coninck & Sagar, 'Article 10'(n5) 271; SBSTA (n12) para.276.

¹⁷⁴ Morgera, 'An International Legal Concept' (n7) 363, 367, 382; Morgera, 'Under the Radar' (n8) 1106.

¹⁷⁵ Morgera, 'Under the Radar' (n8) 1106; e.g. Mo'otz Kuxtal Guidelines (n170) para.8, 23.

¹⁷⁶ Morgera, 'Under the Radar' (n8) 1102.

¹⁷⁷ Ockwell, Sagar & Coninck (n47) 403, 408.

¹⁷⁸ Ibid 408; Ambuj Sagar, Cath Bremner and Michael Grubb, 'Climate Innovation Centres : A Partnership Approach to Meeting Energy and Climate Challenges' (2009) 33 Natural Resources Forum 274.

¹⁷⁹ Morgera, 'An International Legal Concept' (n7) 363; Morgera, 'Under the Radar' (n8) 1107.

the climate regime may be failing to compel state action. But it's possible that the characterisation of technology transfer as fair and equitable benefit-sharing could hold promise in being able to stimulate heightened political will, simply by framing the issues at hand in a different way. Morgera notes that framing devices can play powerful roles in the development of international law, acting to select and accentuate certain aspects of reality over others.¹⁸⁰ While benefit-sharing itself may be formulated slightly differently in different legal contexts, generally it frames searches for equitable solutions to environmental problems by focusing dialogue on the benefits and advantages of environmental protection at both local and global levels, rather than burdens and cost.¹⁸¹ In the context of technology transfer under the climate regime, this framing could present an opportunity to shift negotiations in a more productive direction by pushing participants to think in new ways about resources, their value and to reconcile alternative views through a shared cooperative agenda.¹⁸² It could offer new perspectives in addressing questions of fairness and equity, by characterising the historic developmental progress derived from the fossil fuel exploitation of developed states as a benefit to be shared, and climate technology transfer as a translation of those benefits into the global benefits of climate mitigation and local sustainable development objectives, in both their inter- and intra-generational dimensions. In this way, understandings of equity might be narrowed. Shared understandings of equity have been described as an 'enabler of ambition' given that it will foster the trust that states need to do more, without the risk of free-riders.¹⁸³

The procedural dimensions of benefit-sharing feed into this, through the promotion of greater fairness by amplifying and giving greater weight to developing states' voices in the decision-making arena. Heightened procedural equity has the power to foster better links between normative and political dimensions of a given issue, and this is particularly important in the context of the Paris Agreement's self-determination approach.¹⁸⁴ By creating additional space for the incorporation of developing states' perceptions of sub-

stantive equity, particularly with regards to the relevance of historic emissions in the application of the CBDR principle, additional political pressure may be brought to bear on developed states to increase their efforts.

An additional aspect of a benefit-sharing lens that could drive ambition within the climate regime, including technology transfer, is the bridge that may be created for further cross-fertilisation between the climate regime and the human rights regime.¹⁸⁵ This human rights connection has the potential to inform debates on state accountability, equity and distributive justice and, as Savaresi puts it, go beyond 'entrenched dynamics' of the climate regime.¹⁸⁶ The inherent focus of human rights law on the impacts of climate change on the individual could serve to bring added awareness to the multi-level nature of the climate problem, strengthening understandings of how global action permeates down to the local and individual level and vice versa. In its ethical connotations and origins, it could also stress moral imperatives to act, which have an important role to play in equity discussions. States may become more and more willing to engage in such moral discourses as the climate challenge becomes more immediate and urgent.¹⁸⁷ This could potentially at least shift the needle of the character of international dialogue further away from the purely political end of the spectrum and raise acceptable benchmarks for action.¹⁸⁸ Where ethical considerations play a greater role in decision-making, this could also diminish the background influence of corporate profit motives and agendas. As Savaresi and Bouwer have pointed out, benefit-sharing's focus on states' needs and prioritisation of the vulnerable could thus in turn potentially create more leeway for distributive justice issues to be addressed.¹⁸⁹

4.2.2. *Diversification Beyond Market Orientated Mechanisms*

Section 2.4.2 explored the concern that market-based approaches favoured by the Global North dominate technology transfer efforts and dialogue, which stifles legitimate debate regarding the role of

¹⁸⁰ Morgera, 'Conceptualising Benefit-Sharing' (n9) 2; Morgera, 'An International Legal Concept' (n7) 356; Robert Entman, 'Framing: Toward Clarification of a Fractured Paradigm' (1993) 43 *Journal of Communication* 51.

¹⁸¹ Morgera, 'Conceptualising Benefit-Sharing' (n9) 2; Louisa Parks and Elisa Morgera, 'The Need for an Interdisciplinary Approach to Norm Diffusion: The Case of Fair and Equitable Benefit-Sharing' 24(3) *RECIEL* 353, 365.

¹⁸² Morgera, 'Conceptualising Benefit-Sharing' (n9) 2; Savaresi (n11) 3.

¹⁸³ Lawrence and Reder (n61) 525.

¹⁸⁴ *Ibid* 519.

¹⁸⁵ Savaresi (n11) 4.

¹⁸⁶ *Ibid* 13; OHCHR (n137) para. 88.

¹⁸⁷ Lawrence and Reder (n61) 526; Hugh Breaky, 'COP 20's Ethical Fallout: The Perils of Principles Without Dialogue' (2015) 18.2 *Ethics, Policy & Environment* 155, 160; Cameron and Limon (n141) 218.

¹⁸⁸ Peel and Osofsky (n142) 66; Cameron and Limon (n141) 218.

¹⁸⁹ Savaresi (n11) 14; Bouwer (n11) 15.

non-market approaches and only privileges the transfer of certain technologies to emerging economies that already have market pull. But a benefit-sharing lens could arguably open up these conversations and broaden the scope of action. Although mechanisms for implementation of benefit-sharing may indeed take market-orientated forms, a prime example arguably being the CDM itself,¹⁹⁰ the point is that benefit-sharing could extrapolate why such approaches are limited in the outcomes they can deliver and the need therefore to incorporate additional and supplementary global approaches that overcome these limitations.

This might be driven firstly as an outcome of the enriched procedural dimensions that benefit-sharing could bring as discussed above, through improved TNA processes and deeper forms of collaboration. The inherent intention of benefit-sharing's comprehensive procedural expectations is to produce more concentrated and nuanced understandings of the issues and interests at hand within complex socio-economic landscapes, in order to deliver more appropriate and mutually-agreed tailored solutions.¹⁹¹ It follows that, in so doing, implementation of these aspects of benefit-sharing could better extrapolate the relevant factors feeding into technology transfer, such as technology categorisation, recipient capacity and market pull, shedding better light on the circumstances in which market-based approaches may not by themselves constitute effective mechanisms of transfer or may be entirely unfeasible in some jurisdictions. Furthermore, by amplifying the voices of developing countries within this procedural process and in collaborative forums, these countries may be better empowered to advocate for their positions and legitimate debate on the role of markets versus command-and-control approaches could be reinvigorated.¹⁹² With regards to IPRs specifically, this could also encourage some form of compromise and resolution on the outstanding issues that the Global North is currently stonewalling.¹⁹³

Of particular and far-reaching benefit could be an expansion of collaborative action in respect of technology R&D between developed and developing states, which would give public agencies a greater role to promote the development of technologies suited for low-income communities that lie outside of estab-

lished markets. Ockwell, Sagar and Coninck in particular note the impact that increased collaborative action in this area could have in producing technologies that would carry both climate and development benefits for developing countries according to their needs, instead of letting markets alone drive innovation, since developing and least-developed countries otherwise lack the capacity to independently carry out their own R&D work.¹⁹⁴ As Bouwer notes, benefit-sharing's capacity to direct attention to state needs rather than financial viability of projects could stimulate such action.¹⁹⁵

Feeding into this, the scaled up ambition that could result from greater synthesis with the moral discourses of the human rights regime, by characterising technology transfer as an exercise of the right to science, could motivate states to reach beyond the low-hanging fruit that market approaches favour, in recognition of those technologies, states and communities that they neglect.

4.2.3. Emphasising the Need for Capacity Building

Section 2.4.3 reflected on the ongoing failure of the climate regime to adequately implement measures to build developing country capacity in the orgware dimensions of technology and in development of enabling environments. This deficiency limits or inhibits the effective diffusion and absorption of technologies in recipient states, while also limiting developing states' abilities to participate in technology transfer collaboration and decision-making. But, application of a benefit-sharing frame could help reinforce the fact that technology transfer should encompass broader capacity-building support, as well as encourage better evaluation of capacity barriers and how they can best be addressed.

Firstly, a duty of capacity-building can be deduced through benefit-sharing's requirement that benefits are not only distributed to beneficiary states, but that those states are equipped with the means and opportunity to take an active and meaningful role in collaborative processes to ensure that the benefits are mu-

¹⁹⁰ Bimo Nkhata et al, 'A Typology of Benefit Sharing Arrangements for the Governance of Social-Ecological Systems in Developing Countries' (2012) 17(1) *Ecology and Society* 17.

¹⁹¹ Morgera, 'An International Legal Concept' (n7) 363, 367.

¹⁹² *Ibid* 363, 378.

¹⁹³ Rimmer (n53) 4.

¹⁹⁴ Ockwell, Sagar & Coninck (n47) 405; Haselip et al (n65) 367.

¹⁹⁵ Bouwer (n11) 14.

tually agreed and appropriate to local needs and circumstances.¹⁹⁶ Such participation has to be underpinned by sufficient levels of capacity in the first place,¹⁹⁷ thus it could be naturally inferred through interpretation that benefit-sharing imposes a duty on donor states to ensure that recipients at least have minimum degrees of capacity to support participation. Otherwise, benefit-sharing cannot be properly implemented with beneficiaries that don't meet such standards. This implied duty manifests itself in other benefit-sharing contexts. For example, the Nagoya Protocol mentions that capacity-building might involve training in how to negotiate mutually agreed terms.¹⁹⁸ In respect of bioprospecting, the International Seabed Authority (ISA) has established an endowment fund focused, *inter alia*, on providing scientists and technical personnel from developing countries with 'the opportunity to participate' in international technical cooperation.¹⁹⁹ And the Akwé: Kon Guidelines encourage states to support indigenous and local expertise through capacity-building in order to facilitate effective participation in impact assessments.²⁰⁰ Thus, by imposing similar duties through a benefit-sharing lens to technology transfer obligations under the climate regime, this might infer that states should provide capacity-building assistance that would at least lay a basic foundational capacity to participate in technology transfer collaboration, whereby comprehensive TNAs can be conducted and informed conversations about needs and priorities can be entered into.

Beyond this sort of baseline capacity, benefit-sharing may also go further in requiring more advanced innovation capacity-building when considering its sustainable development roots and objectives. In intra-state benefit-sharing contexts under human rights law, capacity-building as part of the right to development has been connected to the substantive core of benefit-sharing. Under the CBD, this finds reflection in many of the support-benefits identified that would support the economic activities of indigenous and local communities.²⁰¹ Furthermore, in respect of the right to participate in the benefits of scientific progress, Plomer has identified the influence of capabilities theory in its emphasis of the need to support individuals' ability to self-develop and to create and maintain so-

cial, legal and economic institutions to sustain scientific advancement.²⁰² This interpretation is supported by the CESCR's analysis of the right to science, which states that it encompasses not only a right to receive the benefits of the applications of scientific progress, but also a right to participate without discrimination.²⁰³ On the international plane, the CESCR translates this aspect into a duty to adopt measures which contribute to the development of technology in developing countries, including building and improving scientific education, research and training.²⁰⁴ Specifically, it notes that '*bilateral and multilateral agreements should enable developing countries to build up their capacity to participate in generating and sharing scientific knowledge and benefiting from its applications*'.²⁰⁵ All of this deeply resonates with the need under the climate regime to do more to build developing states' innovation capacities in order to facilitate endogenous invention, adaptation and absorption of technologies, break dependence cycles and help align climate policy with sustainable development and economic growth. Viewing technology transfer through a benefit-sharing lens may thus enable these inherent capacity-building dimensions to be harnessed and reinforce this aspect of state obligations. In this sense, it may also serve to embed the idea that, although it may not be possible to directly link and attribute in isolation broad capacity-building work to specific technological development outcomes, it's inextricable from and integral to technology transfer within a development context.

Supplementing this added emphasis on capacity-building that benefit-sharing could bring, its rich procedural components could also facilitate better understandings of the barriers to transfer, diffusion and absorption that various lacks of capacity can pose. This would naturally follow improved TNA processes and the bridged understandings of local conditions fostered through deeper collaboration. Moreover, improved action in collaborative initiatives through expansion of the scope of their subject matter, participating jurisdictions and intensity of partnership-building, would in itself act as capacity-builders through interactive learning.²⁰⁶

¹⁹⁶ Morgera, 'An International Legal Concept' (n7) 363, 367.

¹⁹⁷ Ockwell, Sagar & Coninck (n47) 402.

¹⁹⁸ Nagoya Protocol (n101) Art.22.5(b).

¹⁹⁹ ISA, *Resolution Establishing an Endowment Fund for Marine Scientific Research in the Area* (16 August 2006) Document ISBA/12/A/11, para.2.

²⁰⁰ *Akwé: Kon Guidelines* (n166) 18, 64-66.

²⁰¹ Morgera, 'Under the Radar' (n7) 1108; *Endorois Decision* (n134) para.283;

²⁰² Morgera, 'Cross-Roads' (n145) 814; Aurora Plomer, *Patents, Human Rights and Access to Science* (Edward Elgar 2015) Chap.2, 32.

²⁰³ CESCR (n144) para.11, 17, 45, 46.

²⁰⁴ *Ibid* para.79.

²⁰⁵ *Ibid* para.83.

²⁰⁶ Ockwell, Sagar & Coninck (n47) 402, 404.

5. Conclusions

The key thrust of this paper has been to demonstrate that the concept of fair and equitable benefit-sharing can not only find traction in respect of technology transfer obligations under the climate regime, but has the theoretical potential as a framing device to compel states to improve their efforts and overcome existing implementation gaps.

The implantation of the concept into the climate regime would constitute a continuation of benefit-sharing's appearance and horizontal normative diffusion through different spheres of international environmental law. Its ability as a framing tool to transcend particular regimes and apply to a diverse range of scenarios in reconciling party interests arguably renders it definable as a general principle of international law.²⁰⁷ This, together with increasing trends towards understanding the world as one complex socio-ecological system, prompting the expansion of mutually supportive law-making, creates an opportune setting for its further infusion into the technology transfer dimensions of the climate regime.

How to effectively accelerate climate technology transfer in equitable and effective ways is a deeply complex challenge. But this paper submits that, by leveraging benefit-sharing's conceptual roots in the operationalisation of equity, pursuit of sustainable development and protection of human rights, and connecting these themes with their shared influence in the climate regime, benefit-sharing could find a valuable role as a supplementary tool to guide state action. Its alternative framing of these influential but ambiguous principles as they apply to inter-state technology transfer, and accentuation of benefits over burdens, could shift perspectives, narrow the parameters of interpretation and bridge gaps between opposing points of view as to the scale and form of action required. Its rich procedural safeguards stress the importance of concerted dialogue, genuine partnership and the protection and agency of developing states, which could help improve TNA processes and expand and deepen collaborative action to foster better understanding of priorities, opportunities and appropriate solutions. These framings and procedural

features could in turn prompt more diversified approaches, particularly in respect of neglected non-market mechanisms, and attention to capacity-building, thereby addressing ongoing distributional justice issues. Moreover, in general, it's amplification of developing state voices, potential to emphasise the significance of historic emissions in equity debates and ethical implications imported from human rights links could create pressure to stimulate heightened political will and ambition.

Notwithstanding, these propositions are put forward in full recognition of the fact that benefit-sharing remains a fairly abstract and underdeveloped concept, which is very much an emerging phenomenon rather than a fully established principle.²⁰⁸ Inconsistencies across different contexts in its formulation, content, status and effects leaves many open questions as to its specific implementation and practical application, as well as the relationship between different regimes in guiding the interpretation of benefit-sharing requirements.²⁰⁹ Moreover, empirical evidence lends support to criticism of benefit-sharing's susceptibility to duplicitous misuse in practice by more powerful parties, simply concealing or adding credibility to harmful outcomes driven by the status quo of political forces.²¹⁰ As a result, Morgera implores that a healthy scepticism is adopted in considering its practical implications.²¹¹ Nonetheless, earlier discussion in this paper reflected on the fact that power dynamics already strongly influence climate technology transfer policy, thus this risk would not be new. On the other hand, benefit-sharing shows promise in its framing of equity and inherently optimistic and aspirational objective of nurturing partnership and consensus.²¹² Going forward, further conceptual refinement of the concept of benefit-sharing will help to clarify its potential role within the technology transfer dimensions of the climate regime and further empirical analysis would assist understanding of its practical applications in different contexts, to deduce how it can be operationalised in truly constructive and equitable manners.

Also warranting further research is how technology transfer as a form of benefit-sharing might interplay with the emergence of benefit-sharing norms in climate finance.²¹³ Technology transfer is, after all, heavily dependent on leveraging finance and thus the

²⁰⁷ Morgera, 'History, Normative Content and Status' (n122) 10.

²⁰⁸ Medaglia and Perron-Welch (n136) 62; Morgera, 'An International Legal Concept' (n7) 354; Morgera, 'Under the Radar' (n8) 1102.

²⁰⁹ Morgera, 'An International Legal Concept' (n7) 354; Savaresi (n11) 25.

²¹⁰ Morgera, 'An International Legal Concept' (n7) 356, 372; Morgera, 'Conceptualising Benefit-Sharing' (n9) 3, Martin et al (n123) 168.

²¹¹ Morgera, 'Conceptualising Benefit-Sharing' (n9) 3.

²¹² *Ibid* 2.

²¹³ See Kim Bouwer, 'Constructing a Norm of Benefit-Sharing in Climate Finance' BENELEX Working Paper No.25 (SSRN 2019).

interconnections between the TM and the Financial Mechanism and multilateral funds under the UN-FCCC could create further opportunities for coherent adoption of benefit-sharing principles across the regime's inter-state dimensions. In a similar vein in terms of establishing coherency, the interactions between benefit-sharing norms at inter-state and intra-state levels would be a valuable area of further study.

Ultimately, it is envisaged that benefit-sharing can be filled with meaningful and less abstract content through mutually supportive law-making.²¹⁴ Cross-fertilisation between the human rights regime and biodiversity regime has led to enhanced development of benefit-sharing concepts and implementation expectations within both those contexts.²¹⁵ Thus, the ongoing elaboration and strengthening of linkages between the climate regime, law of the sea, biodiversity law and human rights law may also be widening the channels for diffusion and development of discernible benefit-sharing standards from those regimes into climate technology transfer obligations. The purpose of this would not be to replace the CBDR

principle as it applies to technology transfer, but to supplement it and act in a parallel, complementary and supportive way. As the climate crisis becomes increasingly urgent, such innovative approaches and alternative frames must be given serious consideration.

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²¹⁴ Morgera, 'An International Legal Concept' (n7) 381.

²¹⁵ Morgera, 'Under the Radar' (n8).



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David W Cody, Meet Kaur, Mitchell Lennan, Annaïg Nicol, Thomas Paxton and Syed A Tassawar, Interfaces and Interconnections between the Paris Agreement, the Sendai Framework and the Sustainable Development Goals, SCELG Working Paper 13/2021

G Medici Colombo and L Wegener, 'The Value of Climate Change-Impacted Litigation: An Alternative Perspective on the Phenomenon of 'Climate Change Litigation'', SCELG Working Paper 12/2019

E Robb, 'Making Democracy Great Again: An Exploration of Democratic Values in Climate Change Litigation', SCELG Working Paper 11/2018

SCELG Policy Briefs

Debbie Legge & Annaig Nicol, 'Ecocide and Animals: extracting a framework for discussion from the work of Polly Higgins, Damien Short and Nigel South', SCELG Policy Brief 19/2021

Chrysa Alexandraki, 'Sustainable Finance Law: the EU Paradigm and the Way Forward', SCELG Policy Brief 18/2021

Mika Schroder, 'Governments fail to meet the Aichi Biodiversity Targets – do they have a pathway towards “transformative change”?', SCELG Policy Brief 16/2020

SCELG Dialogues

K McKenzie and F Sindico, 'Climate Change Litigation: Recent Trends, the Global South, Human Rights and Rights of Nature', SCELG Dialogue 11/2020

F Sindico, 'From Climate Strikes to Climate Solutions', SCELG Dialogue 10/2019

Find out more at:

<https://www.strath.ac.uk/research/strathclydecentreenvironmentallawgovernance/ourwork/latestoutcomesfromourwork/>



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