RE-IMAGINING INTERNATIONAL LAW'S ENVIRONMENT: AN ECOLOGICAL CRITIQUE OF INTERNATIONAL FOOD LAW AND INTERNATIONAL DISASTER LAW

AYŞE DIDEM SEZGIN* AND ASHLEIGH BEST†

This article undertakes an ecological critique of international law through an analysis of international food law and disaster law. Although these two fields seem separate in nature, they share a common motivation: enhancing human security. From an ecological perspective, international law's preoccupation with human security is part of an anthropocentric view that foregrounds the instrumental — as opposed to the intrinsic — value of the environment. International law has followed the security-centric trace through food security by openly endorsing agricultural intensification. The outcome humanity is facing today is exacerbated rates of global hunger and damaged ecosystem processes. To reverse the negative outcomes of agricultural intensification, the four pillars of food security are constantly being reworked. Yet, the focus remains on intensive production and legitimising the type of agriculture necessary for such production. Ecosystem-based approaches to agriculture signify that it is not just an economic sector but a way of life that has great implications for conservation and sustainable use of biological and landscape diversity. International law in general, and the International Treaty on Plant Genetic Resources for Food and Agriculture in particular, has neglected the holistic nature of ecological processes responsible for the survival of species including humans, and habitats including lands used for intensive agriculture. This article argues that international law can only contribute to food security when the impacts of the modes of production on ecological processes are fully acknowledged. The ongoing fierce debates on agroecology are but one example that prove alternative visions are necessary to make this possible. The article also investigates how international disaster law promotes the preservation of world ecosystems and probes the impetus behind such ecological concerns. The article takes as its point of departure the Sendai Framework for Disaster Risk Reduction: the prevailing international instrument for bolstering communities' disaster resilience. Referring to the Framework's provisions that urge member states to conserve environmental assets, the article examines the vital role performed by ecosystem-based approaches to disaster risk reduction. While acknowledging the indispensability of these functions, the article argues that a more ecologically-focused international disaster law would explicitly recognise and protect the innate value of ecosystems, habitats, vegetation and wildlife. It contends that the Sendai Framework's narrow focus on the benefits that ecosystems can deliver for human communities in disasters has the potential to produce critical gaps in domestic environmental law and policy. Drawing on examples from Australia's 2019–20 Black Summer Bushfires, the article identifies the need for a more holistic and ecologically-focused approach to the preservation of natural assets: one which would safeguard ecosystems both for

* PhD Candidate, King's College London Dickson Poon School of Law. LLM (Distinction), LLB. The article is informed by the PhD project examining the approach to agricultural heritage in International Environmental Law. The author acknowledges the support of the Turkish Ministry of National Education Scholarship for this project. The author thanks her supervisors Dr Leslie-Anne Duvic-Paoli and Dr Octávio Ferraz for their support and feedback, as well as Zainab Lokhandwala for her comments on an earlier version of the paper.

† PhD Candidate, Melbourne Law School. BA, LLB (Hons I & University Medal), GDLP, GCLTHE. Parts of the research contained in this article were informed or inspired by a broader doctoral project investigating the legal status of animals in disasters, which is supported by an Australian Commonwealth Government Research Training Program Scholarship. The author thanks her PhD supervisors, Professor Christine Parker and Professor Lee Godden, for their ongoing feedback and guidance in connection with that project. The article was written from the unceded lands of the Wurundjeri People of the Kulin Nation, and the author pays her respects to their Elders past, present and emerging. Originally presented at the ASIL Midyear Meeting Research Forum, November 2021. The authors thank the Forum organisers for their support and feedback.

their protective infrastructure and their intrinsic worth. Methodologically, the article innovatively combines a doctrinal analysis of international food and disaster law instruments with a broadly legal new materialist lens, which is informed by insights from critical environmental law, legal geography, feminist legal theory and critical property law. Through the application of this novel lens to the fields under scrutiny, the article contends that international law must become more ecologically sound if it is to address the pressing global environmental challenges of our time.

CONTENTS

I Introduction 2
II International Food Law and International Disaster Law 6
III An Ecological Critique of International Law on Food and Agriculture 9
  A Agriculture: Part of the World's Ecosystems 10
  B Food Security Governance: Inattention to Ecological Principles 13
  C International Law's Blindness to the Ecological Functions of Agriculture: The Case of Access and Benefit-Sharing 15
  D Reimagining International Food Law: Ecological Functions of Agriculture as Commons 18
IV An Ecological Critique of International Disaster Law 24
  A The Status of Ecosystems in International Disaster Law 25
  B Attending to Ecological Materiality: Recasting Ecosystems as Intrinsically Vital, Valuable and Vulnerable in order to Foster Reciprocity 29
  C The Black Summer Bushfires: A Visceral Call for an Ecological Turn in International Disaster Law 34
V Conclusion 38

> Possibly, in our intuitive perceptions, which may be truer than our science and less impeded by words than our philosophies, we realize the indivisibility of the earth — its soil, mountains, rivers, forests, climate, plants, and animals, and respect it collectively not only as a useful servant but as a living being.[1]

I INTRODUCTION

However abstract its terms and universal its project, international law — as all law — exists in, and exerts influence over, fragile and dynamic natural environments composed of diverse ontological forms. The purpose of this article is to investigate the extent to which international law acknowledges and responds to the material world with which it interfaces; the article undertakes this project through an examination and critique of the field's (in)attentiveness to the intrinsic needs and vital characteristics of ecosystems. In line with international law, the article understands 'ecosystem' to mean 'a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit'.[2] Moving beyond this relatively simple definition, this study scrutinises the complex description and status of

---

[1] Aldo Leopold, 'Some Fundamentals of Conservation in the Southwest' (1979) 1(2) *Environmental Ethics* 131, 140, quoted in Eric T Freyfogle, 'The Land Ethic and Pilgrim Leopold' (1990) 61(2) *University of Colorado Law Review* 217, 217.

[2] *Convention on Biological Diversity*, opened for signature 5 June 1992, 1760 UNTS 79 (entered into force 29 December 1993) art 2 ('*CBD*').

ecosystems in major instruments constitutive of two fields of international law, each of which is subtended by humanity's dependence on and vulnerability to natural geological and ecological processes: international law on food and agriculture, and international disaster law. Through a doctrinal analysis of these instruments and a survey of their animating objectives, the article illustrates how they cast ecosystems in reductive, human-centered terms; they conceptualise and value ecosystems not for their unique qualities, but as means for achieving desired social outcomes, and therefore narrowly foreground the interests of human communities. In particular, the article argues that the fields in question evince a preoccupation with immediate human security concerns. Accordingly, they overlook the centrality of protecting the natural environment to the realisation of their ambitions; they also fail to appreciate the intrinsic and incalculable value of the nonhuman, biotic world, including that which dwells within complex ecosystems.

The article's claims are intended to apply neither restrictively nor universally. While international food and agriculture law and international disaster law have been selected for analysis in the extant study, these by no means exhaust the components of international law in respect of which the article's ecological critique could be made. For example, many of the present article's contentions apply with equal vigour to international legal instruments governing fresh water:[3] a field born out of concern for regulating a scarce, 'finite' and increasingly insecure resource, which 'human needs have permeated' in palpable ways.[4] Likewise, they may be invoked in a survey of certain principles of international space law, particularly those which affirm that the moon and celestial bodies, and the natural resources they contain, are the common property of 'all *mankind*'.[5] The contentions could also hold resonance for international legal instruments governing the use of nuclear or atomic energy.[6] Although these fields are not examined in this article due to practical constraints, it is possible — and indeed hoped — that the findings which follow will serve as a foundation or catalyst for similar ecological critiques of these and other fields of international law into the future.

At the same time, the arguments propounded by this article may *not* apply to all areas of international law, especially those which interface directly with, and display an independent concern for protecting, the natural environment. The treaties comprising the remaining body of international environmental law are

---

[3] The authors thank our first peer reviewer for incisively suggesting this as a propitious line of investigation. See generally Astrida Neimanis, 'Alongside the Right to Water, A Posthumanist Feminist Imaginary' (2014) 5(1) *Journal of Human Rights and the Environment* 5.

[4] Laurence Boisson de Chazournes, *Fresh Water in International Law* (Oxford University Press, 2021) 187.

[5] See, eg, *Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies*, opened for signature 27 January 1967, 610 UNTS 205 (entered into force 10 October 1967) art 1 (emphasis added); *Agreement Governing the Activities of States on the Moon and Other Celestial Bodies*, opened for signature 5 December 1979, 1363 UNTS 3 (entered into force 11 July 1984) arts 4(1), 11(1) (emphasis added).

[6] See, eg, *Convention on Nuclear Safety*, opened for signature 20 September 1994, 1963 UNTS 293 (entered into force 24 October 1996).

salient here. Expansive in scope, these encompass a range of contemporary environmental challenges, including:

> problems of atmospheric and stratospheric air pollution, climate change, water and land pollution, the oceans, international freshwater resources, Antarctica, outer space, historical and cultural preservation, endangered species, biological diversity, marine mammals and fish stocks, energy, hazardous waste and dangerous chemicals, human health, human rights and the environment, international trade, even the military use of environmental modification (ENMOD) in warfare.[7]

While international food and agriculture law and international disaster law might be categorised as falling within this field — broadly conceived — given their close interface with the natural world, they are distinctive in the sense that the environment is ancillary to their main enterprise. Agreements forming the nucleus of international environmental law are, by contrast, usually impelled by the objective of recognising and arresting rampant anthropogenic environmental damage. Despite this, the field and its constitutive documents have been criticised for their anthroparchic underpinnings; as Louis Kotzé and Duncan French observe, 'the perceived failures of IEL [international environmental law] have been attributed to the anthropocentric as opposed to the ecocentric ontology of this body of law'.[8] While such instruments might therefore be valid subjects of aspects of this article's critique, their culpability would likely be tempered by the fact that their very existence is predicated upon an awareness of the sensitivity, vulnerability and dynamism of other-than-human ecologies — and how this reality impacts humans. For example, although art 1 of the *International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties* acknowledges the centrality of pristine marine environments to successful fisheries operations and tourism, and by extension, human livelihoods, it also recognises 'the health of the coastal population and the well-being of the area concerned, including conservation of *living marine resources and of wildlife*' as worthy candidates for protection.[9] In this context, human and non-human interests are coextensive and consonant.

Conversely, in the fields under consideration in the present article, such interests do not always clearly intersect and, in some cases, can diverge. As the piece demonstrates, where human security represents the immediate, overarching concern for a field of international law, ecological systems become liable to being instrumentalised for and subordinated to anthropocentric imperatives: a trend yielding results which are both counterproductive for humans, given that optimal, sustainable outcomes for this cohort depend on a healthy natural environment, and deleterious for ecosystems, since it denies their intrinsic value. This peculiar tension distinguishes international food law and international

---

[7] Ved P Nanda and George (Rock) Pring, *International Environmental Law and Policy for the 21st Century* (Martinus Nijhoff Publishers, 2nd rev ed, 2013) vol 9, 10.

[8] Louis J Kotzé and Duncan French, 'The Anthropocentric Ontology of International Environmental Law and the Sustainable Development Goals: Towards an Ecocentric Rule of Law in the Anthropocene' (2018) 7(1) *Global Journal of Comparative Law* 5, 7.

[9] *International Convention Relating to Intervention on the High Seas in Cases of Oil Pollution Casualties*, opened for signature 29 November 1969, 970 UNTS 211 (entered into force 6 May 1975) arts 1–3 (emphasis added).

disaster law from the broader corpus of international environmental law, and is one reason why they have been selected for examination here.

In developing its contentions, the article draws closely from literatures which might broadly be described as *new materialist* in orientation. It adopts Margaret Davies' description of new materialist critiques as those which seek to '[think] about objects and matter in their physicality' and '[raise] the profile of the physical world as an integral part of the social'.[10] The article thus invokes insights from fields that eschew conceptions of law as abstract and reified, and instead emphasise its emplacement in context, along with its real, tangible effects on material systems and bodies. Departing from paradigms of subjectivity entrenched within the Western, liberal legal imaginary, these commonly foreground the value and significance of diverse ontological forms: they impugn the 'exclusive focus on human matter (ie bodies) and material human relationships', and counter the prevailing 'image of the human–world relationship in which the socio-cultural sphere of human beings is separate from and dominant over nature and the physical world'.[11] In doing so, they reject the Cartesian dualisms which bifurcate humans, and all other living and non-living matter. Such approaches also underscore the co-constitutive relationship between law and the material world, characterising legal norms and frameworks as responsible for marginalising the environment and accelerating its degradation. According to Davies, the promise of materialist legal theory lies in its potential 'to take the living planet and its ecological characteristics seriously'.[12] Although this body of theory intersects with a multitude of literatures from the humanities and social sciences, the present article relies principally on propositions from legal geography and legal feminism, as well as critical property law and critical environmental law.

Through the application of this theoretical framework to the bodies of international legal doctrine under investigation, several instructive themes and patterns emerge; these signal a kind of ecological unawareness that is common to both international law on food and agriculture *and* international disaster law, and are perhaps therefore representative of a deficiency afflicting the broader corpus of international law. Accordingly, they offer generative points of departure for an ecological reimagination of the field. First, the application of a critical lens foregrounding the agency, complexity and value of the non-human world to international law on food and agriculture and international disaster law reveals their striking detachment from *place* and the myriad life forms it supports. Notwithstanding that their operation is predicated upon the existence of real, material locations, these bodies of doctrine are expressed in a totalising register which collapses the heterogeneity of landscapes and the ecosystems they house into an undifferentiated ontological mass. Accordingly, they overlook the vital and unique characteristics of the nonhuman worlds to which they apply. Secondly, the analysis reveals a remarkable — though not unsurprising — degree of *anthropocentrism* in these environmentally-contingent fields; this

---

[10] Margaret Davies, *Law Unlimited: Materialism, Pluralism, and Legal Theory* (Routledge, 2017) 57 (emphasis omitted) ('*Law Unlimited*').

[11] Nicole Graham, Margaret Davies and Lee Godden, 'Broadening Law's Context: Materiality in Socio-Legal Research' (2017) 26(4) *Griffith Law Review* 480, 486.

[12] *Law Unlimited* (n 10) 72.

stems, in large part, from their minimising treatment of ecosystems as constrained and defined by their instrumental value to humans. Thirdly, the study exposes certain flaws afflicting *environmentalism* within the Western liberal imaginary: in particular, its tendency to construct the environment as something separate from and surrounding the human, and as principally (or solely) a resource with market or strategic value. This segues with the final theme: that these areas of law support an ideology of *exploitation, commodification and extraction* in respect of ecosystems and their constituent elements, foreclosing any notion that they might flourish and exist for their own sakes.

To develop its contentions, the article commences with a short description of the bodies of doctrine with which it engages. It briefly introduces the doctrinal legal method upon which it relies, which it follows with a summary of the origins and present state of international law on food and agriculture and international disaster law (Part II). The article then engages with its substantive case studies. It examines how, notwithstanding that agricultural systems are constitutive of a significant number of the world's ecosystems, the ecological character of agricultural activities is largely overlooked in the international law of food and agriculture (Part III). In this vein, the article scrutinises the inattentiveness of food security governance frameworks to ecological principles and international law's indifference to agriculture's ecological dimensions, including through an analysis of access and benefit-sharing. The case study concludes with a consideration of the abundant potential of re-imagining agriculture in line with the more environmentally realistic and favourable 'commons' theory. The article goes on to examine the position of ecosystems within international disaster law (Part IV). It undertakes a survey of their status in principal instruments in the field and examines how their relevance is circumscribed by their characterisation as protective 'green' infrastructure for human settlements. The article then posits that a more ecological rendering of ecosystems in international disaster law would foreground their vitality, value and vulnerability and would accordingly ensure greater reciprocity between these complex systems and the human world. With reference to the impacts of and lessons from the Australian Black Summer Bushfires, the final part of the case study affirms the pressing need for an ecological turn in international disaster law. Part V concludes the article.

II INTERNATIONAL FOOD LAW AND INTERNATIONAL DISASTER LAW

While the fields of international food law and international disaster law share a common underlying concern for maximising human security and development, each has a distinctive lineage and assumes a peculiar role within international law. Additionally, each takes a unique legal form and finds expression in different kinds of international instruments. To ascertain the prevailing status and characterisation of ecosystems across these focus areas, the article applies a doctrinal method. It utilises the hermeneutic function typical of this method in order to derive meaning from the text of relevant instruments that are constitutive of the fields in question.[13] The article scrutinises how their provisions attend to

[13] See, eg, Mark Van Hoecke, 'Legal Doctrine: Which Method(s) for What Kind of Discipline?' in Mark Van Hoecke (ed), *Methodologies of Legal Research: Which Kind of Method for What Kind of Discipline?* (Hart Publishing, 2011) 1, 4.

and construct ecosystems, and in what ways they protect, overlook or otherwise respond to their needs. While the doctrinal method has been criticised for its insularity and reliance on a fallacious assumption about law's internal 'perfectibility',[14] the article invokes it for a *critical* purpose: to establish how international law conceives of the ecological systems it governs and to identify the shortcomings besetting this approach. Before undertaking its substantive critique, this Part briefly charts the origins, development and substantive contours of the fields of doctrine with which it is concerned.

International law on food and agriculture, albeit connected to national agricultural law and food law and policy discourses, is quite distinct with its scale of instruments. The legal issues surrounding agriculture, such as the regulation of agricultural land, international trade in agricultural commodities and environmental issues relating to agriculture, all fall under the scope of the field. For many scholars, the development of international food and agriculture law parallels the expansion of a global food trade and the establishment of the World Trade Organization. The globalisation of food trade triggered the harmonisation of food production standards, which then triggered the need to first establish and coordinate international law actors for better protection of human, animal and plant life and health. The Food and Agriculture Organization ('FAO') is at the centre of this evolution with mostly soft law frameworks such as the 1983 *International Undertaking on Plant Genetic Resources* ('*IU*').[15] The *IU* then evolved into the 2001 *International Treaty on Plant Genetic Resources for Food and Agriculture* ('*IT*').[16] While the *IU* was not binding, the *IT* was designed to be legally binding. Its objectives are to be attained by closely linking it to the *Convention on Biological Diversity* ('*CBD*').[17] Designed as a common pool resource to facilitate access for certain crops of the world that are vital for food security, the *IT*'s objectives of conservation, sustainable use, and access and benefit-sharing are meant to promote sustainable agriculture.

---

[14] Rónán Kennedy, 'Doctrinal Analysis: The Real "Law in Action"' in Laura Cahillane and Jennifer Schweppe (eds), *Legal Research Methods: Principles and Practicalities* (Clarus Press, 2016) 21, 28.

[15] *International Undertaking on Plant Genetic Resources* (Food and Agriculture Organization Resolution No 8/83, 23 November 1983) ('*IU*').

[16] *International Treaty on Plant Genetic Resources for Food and Agriculture*, opened for signature 3 November 2001, 2400 UNTS 303 (entered into force 29 June 2004) ('*IT*').

[17] Ibid art 1(1) states:

> The objectives of this Treaty are the conservation and sustainable use of plant genetic resources for food and agriculture and the fair and equitable sharing of the benefits arising out of their use, in harmony with the *Convention on Biological Diversity*, for sustainable agriculture and food security.

Regine Andersen notes that

> the *ITPGFRA* [the *International Treaty on Plant Genetic Resources for Food and Agriculture*] is the long-awaited core instrument for implementation of its provisions as they relate to PGRFA. As such, the *ITPGFRA* is in some ways nested within the *CBD*, but as a separate regime.

Regine Andersen, *Governing Agrobiodiversity: Plant Genetics and Developing Countries* (Ashgate, 2008) 103.

Notwithstanding its historical origins,[18] disaster law is an emerging field whose development has accelerated in recent decades. Corresponding with this has been a recasting of disaster law's focus from establishing disaster response mechanisms to promoting proactive disaster risk reduction ('DRR') measures.[19] This 'paradigmatic shift' in favour of DRR,[20] which reflects the modern conceptualisation of disaster as *socially* constructed, permeates both the content and prevalence of international disaster law instruments. If the impacts of disasters can be socially controlled at least to a degree, it follows that law has a role to play in minimising the adverse effects of natural hazards upon human society. Over the past forty years, international law has increasingly come to recognise this function.[21] In the late 1980s, the United Nations General Assembly declared the 1990s to be the 'International Decade for Natural Disaster Reduction'.[22] Subsequently, the World Conference on Natural Disaster Reduction adopted the *Yokohama Strategy and Plan of Action for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation* in 1994, an initiative that was followed by the adoption of the *International Strategy for Disaster Reduction* in 1999.[23] Following these developments was the establishment of the *Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters* ('*HFA*'), a non-binding 'global roadmap'[24] that served as the central normative instrument for managing disaster risk between 2005 and 2015. The *HFA* was superseded by the *Sendai Framework for Disaster Risk Reduction 2015–2030* ('*SFDRR*'), which, compared to the *HFA*, is 'very ambitious' in its objectives and scope and more detailed in its articulation of how its aims might be realised.[25] Whereas the *HFA* 'said little about the quality' of DRR laws, the *SFDRR* is more prescriptive, for instance in encouraging an inclusive approach, both in the development and

---

18 '[E]arly attempts at treaty making can be traced back to the 1800s': Jacqueline Peel and David Fisher, 'International Law at the Intersection of Environmental Protection and Disaster Risk Reduction' in Jacqueline Peel and David Fisher (eds), *The Role of International Environmental Law in Disaster Risk Reduction* (Brill Nijhoff, 2016) vol 12, 1, 10.

19 DRR is defined as

> [t]he concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters, including through reduced exposure to hazards, lessened vulnerability of people and property, wise management of land and the environment, and improved preparedness for adverse events

United Nations International Strategy for Disaster Reduction, *2009 UNISDR Terminology on Disaster Risk Reduction* (2009) 10–11. See also Peel and Fisher (n 18) 11–2.

20 Katja LH Samuel, Marie Aronsson-Storrier and Kirsten Nakjavani Bookmiller, 'Introduction' in Katja LH Samuel, Marie Aronsson-Storrier and Kirsten Nakjavani Bookmiller (eds), *The Cambridge Handbook of Disaster Risk Reduction and International Law* (Cambridge University Press, 2019) 1, 1.

21 Peel and Fisher (n 18) 12.

22 *International Decade for Natural Disaster Reduction*, GA Res 44/236, UN GAOR, 2nd Comm, 85th plen mtg, UN Doc A/RES/44/236 (22 December 1989) 161.

23 *International Decade for Natural Disaster Reduction*: *Successor Arrangements*, GA Res 54/219, UN GAOR, 44th sess, 87th plen mtg, Agenda Item 100(b), UN Doc A/RES/54/219 (3 February 2000).

24 Samuel, Aronsson-Storrier and Bookmiller (n 20) 2.

25 Ibid.

implementation of DRR laws, and in outlining accountability measures.[26] Crucially, while recognising that 'an all-of-society and all-of-state institutional response is needed',[27] the *SFDRR* centralises the responsibility of states in successfully managing disaster risks. Consistent with this approach, the need for domestic legal measures is emphasised in the context of each of the *SFDRR*'s four priorities, which include understanding disaster risk; strengthening disaster risk governance to manage disaster risk; investing in disaster risk reduction for resilience; and enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation and reconstruction.[28]

Each of these fields — and their engagement with the natural environment — is examined in turn below.

III AN ECOLOGICAL CRITIQUE OF INTERNATIONAL LAW ON FOOD AND AGRICULTURE

Agriculture has a vital role in ecosystems' functioning and integrity. Yet, this role is acknowledged in international law to the extent it is useful for humans' food security, and it is instrumental in enhancing integration in the global food trade system.

International law on food has engaged with agriculture through an anthropocentric and individualistic perspective.[29] This has occasioned damage to ecosystem processes to an irreversible extent and exacerbated rates of global hunger.[30] Moving beyond individual human rights discourses and the issues of global food security governance, this article takes an ecological perspective on food and agriculture. It explores the idea of re-imagining agriculture as part of ecosystems. To elaborate on how this idea departs from international law's take on food and agriculture, the article then explores the objective of food security. It is contended that the dominant narrative of food security has even permeated innovative approaches that contain an awareness of the ecological impacts of modes of food production in international law.[31] The article then examines access and benefit-sharing frameworks in international law, delineating the

---

26 International Federation of Red Cross and Red Crescent Societies and United Nations Development Programme, *The Handbook on Law and Disaster Risk Reduction* (2015) 16. See, eg, *Sendai Framework for Disaster Risk Reduction 2015–2030*, GA Res 69/283, UN GAOR, 69th sess, 92nd plen mtg, Agenda Item 19(c), UN Doc A/RES/69/28 (3 June 2015) annex II paras 16, 19(e), 30(h), 36(d) ('*SFDRR*').

27 Samuel, Aronsson-Storrier and Bookmiller (n 20) 2.

28 *SFDRR* (n 26) para 20.

29 The close wording between the right to food and the concept of food security is illustrative of this point. This is also apparent in the assessment of the UN Special Rapporteur on the Right to Food who argued that food security is the corollary of the right to food: Jean Ziegler, *Report of the Special Rapporteur on the Right to Food*, UN ESCOR, 57th sess, Provisional Agenda Item 10, UN Doc E/CN.4/2001/53 (7 February 2001) 7 [15].

30 Food insecurity has been on the rise since 2014, decoupled with the pandemic from 2020 onwards. See Food and Agriculture Organization of the United Nations et al, *The State of Food Security and Nutrition in the World: Transforming Food Systems for Food Security, Improved Nutrition and Affordable Healthy Diets for All* (2021) ('*SOFI 2021*') <http://www.fao.org/state-of-food-security-nutrition/en>, archived at <https://perma.cc/HHQ2-G5T4>.

31 Here, sustainable agriculture is defined centrally around the increase of food production and the enhancement of food security: *Report of the United Nations Conference on Environment and Development* UN Doc A/CONF.151/26/Rev.1 (Vol. I) (3–14 June 1992) annex II, ch 14 ('*Agenda 21*').

anthropocentric essence of biodiversity law that keeps agriculture away from its ecological functions.

A *Agriculture: Part of the World's Ecosystems*

Agriculture has a major role in shaping the ecosystems of the world. However, it is not conventionally considered as a component of nature management and conservation. The idea of conservation relies on a certain vision in conservation biology that identifies, isolates and 'rescues' part of the world at the expense of the other parts.[32] This vision automatically embraces a certain type of food production maintained with intensive agriculture.[33] This idea is part and parcel of the anthropocentric thinking in international law on the environment, through which aesthetic and recreational resources are to be preserved, while other resources are devoted to human survival.

This section starts with the contention that agriculture is not just a hazardous activity that needs to be eliminated in certain parts of the world and concentrated in other parts, but also a healthy part of ecosystems depending on the nature of the practice. Ecosystem-based approaches and the broader transition from resource management to ecosystem management have opened up the space to consider agriculture as a component of ecosystems. Agriculture has been a healthy part of the ecosystems for centuries, comprised of land including soil biota, pollinators, predators and species including humans that support its diversity. Ecosystem-based approaches to agriculture emphasise that the agricultural component of a landscape has implications for conservation and sustainable use of biological and landscape diversity.[34]

In fact, agriculture is considered the 'single biggest determinant of changes in landscape and wildlife habitats and thus [plays] an important role in the fate of many species of fauna and flora as well'.[35] This view is mainly carried into social sciences through the 'multifunctionality of agriculture' concept.[36] According to this concept, agriculture is the 'production of *other* values beyond food and fibre, including collective goods such as cultural landscapes and heritage, biodiversity, recreational opportunities, rural settlements and food security'.[37] Geoff Wilson notes that this was considered a '"European way" of addressing agricultural issues' so it was not followed internationally.[38] For rural

---

32 See, eg, Edward O Wilson, *Half-Earth: Our Planet's Fight for Life* (Liveright Publishing, 2016).

33 Intensive agriculture refers to the large-scale industrial food production methods that rely on technological inputs and produce a certain output which is then processed into food. See also International Assessment of Agricultural Knowledge, Science and Technology for Development, *Global Report* (2009) 563–4.

34 Ivette Perfecto, John Vandermeer and Angus Wright, *Nature's Matrix: Linking Agriculture, Biodiversity Conservation and Food Sovereignty* (Routledge, 2nd ed, 2019) 23–4.

35 Peter Wathern and David Baldock, *Regulating the Interface between Agriculture and the Environment in the United Kingdom: Arenas, Actors and Strategies* (IIUG Report 87–15, 1977) 24.

36 See *Global Report* (n 33) 2.

37 Karoline Daugstad, Katrina Rønningen, Birgitte Skar, 'Agriculture as an Upholder of Cultural Heritage? Conceptualizations and Value Judgements: A Norwegian Perspective in International Context' (2006) 22(1) *Journal of Rural Studies* 67, 68 quoted in Geoff A Wilson, *Multifunctional Agriculture: A Transition Theory Perspective* (CABI, 2007) 187 (emphasis added).

38 Wilson (n 37) 182.

economies and small-scale producers, especially in the Global South, agriculture was naturally 'multifunctional' and therefore did not require reconceptualisation.[39] Yet, being at the centre of international law and global policy-making, the 'European way' of multifunctionality in agriculture appeared in the agenda of the international community.[40] Here, it was already acknowledged that '[m]ajor adjustments are needed in agricultural, environmental and macroeconomic policy, at both national and international levels, in developed as well as developing countries, to create the conditions for sustainable agriculture'.[41] From the perspective of this article's theoretical lens, the multifunctionality of agriculture debate allows various entry points for the ecological reappraisal of international agricultural law.

The first concerns the role and function of agriculture on ecosystems beyond farmlands, which are broadly referred to as the ecological functions of agriculture. The world can be considered as a matrix that consists of patches of agricultural ecosystems and natural habitats. In this ocean of patches, Ivette Perfecto and others draw a parallel between a landscape and archipelago of islands where forests, savannahs and other natural ecosystems are in between agricultural lands.[42] Biodiversity and habitat conservation in these patches depend not only on the local extinction rates but also the immigration rates between.[43] It is argued that the type of agriculture practiced will determine the immigration rate from farmland to natural habitat within the matrix;[44] 'most of the world's biodiversity is located not in those few remaining protected natural areas, but in the far more extensive landscapes in which thousands of islands of natural habitat exist in a matrix of myriad agricultural activities'.[45] On a larger scale then, the type of agriculture practiced is one of the most important determinants for conservation efforts. Law and geography scholars also emphasise this point by stating 'the task of biodiversity conservation cannot be regarded practically as the sole province of public properties such as national parks, heritage sites and state conservation areas'.[46] Indeed, the world cannot afford such luxury of dividing conservation from farming, when considering half of the world's habitable land is used for agriculture.[47] What was once seen as a

---

39 At least not yet up until the full integration of agriculture into the global trade system. See generally Michael Fakhri, 'A History of Food Security and Agriculture in International Trade Law, 1945–2017' in John D Haskell and Akbar Rasulov (eds), *New Voices and New Perspectives in International Law* (Springer, 2020) 55.

40 For the foundations of the 'European Way' of multifunctionality in agriculture in the context of Agenda 2000 tracing the 'European Model of Agriculture': see, eg, Commission of the European Communities, *Proposals for Council Regulations (EC) concerning the Reform of the Common Agricultural Policy* (Proposal No COM(1998) 158 final, 18 March 1998) 7-8.

41 *Agenda 21*, UN Doc A/CONF.151/26/Rev.1 (Vol. I) (n 31) ch 14 para 14.2.

42 Perfecto, Vandermeer and Wright (n 34) 42, 44.

43 Ibid 42–3.

44 Ibid 44.

45 Ibid 42.

46 Nicole Graham and Robyn Bartel, 'Farmscapes: Property, Ecological Restoration and the Reconciliation of Human and Nature in Australian Agriculture' (2017) 26(2) *Griffith Law Review* 221, 221.

47 See Hannah Ritchie 'How Much of the World's Land Would We Need in Order to Feed the Global Population with the Average Diet of a Given Country?', *Our World in Data* (Blog Post, 3 October 2017) <https://ourworldindata.org/agricultural-land-by-global-diets>, archived at <https://perma.cc/RYH7-HGYW>.

North–South divide of perceptions in the context of conservation and use of biodiversity, is now a global issue underpinning the inherent choices behind the globalised food system.[48] In fact, going beyond the present generations, Cameron Muir notes that '[t]he way we do modern agriculture will determine the fate of our species'.[49] Therefore, beyond the public–private dichotomy, international law must respond to the unique role of agriculture without segregating it from conservation objectives.

Second is the reappraisal of farmers' role in maintaining the ecological functions of agriculture. This is another strong illustration that this article seeks to explore on the agricultural sector's potential for conservation and sustainable use of biological and landscape diversity. This argument also comes in through the multifunctionality debates during the WTO agriculture negotiations. For example, at the core of the European Union's negotiations, a point of emphasis was that sufficient numbers of farmers must be kept on the land; there is no other way to preserve the natural environment, traditional landscapes and a model of agriculture based on the family farm as favoured by society generally.[50] In the EU context, the central theme was rural development as it was viewed as key for the multifunctional nature of agriculture.[51] The European Community understood agriculture as one of the five economic sectors having major impacts on the environment and thus highlighted the potential role agriculture can play in protecting landscapes.[52] The EU's emphasis on multifunctionality was therefore to strengthen its basis of justification for continued domestic support under subsidies.[53] Despite the connotations of ensuring an efficient European agricultural industry, the direct connection made between the role of farmers for landscape and biodiversity conservation has set an important example. Beyond the economic and political agenda surrounding the potential role of farmers, this article seeks to explore more on the role of farmers in reimagining international agricultural law through the ecological functions of agriculture.

---

48 See an early analysis about the legal environment before the UN Conference on Environment and Development, discussing the same matter for the more divided world between Global North and South: David Cooper, 'Genes for Sustainable Development: Overcoming the Obstacles to a Global Agreement on Conservation and Sustainable Use of Biodiversity' in Vandana Shiva et al (eds), *Biodiversity: Social & Ecological Perspectives* (Zed Books, 1991) 105, 106–8.

49 Cameron Muir, *The Broken Promise of Agricultural Progress: An Environmental History* (Routledge, 2014) 7.

50 But Potter also notes '[r]eferences to the need for an efficient European agricultural industry to be in a position "to compete on world markets" enjoy equal prominence with the need to defend its multifunctionality in many of the WTO papers': Clive Potter, 'Agricultural Multifunctionality, Working Lands and Public Goods: Contested Models of Agri-Environmental Governance under the Common Agricultural Policy' in Joseph A McMahon and Michael N Cardwell (eds), *Research Handbook on EU Agriculture Law* (Edward Elgar, 2015) 113, 117.

51 See European Communities Commission, *The Future of Rural Society* (Bulletin Supplement No 4/88, 29 July 1988).

52 Brian Jack, *Agriculture and EU Environmental Law* (Ashgate, 2009) 49. See also Brian Jack, 'The European Community and Biodiversity Loss: Missing the Target?' (2006) 15(3) *Review of European, Comparative and International Environmental Law* 304.

53 See also Potter (n 50) 117.

B *Food Security Governance: Inattention to Ecological Principles*

Food security 'is a concept that describes programmes focusing on the creation of institutions that organize the production and distribution of food based on *human need*'.[54] Therefore, it is a matter of international law and governance, centrally focusing on standardising food production based on human needs. The FAO deals with the governance of food and agriculture alongside other institutions, such as the World Bank and the WTO, which govern food security through matters of trade, investment, population control, intervention and rights.[55] Each of them, based on their own agenda, help shape the standardised institutional take on food security.

According to the FAO,

> [f]ood security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The four pillars of food security are availability, stability of supply, access and utilization.[56]

The FAO's approach to food security is built on the Malthusian theory, which basically contends that population growth leads to a shortage of food and that food production must be increased continuously.[57] The problem starts here with the conviction that increasing the extent and efficiency of the currently dominant model of high input agriculture will be sufficient to address the global challenges related to food security.[58] This approach is also reflected in the literature on rights-based approaches to food.[59] With this assumption at the centre, the remaining search for a solution focuses on the institutional obstacles to the right

---

54 Fakhri (n 39) 61 (emphasis added).

55 These aspects are beyond this article. For an interesting account of these different aspects in the history of Food Security: see Anne Orford, 'Food Security, Free Trade, and the Battle for the State' (2015) 11(2) *Journal of International Law and International Relations* 1, 3.

56 FAO, *Voluntary Guidelines to Support the Progressive Realization of the Right to Adequate Food in the Context of National Food Security* (2005) 5 para 15.

57 See generally Thomas Malthus, 'An Essay on the Principle of Population (Essay, 1798) <http://www.esp.org/books/malthus/population/malthus.pdf>, archived at <https://perma.cc/L5DW-C8MH>; Prateek Agarwal, 'Malthusian Theory of Population', *Intelligent Economist* (Web Page, 2 February 2022) <https://www.intelligenteconomist.com/malthusian-theory/>, archived at <https://perma.cc/U77G-JEPQ>.

58 Even the recent approaches of the FAO on conservation agriculture predominantly focuses on the potential of innovative business models in improving food production: Karim Houmy, Mayling Flores Rojas and Claude Side, *Agri-Hire in Sub-Saharan Africa: Business Models for Investing in Sustainable Mechanization* (FAO, 2021) <http://www.fao.org/documents/card/en/c/cb5071en>, archived at <https://perma.cc/Q4KB-DCY9>.

59 See also Hans Morten Haugen, 'The Right to Food, Farmers' Rights and Intellectual Property Rights: Can Competing Law Be Reconciled?' in Nadia CS Lambek et al (eds), *Rethinking Food Systems: Structural Challenges, New Strategies and the Law* (Springer, 2014) 195; Rosemary Rayfuse and Nicole Weisfelt, 'The International Policy and Regulatory Challenges of Food Security: An Overview', in Rosemary Rafuse and Nicole Weisfelt (eds), *The Challenge of Food Security: International Policy and Regulatory Frameworks* (Edward Elgar, 2012) 3; Alex McCalla, 'The Governance Challenges of Improving Global Food Security' in Jennifer Clapp and Marc J Cohen (eds), *The Global Food Crisis: Governance Challenges and Opportunities* (Wilfrid Laurier University Press, 2009) 237. Cf David Fazzino, 'The Meaning and Relevance of Food Security in the Context of Current Globalization Trends' (2004) 19(2) *Journal of Land Use and Environmental Law* 435.

to food and food security.[60] However, as this article will elucidate, this is not quite an accurate characterisation of the problem the world is facing.

Contemporary food governance is preoccupied with the economic problems created by the 'solution' of increasing production to such an extent that it is unable to deal with the ecological outcomes of the food security project. From the very anthropocentric survival perspective, food security has emerged as an international project aimed at tackling hunger by way of greater international coordination, cooperation and policy coherence with the overall goal to increase food production. It was a great success for the globalisation and standardisation of agricultural production from the 1960s and 1970s, through the Green Revolutions.[61] Yet, as the global food crisis in 2007–08 has illustrated, the project was not able to keep up with the ambition of 'ending hunger'.[62] The decades of rhetoric on 'development' that prioritised industrial production for export over local food sources made poor economies dependent on a volatile market which eventually led to the outbreak of a global crisis, triggering extreme price increases in staple foods.[63] People living at the verge of food insecurity rely on basic grains and vegetable oils, and the increasing diversion of key foods for other uses as a direct outcome of globalisation and standardisation of agricultural production has had serious impacts on those parts of the population.[64] Therefore, before assuming natural resources, in this case plant genetic resources, are managed or classified for the sole purpose of ending human hunger, it is important to acknowledge that the choices inherently made to increase the capacity of intensive agriculture are much more complex. It is imperative to remember the main lesson drawn from the 2008/2009 global food crisis at this point:

> In 2008 more food was grown than ever before in history. In 2008 more people were obese than ever before in history. In 2008 more profit was made by food

---

60 See, eg, Geoff Tansey, 'Farming, Food and Global Rules' in Geoff Tansey and Tasmin Rajotte (eds), *The Future Control of Food: A Guide to International Negotiations and Rules on Intellectual Property, Biodiversity and Food Security* (Earthscan, 2008) 3, 6; Rayfuse and Weisfelt (n 59) 13.

61 Orford (n 55) 11. For another analysis along this line of focus on the integration of the invaded Iraq in global food markets: see Ntina Tzouvala, 'Food for the Global Market: The Neoliberal Reconstruction of Agriculture in Occupied Iraq (2003–2004) and the Role of International Law' (2017) 17(1) *Global Jurist* 1.

62 See *SOFI 2021* (n 30) 10, fig 1.

63 Annie Shattuck and Eric Holt-Giménez, 'Moving from Food Crisis to Food Sovereignty' (2010) 13(2) *Yale Human Rights and Development Law Journal* 421, 423, 425–6; Jennifer Clapp and Marc J Cohen, 'The Food Crisis and Global Governance' in Jennifer Clapp and Marc J Cohen (eds), *The Global Food Crisis: Governance Challenges and Opportunities* (Wilfrid Laurier University Press, 2009) 1, 5–6. Fakhri notes that

> [t]he main idea behind the export promotion policy was that a stable, global, and liberal agricultural market would provide developing countries with the requisite amount of revenue they needed to invest in more remunerative sectors like industrial production. This plan, however, depended on active cooperation from the principal agricultural importers, namely the US and EECs, especially in what concerned the reduction of their domestic agricultural support and lowering of their agricultural tariffs

Fakhri (n 39) 67–8.

64 Fred Magdoff, 'Multiple Crises as Symptoms of an Unsustainable System' (2010) 33(2–3) *Review (Fernand Braudel Center)* 103, 105–6.

> companies than ever before in history. And in 2008 more people went hungry than ever before in history.[65]

The role international law has played in advancing food security governance and how it endorsed the standardised intensive mode of food production is not the central focus of this article.[66] Yet it is helpful in explaining why this article's critical engagement with international environmental law embraces an ecological perspective. To elucidate more on this point, the case of access and benefit-sharing in international law is examined in order to explain how the ecological functions of agriculture and the farmers' role have been undermined by international law.

C *International Law's Blindness to the Ecological Functions of Agriculture: The Case of Access and Benefit-Sharing*

In theory, access and benefit-sharing ('ABS') seeks to generate monetary benefits out of the utilisation of plants which then is used to support the conservation and sustainable use of biodiversity. It works differently in the context of the *Convention on Biological Diversity* and the *International Treaty on Plant Genetic Resources for Food and Agriculture*. While the *CBD* does not directly dedicate the monetary benefits for conservation purposes, the *IT*'s funding system utilises the funds for in situ and ex situ conservation mechanisms.[67] Yet, there are certain features that limit the effectiveness of the ABS in terms of perceiving the common goods generated through agriculture. Does the ABS system consider the ecological functions of agriculture at all? Or is it prioritising human security? This section considers the ABS system within the international legal regime, limiting its scope to the *CBD* and the *IT*.

Adopted at the Earth Summit in Rio de Janeiro in 1992, *CBD* established a bilateral negotiation system based on contractual relationships for ABS.[68] 'In practical effect, the *CBD* approved the creation of a market in genetic resources.'[69] This market is tied to the sovereign rights of states over their natural resources and is subject to national legislation.[70] Initially it was designed to remunerate the 'provider' country of the genetic resource, as custodians and

---

65 Josh Viertel, 'Why Big Ag Won't Feed the World', *The Atlantic* (Web Page, 21 January 2010) <https://www.theatlantic.com/health/archive/2010/01/why-big-ag-wont-feed-the-world/33666/>, archived at <https://perma.cc/6FMG-GXWT>.

66 For a comprehensive analysis of this: see, eg, Anne Saab, *Narratives of Hunger in International Law: Feeding the World in Times of Climate Change* (Cambridge University Press, 2019).

67 Gregory Rose, 'International Law of Sustainable Agriculture in the 21st Century: The International Treaty on Plant Genetic Resources for Food and Agriculture' (2003) 15(4) *Georgetown International Environmental Law Review* 583, 593–7, 607. On the *IT*'s funding system, see Christine Frison, *Redesigning the Seed Commons: Law and Policy for Agrobiodiversity and Food Security* (Routledge, 2018) 107–11.

68 See *CBD* (n 2) art 15. See also Rose (n 67) 606.

69 Susan H Bragdon, *The Evolution of Rights and Responsibilities over Agricultural Biodiversity* (Quaker United Nations Office, 2017) 20. For an economic analysis: see Joseph Henry Vogel, 'From the "Tragedy of the Commons" to the "Tragedy of the Commonplace": Analysis and Synthesis through the Lens of Economic Theory' in Charles R McManis (ed), *Biodiversity and the Law: Intellectual Property, Biotechnology and Traditional Knowledge* (Earthscan, 2007) 115, 119.

70 *CBD* (n 2) art 15(1).

developers of plant genetic resources.[71] What is problematic, especially in the case of agriculture, is that the contractual arrangements based on bilateral negotiations capture the economic value of the genetic resource but not the *other* non-tradable values that generate common goods. This problem is more apparent when viewed with art 8(j) of the *CBD*:

> Each contracting party shall …:
>
> (j) Subject to its national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge, innovations and practices …

This section acknowledges the relevance of some of the non-tradable values and their ecological functions generated through agricultural practices. Article 8(j) innovatively states that the traditional knowledge and lifestyle relevant for the conservation and sustainable use of biodiversity are included within the scope of conservation, with the necessary national legislation in place. The intention is to conserve traditional and threatened landraces, especially species that are reliant on traditional cultural practices.[72] Yet, the recommendatory and ambiguous tone raises issues about the extent to which the bilateral negotiation process can take benefits which arise from the use of such non-tradable values into account. How the contracting parties of ABS should take art 8 into consideration is left unaddressed in the *CBD*.

Another problematic feature of the ABS system in terms of the ecological functions of agriculture is the definition of country of origin. Article 15(3) states that the contracting party must be the country of origin of genetic resources or the party that has acquired the genetic resources in accordance with the *CBD*. Yet defining the country of origin neglects the accumulated human services towards genetic diversity, in the case of crop plants.[73] Given the central role of farmers, there is no strict provider in contractual terms, but custodians of the crops who cultivate and develop them throughout centuries.[74] Sabrina Safrin notes that

> [t]he open system that predated the expansion of intellectual property rights and sovereign rights over genetic material accounts for the widespread distribution and preservation of crops and crop varieties away from their places of origin. The

---

[71] Susan H Bragdon, 'Global Legal Constraints: How the International System Fails Small-Scale Farmers and Agricultural Biodiversity, Harming Human and Planetary Health, and What to Do About It' (2020) 36(1) *American University International Law Review* 1, 16 ('Global Legal Constraints').

[72] Adrian Phillips and Sue Stolton, 'Protected Landscapes and Biodiversity Values: An Overview' in Thora Amend et al (eds) *Protected Landscapes and Agrobiodiversity Values* (Kasparek Verlag, 2008) 8, 8–9.

[73] Jack R Harlan, *Crops and Man* (American Society of Agronomy, 2nd ed, 1992) xii, cited in Andersen (n 17) 19.

[74] Andersen (n 17) 141.

> maintenance of genetic material in multiple countries and locations has benefited all.[75]

The proprietary function of 'country of origin' does not correspond to the ecological function of 'versatility' of crops.

The *IT* is a response to the limitations that the *CBD* bilateral system has for crop plants.[76] It was adopted in November 2001 by the FAO and came into force in June 2004.[77] Its two overall objectives are sustainable agriculture and food security.[78] The conservation, sustainable use and fair and equitable sharing of plant resources are all pillars of the two overall objectives. Attainment of these objectives are tied to the Treaty's collaboration with the FAO and the *CBD*.[79] Indeed, plant genetic resources in general and especially plant genetic resources used for food and agriculture are unique types of natural resources that suffer from underuse rather than being overused.[80] Acknowledging this threat, art 5 introduces an integrated management approach and art 6 of the *IT* specifies measures to enhance sustainable use of plant genetic resources. However, in line with the *CBD*, states' sovereign rights on natural resources and their right to development are prioritised over the integrated management approach.[81] Although social and environmental concerns are integrated in a non-exhaustive way, through supporting farmers and local communities, and diversifying in situ and ex situ conservation methods, the discretion is left to states' national legislation.[82]

The *IT* establishes the most developed means to regulate crop plants through a model of common pool resource management called the multilateral system ('MLS'). Through the MLS, certain plants that are key for food security are made available for access and benefit-sharing.[83] The objectives of the Treaty rely heavily on transactional mechanisms to govern benefit-sharing mechanisms. Despite establishing the multilateral system of ABS, the *IT* shares the similar basis of benefit-sharing with the *CBD*.[84] Access to the multilateral system is tied to a similar contractual basis through a standard material transfer agreement.[85]

The *IT* expands proprietary rights on the genetic elements of crop plants by relying on a contractual basis for access and benefit-sharing. Such proprietary rights are designed to increase productivity and growth in the agriculture

---

75 Sabrina Safrin, 'Hyperownership in a Time of Biotechnological Promise: The International Conflict to Control the Building Blocks of Life' (2004) 98(4) *American Journal of International Law* 641, 670–1, quoted in Christine Frison, *Redesigning the Global Seed Commons: Law and Policy for Agrobiodiversity and Food Security* (Routledge, 2018) 71.

76 See generally *Report of the Sixth Meeting of the Conference of the Parties to the Convention on Biological Diversity*, 6th mtg, UN Doc UNEP/CBD/COP/6/20 (27 May 2002) annex I 91.

77 *IT* (n 16).

78 Ibid art 1.

79 See ibid art 1.2. See also *CBD* (n 2) art 1.

80 Michael A Heller, 'The Tragedy of the Anticommons: Property in the Transition from Marx to Markets' (1998) 111(3) *Harvard Law Review* 621, cited in Frison (n 75) 74.

81 *IT* (n 16) art 5.1.

82 See ibid arts 5, 6, 9, 12.

83 The *IT* (n 16) lists 64 crops in Annex I which account for almost 80 % of the world's supply of food.

84 Bragdon, 'Global Legal Constraints' (n 71) 17.

85 Ibid.

sector.[86] Therefore, the non-tradable values generated through agriculture are left at the periphery of the system. How does the *IT* do this? By providing facilitated access to any natural and legal persons under the jurisdiction of any contracting party.[87] Indeed, one of the core norms inherited from the *IU* is that the world's most vital resources for food and agricultural production have to be made available by the parties. This obligation was put under scrutiny with the reinterpretation of the 'common heritage of mankind' principle in light of the acknowledged sovereign rights of states.[88] Nonetheless, it has not changed the core obligation to provide access for certain crops provided under the list in the *IT*'s Annex.[89] An interesting limitation to the obligation to facilitate access to plant genetic resources for food and agriculture ('PGRFA') is the discretion left to those natural and legal persons when sharing the crop plants in their inventory with the MLS.[90] This way the *IT* becomes part of the global institutional structure that utilises the common pool resource system to bolster private property rights on plants for food and agriculture.[91] This in turn transforms agriculture to the advantage of the large-scale intensive agriculture industry.[92]

Using the same commodifying tool that clearly prioritises enhancing productivity over biodiversity protection reproduces the exploitative relationships that brought the state of crop biodiversity to its current levels. Further questions arise based on the design of the MLS and the degree of freedom it has provided for natural and legal persons. The facilitated access and benefit-sharing mechanism is one of the most developed tools of *IT* while there are many other aspects of the objectives waiting to be developed to reach sustainable agriculture and food security. Indeed, biodiversity is just one element of the complex set of ecological functions agriculture initiates. Nonetheless the dominant focus on biodiversity is carried forward to the extent this enhances its transferability. This focus fuels discrepancies between public and private stakeholders and leads to the failure to attend to the non-tradable values generated through agriculture.

D *Reimagining International Food Law: Ecological Functions of Agriculture as Commons*

Critical environmental and property law, both of which are routinely inflected by new materialism, seek to describe, expose and question the dominant philosophy of development that informs international law's understanding of the environment. This central narrative is framed generally as 'market

---

86 Graham and Bartel (n 46) 222.

87 *IT* (n 16) art 12.2.

88 *Annex 3 to the International Undertaking on Plant Genetic Resources*, FAO Res 3/91, 26th sess, (25 November 1991).

89 The *IT* (n 16) provides facilitated access to all plant genetic resources for food and agriculture that are listed under Annex I. These are listed as food crops, legume forages, grass forages and other forages.

90 Juliana Santilli, *Agrobiodiversity and the Law: Regulating Genetic Resources, Food Security and Cultural Diversity* (Earthscan, 2012) 134.

91 See Rajshree Chandra, *The Cunning of Rights: Law, Life, Biocultures* (Oxford University Press, 2016) 102, 116–8.

92 Christine Frison's stakeholder analysis of the *IT* sheds light into the influence of agricultural industry lobby groups in the making of the *IT*: Frison (n 75) 139–66.

environmentalism' which strives to combine the targets of economic growth, efficiency and environmental conservation, 'through establishing private property rights, employing markets as allocation mechanisms and incorporating environmental externalities through pricing'.[93] One way to read this narrative is through the growing enclosure of the commons and its compliance and conflation to individualised rights.[94] The other way to read the narrative of market environmentalism is to understand how the normative environmental narrative is deployed to legitimise the transformation of the commons. In the case of agriculture, conservation efforts and sustainable resource management strategies internalise the humanitarian notion of feeding the world's population through endorsing the assertion that agriculture will have to be intensified. This vision of conservation can be correlated with the remnants of the Malthusian theory. Such awareness also invites questioning of the way in which commons, ie communally held rights in natural resources, are put into use for conservation and sustainable use. For critical scholars, while it is not unimaginable that the idea of property can be modified in order to better protect the environment, they find it problematic that in the post-*CBD* era, various institutional designs like the common pool resource systems are also put in use to advance private property rights.[95]

Revisiting the tragedy of the commons thesis further sheds light on the foundations of market environmentalism that has kept creeping through the justifications for property. Garrett Hardin's vision of 'commons' leads to an expansion of 'res nullius' at the expense of 'res communis'.[96] According to Kathryn Milun, commons are doomed to be overused and eventually become 'empty space[s]' of nature ready to be owned.[97] If certain resources are non-excludable but rivalrous (as in the case of biogenetic resources), innovative legal tools must be arranged for these resources to become excludable. Hardin's tragedy thesis rests on two expected disastrous outcomes of 'commons': underinvestment and overuse.[98] Environmental law certainly builds on these liberal foundations by responding to ecological crises with a continuous promotion of technology and innovation against underinvestment, and by restriction of common use against overuse. Indeed, property was/is a distributive

---

93 Karen Bakker, 'Commons versus Commodities: Debating the Human Right to Water' in Farhana Sultana and Alex Loftus (eds), *The Right to Water: Politics, Governance and Social Struggles* (Earthscan, 2012) 19, 20.

94 Commons refers to the environment as both physical resources and our accumulated knowledge in managing the relationship between humans and nature: Chandra (n 91) 70. See also Klaus Bosselmann, *Earth Governance: Trusteeship of the Global Commons* (Edward Elgar, 2015) 55–6.

95 Chandra refers to this as 'the moral economy of the commons': Chandra (n 91) 69. This point will be further elaborated under Part III(C).

96 Garrett Hardin, 'The Tragedy of the Commons' (1968) 162(3859) *Science* 1243. Hardin's vision is criticised for its loose approach to what 'commons' encapsulates, and which norms apply to it: Christian Siefkes, 'The Commons of the Future: Building Blocks for a Commons-Based Society' (Article, Heinrich Böll Stiftung North America) <https://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=44ACF5D82E299F73FA21EED4FE925B3E?doi=10.1.1.526.2660&rep=rep1&type=pdf>, archived at <https://perma.cc/6JUV-QVB9>.

97 Kathryn Milun, *The Political Uncommons: The Cross-Cultural Logic of the Global Commons* (Ashgate, 2011) 53–5 cited in Chandra (n 91) 70–1.

98 Chandra (n 91) 71–2.

mechanism meant to solve the problem of scarcity.[99] Yet, Hardin's tragedy thesis, along with the environmentalist arguments supporting innovative proprietary rights on biogenetic resources, has failed to bring a solution to the growing biotic impoverishment of the world.

Critical environmental law and legal geography scholars question the assumption that the economic significance of property will automatically serve environmental conservation and more efficient use of natural resources.[100] They underscore how, manifesting a Hohfeldian rights analysis, property has become a mere abstraction within the Western legal imaginary, divorced from its material and spatial underpinnings. Property in Western law is thus described as 'dephysicalised': proprietary rights principally function to define and limit the entitlements of other persons, as the material object of property recedes into legal insignificance.[101] For Nicole Graham, the inauguration of this 'paradigm of placelessness' has produced a body of property law which is 'maladapted' to local conditions and thus perpetuates 'unsustainable people–place relations'.[102] Yet, as Graham notes eloquently, there are other possible ways of connecting law with place, not necessarily dichotomously, but as part of an ecological network. Scrutinising the standardised paradigms for human security and their impacts on ecosystems allows one to come to terms with the broader understanding that 'the particularities of land, of place, determine the material limits of what is ultimately, authoritatively and sustainably local law and economy'.[103]

An example from the Brazilian Amazon that challenges the paradigm of placelessness to the core is the *Movimento dos Trabalhadores Rurais Sem Terra* (the movement of landless rural workers) ('MST'). Founded in 1984, the movement has led a bottom-up agrarian reform through which the farmers and rural workers resisted the high land concentration in Brazil.[104] While it has a long history enmeshed with the social and political dynamics of Amazon deforestation, what is interesting in this context is the logic the movement has built for responsible land reform. The lands targeted by rural workers were at the midst of the matrix made of myriad agricultural activities and nature reserves.[105] This is why it is imperative to have a closer look at the engagement of a movement known as the largest rural social movement in the world with environmental NGOs to enhance the ecological function of agricultural practices. One particular collaboration with the Institute of Ecological Research (*Instituto*

---

99 Wendy McElroy, *The Debates of Liberty: An Overview of Individualist Anarchism, 1881–1908* (Lexington Books, 2003) 88.

100 Nicole Graham, *Lawscape: Property, Environment, Law* (Routledge, 2010) 6–7 ('*Lawscape*').

101 See Nicole Graham, 'Dephysicalised Property and Shadow Lands' in Robyn Bartel and Jennifer Carter (eds), *Handbook on Space, Place and Law* (Edward Elgar, 2021) 281, 282.

102 Graham, *Lawscape* (n 100) 2, 4–5, 8.

103 Ibid 7.

104 See Angus Wright and Wendy Wolford, *To Inherit the Earth: The Landless Movement and the Struggle for a New Brazil* (Food First Books, 2003). For a comprehensive examination of land concentration in Latin America: see OXFAM *Unearthed: Land, Power and Inequality in Latin America* (Report, November 2016) <https://oi-files-d8-prod.s3.eu-west-2.amazonaws.com/s3fs-public/file_attachments/bp-land-power-inequality-latin-america-301116-en.pdf>, archived at <https://perma.cc/7SJG-Y59C>.

105 These are the patches of lands that are resembling archipelagos and oceans: Perfecto, Vandermeer and Wright (n 34) 42.

de Pesquisas Ecológicas, 'IPE') has contributed to the forming of an agricultural matrix that conserves biodiversity at the landscape level.

In the Atlantic forest region in Brazil, in the *Pontal do Paranapanema* area of Western São Paulo state, where the IPE was founded, there is a designated forest reserve which has gradually become fragmented with large-scale agricultural investments between 1960–90. During the 1990s, the MST began to push for the redistribution of land in this area and then some of the land was expropriated as a consequence of public land reform.[106] The land acquired through the reform was the main source for survival for the local people.[107] This is how initially the movement began to look into alternative forms of agriculture. Beginning from the early 1990s, members started assessing what kind of agriculture would best serve the interests of the members.[108] By 2001, the MST was openly committed to carrying out agroecological farming.[109] While organising some of the land takeovers by landless people, the MST also became an ally of the IPE since both were interested in diversification and advancing the ecological function of agriculture. The alliance later gained recognition as the Corridors for Life project, the idea of advancing the agricultural matrix for its ecological functions brought together two 'enemies' that supposedly carry competing interests.[110] This collaboration, while educating the workers that work the land on agroecology, also teaches the conservation community that conservation can go beyond the embedded Malthusianism.[111] Laury Cullen notes that selected land dedicated to agroecological practices has become ecological corridors or 'stepping stones' that increase connectivity between forest fragments, and eventually lead to well-connected or even growing forests.[112] This way, rural livelihoods have become an active contributor to the diversified genetic exchange between patches and habitats that are preserved.[113]

This experience can also help reimagine international law on agriculture. International law applicable to crop plants, while being concerned with the conservation of biodiversity and supportive of sustainable agricultural practices in theory, does not entirely reject the theory of the 'tragedy of the commons'. Consequently, it feeds into the already existing imbalance in favour of individualised proprietary rights against commons-based management. The problem is not the use of proprietary rights in order to establish facilitated access *per se*, rather the assumption that communally held rights as the commons is only useful to the extent they provide the basis for the next step, which is allowing the genetic material to be modified and become appropriable individually as a new variety. The ABS system is particularly built on

---

106 Laury Cullen, 'Corridors for Life: Improving Livelihoods and Connecting Forests in Brazil' in Jodi Hilty et al (eds), *Guidelines for Conserving Connectivity through Ecological Networks and Corridors* (IUCN, 2020) 96, 96.

107 Perfecto, Vandermeer and Wright (n 34) 145–6.

108 Ibid 145.

109 Ibid 146.

110 Cullen (n 106) 96–7.

111 Perfecto, Vandermeer and Wright (n 34) 164.

112 Cullen (n 106) 96–7.

113 The results of the project show that a significant amount of forest has been restored while rural properties including individually owned lands have become ecological corridors and agroecological stepping stones: ibid.

contractual arrangements to exchange the proprietary rights on plants in order to capture the potential economic value of genetic resources rather than advancing the ecological functions of agriculture. Within this international legal framework, the potential to acknowledge a role for agriculture in conservation that goes beyond regional and national guidance on policy making is very limited. While international biodiversity law is relatively more advanced in this regard, intangible elements such as traditional knowledge still suffer from the embedded assumptions based on the tragedy of commons. By embracing the same approach that turns ecosystems into homogenous categories, international law posits a 'placeless' view of ecosystems: one which fails to recognise the ways in which distinctive local epistemologies contribute to their functioning and survival.

As it can be better viewed from the Brazilian example, agroecology is a relatively early instance of the transition from natural resource management to ecosystem management in the context of agriculture.[114] It is acknowledged that agroecology has the potential to improve food production both in terms of quality and quantity while allowing farmers to decide on their level of reliance on industrial inputs.[115] Indeed, agroecology is the recognition of 'custom-made' food production systems by the science of ecology.[116] It operates based on a bottom-up approach, building on the existing traditional knowledge, smallholder farmers and local varieties of crops.[117] FAO views agroecology as part of the 'transformative process towards "holistic" approaches', which embraces indigenous and traditional knowledge.[118] The 'Ecological Approaches' component of the FAO Symposium on Agroecology has emphasised that greater quality and quantity of food production do not have to rely on chemical inputs and can also be achieved by agroecological practices such as re-introducing biological complexity (ie plant diversity and perennial cover) and improving soil health.[119]

The High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security ('HLPE') identifies 13 principles of agroecology in their 2019 report, 'combining and reformulating principles from

---

114 Altieri refers to this transition as a natural resource management approach for the poor: Miguel A Altieri, 'Agroecology: The Science of Natural Resource Management for Poor Farmers in Marginal Environments' (2002) 93 *Agriculture, Ecosystems and Environment* 1, 1.

115 Food and Agriculture Organization of the United Nations, *The Future of Food and Agriculture: Trends and Challenges* (2017) 49 ('*Trends and Challenges*').

116 Food and Agriculture Organization of the United Nations, *International Symposium on Agroecology for Food Security and Nutrition* (Final Report, 18–19 September 2014) 1–2 ('*International Symposium*') <https://www.fao.org/documents/card/en/c/4e651e91-f75d-4599–9dde-f70e3f26e1de/>, archived at <https://perma.cc/B22H-VGYD>.

117 Altieri (n 114) 2.

118 *Trends and Challenges* (n 115) xi.

119 *International Symposium* (n 116) 3–4.

three different sources'.[120] These principles are enlightening in the sense that they illustrate the potential benefits of agroecosystems that are not fixated on intensive production and tradable values extracted from agriculture. The common themes start with diversification.[121] Diversification refers to scale, place and species that are considered in agriculture as opposed to standardisation which is the common outcome of intensive agriculture. For example, soil health, biodiversity, as well as animal health, are taken as principles that strengthen resilience.[122] Both resources and the enabling environment are acknowledged as part of these principles. While this approach directly improves food security, it innovatively does so using a less anthropocentric lens. Furthermore, since it takes the social and cultural context side by side with biodiversity and the enabling environment, agroecology stands in contrast with the dominant discourse of market environmentalism, which conceptualises social and cultural elements only through 'externalities'. This approach naturally limits the need for more innovative proprietary rights that are used to incorporate environmental externalities. Therefore, it weakens the ideology of exploitation and commodification for the sake of the environment. Emile Frison, the co-lead of the UN Food Systems Summit Solution Cluster on Agroecology reiterates that:

> It starts from this conviction that only increasing the extent and efficiency of the currently dominant model of high input agriculture will not be sufficient to address the global challenges we face and that there is an urgent need for bold action to transform food systems. The transformation required … involves a paradigm shift towards diversified agroecological systems guided by the 13 principles of agroecology, as defined by the high-level panel of experts on food security and nutrition …[123]

Because agroecological systems intensify knowledge and labour rather than capital and technology, they do not attract the investors of intensive

---

120 High Level Panel of Experts on Food Security and Nutrition, *Agroecological and Other Innovative Approaches for Sustainable Agriculture and Food Systems that Enhance Food Security and Nutrition* (Report No 14, July 2019) 39 <https://www.fao.org/family-farming/detail/en/c/1263887/>, archived at <https://perma.cc/9D7W-S5VR> ('HLPE'). The following citations are the relevant three sources used by the HLPE. FAO's 10 elements: diversity; co-creation and sharing of knowledge; synergies; efficiency; recycling; resilience; human and social values; culture and food traditions; responsible governance; circular and solidarity economy: Food and Agriculture Organization of the United Nations, *The 10 Elements of Agroecology: Guiding the Transition to Sustainable Food and Agricultural Systems* (Report, 2018) ('*The 10 Elements of Agroecology*') <https://www.fao.org/agroecology/overview/overview10elements/en/>, archived at <https://perma.cc/G2FK-E4KS>; CIDSE, *The Principles of Agroecology: Towards Just, Resilient and Sustainable Food Systems* (April 2018) <https://www.cidse.org/wp-content/uploads/2018/04/EN_The_Principles_of_Agroecology_CIDSE_2018.pdf>, archived at <https://perma.cc/DR4S-RHAD>; CI Nicholls, MA Altieri and L Vazquez, 'Agroecology: Principles for the Conversion and Redesign of Farming Systems' (2016) 5(1) *Journal of Ecosystems and Ecography* 010:1–8, 4.

121 Also see the FAO's 10 elements: *The 10 Elements of Agroecology* (n 120).

122 HLPE (n 120) 41.

123 PAEPARD, 'Agroecology for Food Systems Transformation' (YouTube, 7 August 2021, 00:38:04–00:38:49) <https://youtube.com/watch?v=WTQQ8tNMqNY>.

agriculture.[124] Yet, still many stakeholders, including farmers and scientists, see them as the only viable pathway for future food production. One of the reasons for this firm belief is the scientific evidence on the nutrient quality of traditional agricultural biodiversity that has become more established in recent years.[125] There is substantial evidence that diversification of agricultural biodiversity at species and varieties level contributes to food security significantly.[126] However, because the assessment of food security at the global level has only recently begun to consider aspects concerning the ecosystems, it is likely to take more time for these findings to become visible.[127]

Further in connection to the critique of the ABS regime that constitutes the backbone of international environmental law in the context of agriculture, the Brazilian example illustrates clearly that commons in the form of public lands or extra-legal forms of land entitlement can enhance the ecological functions of agriculture. Communal forms of ownership do not have to become a step on the way for individual proprietary rights in order to enhance sustainable agriculture and food security.

IV AN ECOLOGICAL CRITIQUE OF INTERNATIONAL DISASTER LAW

International disaster law evinces a clear concern for the preservation — and, at times, regeneration — of ecosystems. However, to the extent that it grants them protection, this body of law is motivated by distinctly anthropocentric and instrumental objectives. Consequently, international disaster law overlooks and fails to make provision for the intrinsic worth of ecosystems and their constituent parts. This Part of the article examines this phenomenon and contends that it has the potential to leave non-human life forms profoundly susceptible to the adverse

---

124 The HLPE report notes that both public and private investment in agroecology is 'severely limited'. Naturally, most of the agricultural research has focused on "Green Revolution" technologies within the last 50 years: HLPE (n 120) 48. See also Michel P Pimbert and Nina Isabella Moeller, 'Absent Agroecology Aid: On UK Agricultural Development Assistance Since 2010' (2018) 10(2) *Sustainability* 505, cited in HLPE (n 120) 48. Also, FAO points that only 8% of their 2018–19 work has contributed to agroecological approaches: Food and Agriculture Organization of the United Nations, *Transition towards Sustainable Food and Agriculture: An Analysis of FAO's 2018–2019 Work Plan* (Report, 2018) <http://www.fao.org/3/I9007EN/i9007en.pdf>, archived at <https://perma.cc/56D9-FFB8>.

125 An accessible example is the data provided by Biodiversity for Food and Nutrition Initiative (BFN) which has brought together the nutrient composition of underutilised traditional plants in the countries it operates, along with detailed information on the factors that drive or hinder local people to eat them on a regular basis. Prioritised species are listed for each country and regularly updated so that research can be disseminated and mainstreamed: 'Provide Evidence', *Biodiversity for Food and Nutrition* (Web Page) <http://www.b4fn.org/what-works-on-the-ground-global-case-studies/provide-evidence/>, archived at <https://perma.cc/HZ9F-LFUJ>.

126 See *Global Report* (n 33) 385–6. See also Miguel A Altieri et al, 'Agroecology and the Design of Climate Change-Resilient Farming Systems' (2015) 35 *Agronomy for Sustainable Development* 869, 875–9; Cheikh Mbow et al, 'Food Security' in Valérie Masson-Delmotte et al (eds), *Climate Change and Land: An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems* (January 2020) 437, 468.

127 For example, the Global Food Security Index has primarily categorised the issues of food affordability, availability, quality and safety with a recent 2020 addition of the 'Natural Resources and Resilience' category into the main index: *Global Food Security Index 2022* (Report, 2022) <https://fabric-staging.economist.com/hubs/gfsi2022/reports/Economist_Impact_GFSI_2022_Global_Report_Sep_2022.pdf>, archived at <https://perma.cc/MMD4-Q6VV>.

effects of hazards. The Part commences with an analysis of how the terms of the *Sendai Framework for Disaster Risk Reduction* and other complementary international instruments engage with questions of ecological conservation and protection; in particular, the article examines the nature of ecosystem-based approaches to disaster risk reduction and their role in reducing human communities' exposure to hazards. Without diminishing the legitimacy and utility of these functions, the article goes on to critique the exclusion of ecosystems' inherent interests from the ambit of international disaster law. Eschewing Cartesian dualisms that have permeated the Western legal imaginary, it argues that these non-human ontological forms are not simply passive and inert examples of 'green' infrastructure which serve human ends and possess no independent moral significance; instead, they are vital and agentic and are endowed with their own purpose and worth. On this basis, the article contends that ecosystems should not only be safeguarded to the extent that they assume a role in attenuating human disaster risk, but should enjoy law's protection before, during and after disasters as innately valuable natural entities. To substantiate its argument, the article scrutinises the plight of ecological communities, plants and animals in the catastrophic 2019–20 Australian Black Summer Bushfires. It contends that the disaster brought the irreplaceable nature of ecosystems into sharp focus, foregrounding the need for international disaster law to undergo an ecological evolution and enhance the protection it confers upon the non-human world.

A *The Status of Ecosystems in International Disaster Law*

Over the past decade, the role and utility of ecosystem-based approaches to disaster risk reduction ('Eco-DRR') have garnered substantial attention across international legal fora. According to Karen Sudmeier-Rieux et al, the effective use of such strategies 'entails combining natural resources management approaches, or the sustainable management of ecosystems' with other crucial components of disaster management, including emergency planning, and mitigation and prevention measures.[128] Similarly, Marisol Estrella and Nina Saalismaa define Eco-DRR as 'the sustainable management, conservation and restoration of ecosystems to reduce disaster risk, with the aim of achieving sustainable and resilient development'.[129] They observe that, unlike engineering-based disaster risk mechanisms, such as floodwalls, which are sometimes referred to as 'gray infrastructure',[130] Eco-DRR measures — or 'green infrastructure' — afford benefits even in the absence of a disaster occurring; they represent a 'cost-effective, no-regret investment'.[131] Examples of these kinds of

---

128 *Disasters and Ecosystems: Resilience in a Changing Climate* (United Nations Environment Programme, 2019) 59.

129 Marisol Estrella and Nina Saalismaa, 'Ecosystem-Based Disaster Risk Reduction (Eco-DRR): An Overview' in Fabrice G Renaud, Karen Sudmeier-Rieux and Marisol Estrella (eds), *The Role of Ecosystems in Disaster Risk Reduction* (United Nations University Press, 2013) 26, 30.

130 See, eg, Ayumi Onuma and Takahiro Tsuge, 'Comparing Green Infrastructure as Ecosystem-Based Disaster Risk Reduction with Gray Infrastructure in Terms of Costs and Benefits under Uncertainty: A Theoretical Approach' (2018) 32 *International Journal of Disaster Risk Reduction* 22.

131 Estrella and Saalismaa (n 129) 30.

valuable, hazard-mitigating ecosystems are abundant and diverse: mountain forests and hillside vegetation protect against soil erosion and landslides; wetlands and floodplains control flooding and slow the release of wet season floods during periods of drought; coastal ecosystems such as mangroves reduce the intensity of storm surges and tidal waves, and provide a buffer against sea-level rise; and drylands host moisture-retaining trees, shrubs and grasses which temper the impacts of drought and reduce desertification, while at the same time supporting prescribed fuel reduction burns and the establishment of effective fire breaks.[132]

Although communities have understood the role ecosystems play in reducing their exposure to hazards for centuries, as in the case of the protective forests of Switzerland that have long been known to protect settlements from rockfalls and avalanches,[133] the formal integration of these assets into disaster risk reduction policy is a relatively recent phenomenon. The *HFA* contained limited provision for the preservation of ecosystems and their contribution to the reduction of populations' exposure to hazards. It referred only twice to the imperative of protecting ecosystems, nominating as priorities for action that states and other actors '[e]ncourage the sustainable use and management of ecosystems, including through better land-use planning and development activities to reduce risk and vulnerabilities' and

> [i]mplement integrated environmental and natural resource management approaches that incorporate disaster risk reduction, including structural and non-structural measures, such as integrated flood management and appropriate management of fragile ecosystems.[134]

However, since the adoption of the *HFA*, the international community has increasingly come to appreciate the substantial, and even central, role of ecosystems in achieving successful DRR. Such a shift manifested palpably in the terms of the *HFA*'s successor: the non-binding *SFDRR*, which has taken the *HFA*'s place as the 'principal internationally accepted instrument for building resilience to disasters and engaging in DRR' from 2015 through to 2030.[135]

In reflecting upon lessons learned during the *HFA* era, the *SFDRR* articulates the need to preempt and manage disaster risk with a view to protecting 'persons, communities and countries, their livelihoods, health, cultural heritage, socioeconomic assets and *ecosystems*' as factors that are vital to human communities' resilience.[136] To this end, the instrument affirms the need to foster transboundary collaboration to 'enable policy and planning for the implementation of ecosystem-based approaches with regard to shared resources', including within river basins and along coastal areas.[137] It also foregrounds the

---

132 Ibid 34–5.

133 See, eg, Fabrice G Renaud, Karen Sudmeier-Rieux and Marisol Estrella, 'The Relevance of Ecosystems for Disaster Risk Reduction' in Fabrice G Renaud, Karen Sudmeier-Rieux and Marisol Estrella (eds), *The Role of Ecosystems in Disaster Risk Reduction* (United Nations University Press, 2013) 3, 6.

134 *Report of the World Conference on Disaster Reduction*, UN Doc A/CONF.206/6(16 March 2005) 15–16 (citations omitted).

135 Rosemary Lyster, *Climate Justice and Disaster Law* (Cambridge University Press, 2015) 241.

136 *SFDRR* (n 26) annex II para 5 (emphasis added).

137 Ibid annex II para 28(d).

imperative of ensuring the 'sustainable use and management of ecosystems', and calls for the incorporation of DRR considerations into environmental and resource management frameworks.[138] At a more granular level, the Framework identifies how particular ecosystems and landscapes can increase human communities' exposure to hazards: it confirms the importance of integrating disaster risk assessment and hazard mapping into the management of amongst other things, 'mountains, rivers, coastal flood plain areas, drylands, wetlands and all other areas prone to droughts and flooding, including through the identification of areas that are safe for human settlement', while also conserving ecosystem functions that temper or mitigate those risks.[139] In this vein, to improve actors' understanding of disaster risk, the instrument also confirms the pressing need to deploy and enhance 'baselines and periodically assess disaster risks, vulnerability, capacity, exposure, hazard characteristics and their possible sequential effects at the relevant social and spatial scale on ecosystems.'[140]

While these provisions of the *SFDRR* evince what might be described as a progressive concern for the dual role of ecological systems in engendering and, crucially, *attenuating* disaster risk, the patent focus is on the implications of this for human safety and survival.[141] Consequently, the measure of protection extended by the *SFDRR* to ecosystems is coextensive only with that necessary to secure certain outcomes for human populations; the instrument thus marginalises their peculiar characteristics and requirements, and intrinsic interests. It should be acknowledged that, at points, the *SFDRR* characterises ecosystems as *themselves* susceptible to the adverse effects of hazards. For example, it affirms that '[m]ore dedicated action needs to be focused on tackling underlying disaster risk drivers, such as … unsustainable uses of natural resources, [and] *declining* ecosystems'.[142] While this concession about ecological fragility is significant, the degradation of ecosystems is conceptualised as a source of communities' vulnerability to hazards rather than an ill in itself. Accordingly, to the extent that the *SFDRR* acknowledges the sensitivity of ecosystems, the benefit the instrument delivers them is limited: they are conceptualised through the prism of human interest and are expressed in the language of environmental instrumentalism, affording little recognition of ecosystems' distinct, independent worth and vulnerability, however profound this may be.

Although the *SFDRR* offers an instructive example of anthropocentrism at the interface of ecosystem management and the mitigation of disaster risk, this phenomenon is not limited to disaster law: rather, it is evident in instruments and initiatives that engage with questions of disaster policy within the broader corpus of international environmental law. Notably, the International Union for the Conservation of Nature has developed a 'Safe Havens' programme to investigate

---

138 Ibid annex II para 30(n).

139 Ibid annex II para 30(g).

140 Ibid annex II para 24(b).

141 See also Ilan Kelman, 'Categorising Animals and Habitats in Disaster-Related Activities' (2021) 36(3) *Australian Journal of Emergency Management* 57, 60.

142 *SFDRR* (n 26) annex II para 6 (emphasis added).

how Protected Areas,[143] spaces which often serve as critical biodiversity reservoirs, 'can be better managed' to accommodate the objectives of human disaster risk reduction and climate change adaptation.[144] Similarly, several Conferences of the Parties ('COP') to the *CBD* have emphasised the capacity for ecosystems to dampen and attenuate the effects of natural hazards on human communities. For example, the decision of the COP 12 to the *CBD* in October 2014 on the *Convention on Biological Diversity* in 2014 makes provision for Eco-DRR. It also acknowledges that, while ecosystems and biodiversity are themselves vulnerable to the effects of climate change and disasters, their conservation, restoration and sustainable use 'can play a significant role in climate-change mitigation and adaptation, combating desertification and disaster risk reduction'.[145] The decision of the COP 13, held two years later, contained comparable reference to the role of ecosystems in tapering disaster risk, while explicitly referring to 'potential … synergies' between the objectives of the *CBD* and those of the *SFDRR*.[146] In a similar register, a resolution of the COP 12 to the Ramsar *Convention on Wetlands* in June 2015 urged states party to 'integrate wetland-based disaster risk reduction and management' into their domestic frameworks, while cautioning that States should 'ensure disaster risk planning does not compromise the internationally important values and ecological character of Ramsar Sites'.[147]

This last example from the Ramsar COP illustrates points of dissonance — and, as this article contends, critical gaps — in the conceptualisation of ecosystems by international environmental law in the context of DRR. On the one hand, the discipline of Eco-DRR frames ecosystems as natural, cost-effective ways to temper humans' disaster vulnerability. However, as articulated in the introduction to this article, certain aspects of international environmental law also recognise the need to protect ecosystems in a more holistic sense, an imperative that is largely animated by an awareness of their centrality to human survival and a concern for ensuring sustainable development. This explains the qualifications upon the use of ecosystems for disaster management purposes affirmed by the Ramsar COP 12 identified above. While the notion that ecosystems are imbued with intrinsic value is perhaps more evident in or aligned with this second approach, both understandings are impoverished in one crucial way: they centralise the human in their appraisal of ecosystems' worth, and fail to recognise the independent, inherent value of ecological systems and their

---

143 'A protected area is a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long term conservation of nature with associated ecosystem services and cultural values': 'Protected Areas: About', *IUCN* (Web Page) <https://www.iucn.org/theme/protected-areas/about>, archived at <https://perma.cc/28CX-NCJU>.

144 Radhika Murti, Ali Raza Rizvi and Camille Buyck, 'Introduction' in Radhika Murti and Camille Buyck (eds), *Safe Havens: Protected Areas for Disaster Risk Reduction and Climate Change Adaptation* (IUCN, 2014) v, v.

145 *Report of the Twelfth Meeting of the Conference of the Parties to the Convention on Biological Diversity*, 12th mtg, UN Doc UNEP/CBD/COP/12/29 (17 October 2014) 109.

146 *Report of the Conference of the Parties to the Convention on Biological Diversity on its Thirteenth Meeting*, 13th mtg, UN Doc CBD/COP/13/25 (17 December 2016) 33.

147 *12th Meeting of the Conference of the Parties to the Convention on Wetlands*, Res XII.13 (1–9 June 2015) paras 14, 15 <https://www.ramsar.org/sites/default/files/documents/library/cop12_resolutions_pdf_e.pdf>, archived at <https://perma.cc/UP7E-9H6Z>.

constitutive life forms. This article does not take issue with technologies and policies that contemplate reliance on ecosystems to support disaster management ambitions in respect of human populations. Rather, it contends that, by affording ecosystems only a vicarious kind of protection from hazards — one which is filtered through an anthropocentric lens — international disaster law leaves unaddressed threats to non-human ecologies and entities which, while appreciable, fall short of compromising or are unrelated to the integrity of those systems crucial to human survival. A comprehensive enumeration of the ways in which the international community might revise its normative framework in respect of ecosystems is beyond the scope of this article. However, the section that follows offers a point of departure: it examines the generative and disruptive potential of applying broadly new materialist frames to the reimagination of ecosystems in international disaster law.

B *Attending to Ecological Materiality: Recasting Ecosystems as Intrinsically Vital, Valuable and Vulnerable in order to Foster Reciprocity*

As acknowledged above, critical literatures adopting a broadly new materialist orientation offer an instructive and innovative lens through which to appraise how Western liberal legal imaginaries — including those underpinning international law[148] — engage and respond to the natural world. Drawing upon insights from a rich tapestry of new materialist perspectives, including legal feminism, legal geography, and critical property and environmental law, which are united by their common attentiveness to worldly and nonhuman matter, this section of the article considers how the integration of new materialist perspectives into international disaster law might offer a starting point for a radical, salutary reform of the field's relationship with ecosystems and the diverse ontological forms they comprise. After explaining how these approaches contest core aspects of Western legality, it outlines the coordinates of an ecologically-responsive body of international disaster law: one which would conceptualise ecosystems as complex entities as inherently vital, valuable and vulnerable, and therefore as deserving of a direct legal status that recognises their independent, innate needs. The article goes on to explain how such a reconfiguration of ecosystems in the international legal imaginary might inaugurate a welcome kind of reciprocity between humans and the environment, whereby ecosystems and the life forms they sustain are not perceived solely as means of enhancing human outcomes in disasters but as worthy of protection in their own right.

As the new materialist thesis is anchored by a concern for questioning and reversing the marginalisation of nonhuman matter and its characterisation as meaningless, it poses profound structural challenges to Western liberal systems of law. Davies explains that the field is animated by the view that 'epistemology has swamped ontology' and that, to redeem theory's equilibrium, 'we need to

---

148 See, eg, Brian-Vincent Ikejiaku, 'International Law is Western Made Global Law: The Perception of Third-World Category' (2013) 6(2–3) *African Journal of Legal Studies* 337, 338; Antony Anghie, 'International Human Rights Law and a Developing World Perspective' in Scott Sheeran and Nigel Rodley (eds), *Routledge Handbook of International Human Rights Law* (Routledge, 2013) 109, 109–11.

critique the object, and re-value ontology'.[149] For Davies, one of new materialism's most radical features is its tendency to collapse dualisms entrenched within the Western liberal schema, notably including the delineation between the realms of nature and culture.[150] Provocatively, new materialist perspectives counter Western understandings of law as an abstract, universal and reified structure that is wholly separate from the 'daily interactions'[151] that enact it. They also defy the Cartesian subject-object divide, which is central to Western legal thought and emphasise law's co-constitutive — rather than unidirectional — relationship with the natural world.[152] A radical departure from Eurocentric legality, new materialist perspectives are closely aligned with Indigenous epistemologies, in which law is often understood to be inextricable from and constituted by the places and beings it governs.[153] As Christine Black writes, 'within Indigenous legal traditions individuals are patterned into Nature, not outside of Nature; and with that patterning comes responsibilities. The *logos* of law is the land'.[154] Given the emphasis they lend to the natural world, new materialist approaches craft an instructive lens through which to critique and re-envision the status of ecosystems in international disaster law. Three promising directions are considered below.

First, the incorporation of new materialist insights into the field of international disaster law would beneficially call attention to the vitality and dynamism of non-human ecologies. By impugning the validity of any firm demarcation between humans and other worldly matter, these perspectives enable features of the biotic — and even abiotic — worlds to be re-conceived, not as static, inert and lifeless, but as vital, agentic and intractable. In her theory of vibrant matter, Jane Bennett distinguishes between objects and things; as the latter have independent agency, they are unbounded and undefined by the human.[155] In this respect, Bennett provides an account of the lively and affective qualities of non-human matter she encountered in a storm drain: '[i]n this assemblage, objects appeared as things, that is, as vivid entities not entirely reducible to the contexts in which (human) subjects set them, never entirely exhausted by their semiotics'.[156] Engaging with Bennett's work, Davies argues that, despite being relegated by law to a lesser ontological category, 'objects can have their own "vitality" and capacity for activity, relationality, and resistance'.[157] Christopher Bear applies a similar critique in his examination of the ecological blindness of a European directive designed to improve bathing water quality, which he argues erroneously constructs animals as blameworthy

---

149 Davies, *Law Unlimited* (n 10) 42.
150 Ibid 57.
151 Ibid 9, 42–3.
152 Ibid 42–3.
153 See Graham, Davies and Godden (n 11) 499; Estair Van Wagner, 'Putting Property in its Place: Relational Theory, Environmental Rights and Land Use Planning' (2013) 43 *Revue générale de droit* 275, 280, 311.
154 CF Black, 'On Lives Lived with Law: Land as Healer' (2016) 20 *Law Text Culture* 164, 165.
155 Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Duke University Press, 2010) xvi, 2, 5, 13.
156 Ibid 5 (emphasis omitted).
157 Davies, *Law Unlimited* (n 10) 65.

polluters of local coastlines. According to Bear, the directive is out of touch with, and thus ill-adapted to, the ecological realities of the region: its simplistic policy of blaming animals for polluting beaches and natural pools disregards the 'vital materialities of bathing waters — including the interplay of bacteria, sunlight, wind and currents'.[158] The *SFDRR*, and cognate instruments which support international law's policy of Eco-DRR, could be said to fall into similar error. While acknowledging the fragility and volatility of ecosystems, the documents characterise their 'thing-power'[159] through a reductive, instrumentalist lens, overlooking their intrinsic vitality and peculiar needs. By attending to the active, lively and agential characteristics of ecosystems, international disaster law might provide a more accurate rendering of them and accordingly provide for them in an apposite, targeted way.

Second, as new materialist approaches collapse any firm normative distinction between subjects and objects, even though they may retain the binary in some form, their integration into international disaster law promises to elevate the legal value ascribed to non-human matter, including ecosystems. Although Davies recognises the centrality of the subject-object dichotomy to existing Western legal doctrines, particularly those pertaining to property, she critiques it as ill-adapted and misguided on the grounds that law's subjects — humans — are fully 'enmeshed in the physical world' of law's objects.[160] For Davies, what is required is not the conferral of personhood on non-humans, but a radical re-imagination and re-description of legal subjects and objects which, in line with Indigenous epistemologies, recognises humans as 'part of, but not central to, world ecology and its meaningful materiality'.[161] Anna Grear also takes up law's tendency to bifurcate the world into subjects and objects, and the place of the environment in this binary. She observes that, etymologically, 'environment' derives from the French terms for 'surrounds': the origins of the word thus '[point] relentlessly to an underlying conceptualization of "the environment" as object surrounding an assumed, privileged (and frequently invisibilized) pivot point: "the subject"'.[162] For Grear, this distinction has profound, material consequences. Hegemonic epistemologies have consistently denied the value of, and withheld legal protections from, those non-paradigmatic subjects 'consigned to the marginal, the feminine, the relatively "primitive"'[163] throughout history which has had 'violent historical results for the blood and bone realities of bodily life on this planet'.[164] David Delaney similarly contends that the concept of the "animal" differentiates humans from all other non-human life forms; this legitimises 'relations of the most extreme forms of domination'[165] while

---

158 Christopher Bear, 'Tracing Bacterial Legalities: The Fluid Ecologies of the European Union's Bathing Water Directive' in Irus Braverman (ed), *Animals, Biopolitics, Law: Lively Legalities* (Routledge, 2016) 79, 92.

159 Bennett (n 155) 3.

160 Margaret Davies, 'Material Subjects and Vital Objects: Prefiguring Property and Rights for an Entangled World' (2016) 22(2) *Australian Journal of Human Rights* 37, 38.

161 Ibid 47.

162 Anna Grear, 'Foregrounding Vulnerability: Materiality's Porous Affectability as a Methodological Platform' in Andreas Philippopoulos-Mihalopoulos and Victoria Brooks (eds), *Research Methods in Environmental Law* (Edward Elgar 2017) 3, 4.

163 Ibid 8.

164 Ibid.

165 David Delaney, *Law and Nature* (Cambridge University Press, 2009) 218.

rejecting animals' ontological diversity and the 'profound heterogeneities among them'.[166] Engagement with these perspectives has the potential to enhance international disaster law's ecological literacy. If it were to value natural, non-human material forms outside the prism of human interest and without reference to their status as legal objects, international disaster law might recognise ecosystems for their distinct capabilities,[167] and grant a holistic, targeted kind of legal protection that responds to and accommodates these. The adoption of a new materialist perspective also promises to correct the fallacious assumption evident in the *SFDRR* and other instruments supporting Eco-DRR, that human beings are somehow ontologically separate from and dominant over the ecosystems that surround them. Such a view is evident in para 5 of the *SFDRR*, which principally implores actors to protect 'persons, communities and countries', a mandate that is followed by the subsidiary imperative of conserving '*their* … ecosystems'.[168] By overlooking their inextricable entanglement[169] and mutual vulnerability, this notion of human exceptionalism imperils both humans and non-humans alike.

This dovetails with the third way in which new materialist perspectives might enhance international disaster law's ecological attunement: through foregrounding the innate vulnerability of ecosystems and their constituent life forms. In this respect, feminist critiques of liberal legal subjectivity and its blindness to fleshy, physical bodies are instructive. As Maneesha Deckha observes, a 'signal contribution of feminist theories broadly conceived is their focus on the body, its discursive formation as well as its material registers'.[170] Although the thrust of feminist theory was originally impugning and dismantling gender-based distinctions, it has progressively come to take 'embodied difference' as its foundational principle.[171] At its intersection with legal doctrine and scholarship, feminism has thus taken issue with law's indifference to 'marginalized bodies',[172] particularly those which diverge from liberal descriptions of the archetypal legal subject. Such feminist influence permeates Martha Fineman's theory of the vulnerable subject, which is predicated upon the fragility of the human body and serves as a sharp counterpoint to the autonomous

---

166 Ibid 217.

167 See, eg, Rosemary Lyster, 'A Capabilities Approach to Defining Climate Disasters' in Jacqueline Peel and David Fisher (eds), *The Role of International Environmental Law in Disaster Risk Reduction* (Brill Nijhoff, 2016) 73, 88–90; David Schlosberg, 'Climate Justice and Capabilities: A Framework for Adaptation Policy' (2012) 26(4) *Ethics and International Affairs* 445, 446–7; Martha C Nussbaum, 'The Capabilities Approach and Animal Entitlements' in Tom L Beauchamp and RG Frey (eds), *The Oxford Handbook of Animal Ethics* (Oxford University Press, 2011) 228, 237; Ani B Satz, 'Animals as Vulnerable Subjects: Beyond Interest-Convergence, Hierarchy, and Property' in Martha Albertson Fineman and Anna Grear (eds), *Vulnerability: Reflections on a New Ethical Foundation for Law and Politics* (Ashgate, 2013) 171, 191.

168 *SFDRR* (n 26) annex II para 5 (emphasis added). For further discussion relating to overcoming the human/non-human and nature/climate divides in the context of Eco-DDR, see also Kelman (n 141) 60, citing Philippe Descola, *Beyond Nature and Culture* (University of Chicago Press, 2013).

169 Andreas Philippopoulos-Mihalopoulos, 'Critical Environmental Law as Method in the Anthropocene' in Andreas Philippopoulos-Mihalopoulos and Victoria Brooks (eds), *Research Methods in Environmental Law* (Edward Elgar, 2017) 131, 147.

170 Maneesha Deckha, *Animals as Legal Beings: Contesting Anthropocentric Legal Orders* (University of Toronto Press, 2020) 124.

171 Ibid.

172 Ibid.

and rational subject of Western law.[173] While the latter is presumed to be autonomous and rational — a 'competent social actor'[174] — Fineman contends that humans are more accurately described as *vulnerable* subjects of law.[175] For Fineman, what generates this condition of vulnerability is the fact of *embodiment*, which gives rise to a persistent threat of harm.[176]

Fineman's description of the vulnerable subject is peculiarly human; however, Grear illustrates the paradigm's applicability to the environment. Rather than conceptualising vulnerability in distinctively human terms, Grear refers to it as 'materiality's porous affectability': the capacity of worldly things dwelling together on earth in 'creaturely continuity'[177] to influence one another adversely or beneficially. The characterisation of this 'radically open ecology of entanglements'[178] as legal subject eschews the bounded, individualistic liberal archetype, and forces environmental law to become responsive to plural epistemologies: those produced by the 'incarnate, contingent and vulnerable knowing by vulnerable bodies in constant intra-action'.[179] As the inherent vulnerability of these material 'assemblages' is explicitly foregrounded, environmental law changes its 'epistemic "receptor sites"'.[180] Instead of taking the 'centre' — the liberal, human subject — as its point of departure, a materially informed, ecologically aware environmental law that is responsive to vulnerability starts in the 'middle' or in the 'midst' to include 'previously unconsidered constituencies of material meaning-making'.[181] Such a profound and far-reaching reconceptualisation of vulnerability — one which is not centered exclusively upon the human but is informed and responsive to the experiences of diverse ontological forms — would dramatically alter the approach to ecosystems within international disaster law. As it departs from an understanding of them as insensate phenomena whose utility is limited to their role in human disaster risk reduction, the application of Grear's finessed version of Fineman's vulnerable subject to ecosystems in international disaster law could have the desirable effect of reframing their legal status, thereby supporting the establishment of crucial safeguards for their own survival and integrity in the face of hazards.

The re-imagination of ecosystems as vital, valuable and vulnerable within international disaster law in these ways would favourably enhance reciprocity between humans and the non-human — and inhuman — entities they dwell alongside. Departing from the exploitative and extractivist assumptions pervading liberal conceptualisations of the environment, several new materialist interventions contemplate a salutary, productive kind of human–non-human

---

173 Martha Albertson Fineman, 'The Vulnerable Subject: Anchoring Equality in the Human Condition' (2008) 20(1) *Yale Journal of Law and Feminism* 1 ('Anchoring'); Martha Albertson Fineman, 'The Vulnerable Subject and the Responsive State' (2010) 60(2) *Emory Law Journal* 251 ('Responsive').

174 Fineman, 'Anchoring' (n 173) 10.

175 Ibid 11.

176 Ibid 9; Fineman, 'Responsive' (n 173) 267.

177 Grear (n 162) 3, 14.

178 Ibid 19.

179 Ibid 21.

180 Ibid 26.

181 Ibid.

coexistence, and a relationship between these spheres that is characterised by mutual benefit, stewardship and care. For Davies, Western property law doctrines centralise the owner's right to exploit the material object of property, excluding the possibility that duties may be owed directly to that object. Against this notion of property relations as abstract, disconnected and unidirectional, and the related conceptualisation of objects of property rights as inert and devoid of intrinsic value, Davies avows the promise of a more mutually constructive, 'stewardship'-like arrangement that would effect a 'rebalancing of rights with responsibilities': as she explains, '[s]tewardship implies that an owner holds a duty to current and future users of a resource, and in a sense, a duty to the resource itself'.[182] In this regard, Davies draws from Indigenous epistemologies, in which there is 'reciprocity' between 'people owning land and land owning people'.[183]

Similarly, while Andreas Philippopoulos-Mihalopoulos contends that human beings cannot be distinguished from contiguous worldly phenomena,[184] he acknowledges a need for a kind of human exceptionalism: one which recognises that humans are 'not the same as other material and immaterial bodies that populate the planet'.[185] This promotes accountability for anthropogenic impacts on the world. To echo Kathryn Yusoff, '[i]t is a case of negotiating human exceptionalism rather than trying to do away with it all together, because that elision negates the power and responsibility that comes with … our humanism (the *ontological debt*)'.[186] Conceptualising ecosystems only as means of attenuating humans' disaster risk establishes an asymmetrical relationship characterised by largely unidirectional benefit. However, the inauguration of a material understanding of these ecosystems as vital, valuable and vulnerable, and accordingly as worthy of independent protection within international disaster law holds substantial promise. It would support a markedly more mutually beneficial, reciprocal relationship between humans and the ecosystems they dwell alongside, and would go some way to satisfying the former's 'ontological debt', to use Yusoff's words.[187] With reference to a recent example of catastrophic ecological damage, the following section considers the need for such a paradigm shift within international disaster law.

C *The Black Summer Bushfires: A Visceral Call for an Ecological Turn in International Disaster Law*

That international disaster law — and the domestic regimes that are normatively influenced and informed by it — must take greater account of ecosystems' intrinsic interests, peculiar needs and profound vulnerabilities of

---

182 Margaret Davies, 'Persons, Property and Community' (2012) 2(2) *feminists@law* 1, 16.

183 Margaret Davies, 'Can Property Be Justified in an Entangled World?' (2020) 17(7) *Globalizations* 1104, 1110.

184 Philippopoulos-Mihalopoulos (n 169) 136.

185 Ibid (emphasis omitted), citing Anna Grear, 'Deconstructing *Anthropos*: A Critical Legal Reflection on "Anthropocentric" Law and Anthropocene "Humanity"' (2015) 26(3) *Law and Critique* 225.

186 Kathryn Yusoff, 'Geologic Subjects: Nonhuman Origins, Geomorphic Aesthetics and the Art of Becoming *In*human' (2015) 22(3) *Cultural Geographies* 383, 400–1 (emphasis altered), quoted in Philippopoulos-Mihalopoulos (n 169) 136–7.

187 Yusoff (n 186).

ecosystems finds support in the ecological devastation wrought by the 2019–20 Australian Black Summer Bushfires. The catastrophe directly killed 33 human individuals[188] and close to a further 450 as a result of smoke inhalation. One of the worst (on some metrics, the single worst of all) bushfire disasters to afflict the biodiverse continent of Australia, the Black Summer Bushfires razed tens of millions of hectares of land, prompting its designation as an 'ecological disaster' by a Royal Commission established in response to the catastrophe.[189]

The affected regions comprised native forests and other grasslands which provided valuable wildlife habitat and accommodated significant ecosystems;[190] indeed, no Australian bushfires on record have been known to have incinerated a comparable quantum of forest and woodland habitat within a single season.[191] In the path of the fires stood six World Heritage properties, including the Gondwana Rainforests of Australia in the state of Queensland, of which more than half burnt, and the Blue Mountains in New South Wales, which suffered fire damage to a staggering 82% of its area.[192] The fires also tore through landscapes protected as national heritage and affected at least five Ramsar Wetlands, of which three were consequently deemed to be at 'high-risk' of protracted ecological damage.[193] More generally, a Senate Inquiry into lessons learned in connection with the disaster observed that a 'significant proportion of the land and ecosystems affected by the 2019–20 bushfires had not previously been impacted by fire', and noted concerns that some ecosystems will have suffered permanent, indelible change.[194] A community of fewer than 100 Wollemi Pines — a critically endangered plant species from the Jurassic Period believed to be extinct until the 1990s — narrowly survived the fires after an urgent rescue mission was initiated to protect them; this involved the deployment of fire retardant, irrigation of the surrounding area and aerial water drops to preventatively extinguish approaching fire fronts.[195] The Wollemi Pines represent a rare instance of success in Australia's defense against the fires' ecological impacts.

While the effects on flora and fauna continue to be quantified, ecologists have projected grave, enduring deleterious impacts on populations and species, and on Australia's overall biodiversity.[196] Given the fires' immense geographical spread, they affected the habitat range of more than 330 threatened species and 37 threatened ecological communities protected under federal environmental law.[197] It is expected that a notable subset of these — many of which were not

---

188 *Royal Commission into National Natural Disaster Arrangements* (Report, 28 October 2020) 5 ('*Royal Commission*').
189 Ibid 353 [16.2].
190 Ibid.
191 Ibid 354 [16.11].
192 Ibid.
193 Ibid 355 [16.11].
194 Senate Finance and Public Administration References Committee, *Lessons to be Learned in Relation to the Australian Bushfire Season 2019–2020* (Interim Report, October 2020) 89 [5.2]–[5.3].
195 *Royal Commission* (n 188) 358.
196 Ibid 355 [16.12].
197 Ibid 355 [16.13].

previously threatened — will have their conservation status upgraded,[198] with the Australian Government already having identified 119 animal species in need of urgent management intervention. The majority of these species suffered damage to 30% or more of their known range during the fires and for many species, this percentage was much greater.[199] As one group of environmental scientists found, the majority of the range and population of between 20 and 100 threatened species would have burned during the fires, drawing at least 20 already imperilled species substantially closer to extinction.[200] One report commissioned by the World Wide Fund for Nature Australia ('WWF') into the impacts of the fires on koalas found that the fire season caused populations of the slow-moving species in the sampled region to decline by a breathtaking 71%.[201]

Distressingly, a separate WWF-sponsored report found that approximately *three billion* wild native vertebrate animals in total would have been in the paths of the fires, including mammals, reptiles, birds and frogs.[202] That study characterised 'species' ability to flee or shelter from fire' and 'availability of suitable habitat, including unburnt refuges' as two of five direct factors affecting wildlife mortality during the fires.[203] It went on to attribute poor habitat availability and connectivity to the removal of native vegetation, and observed that 'fragmented habitat and cleared land' engender conditions conducive to the survival of invasive species, impeding native animals' capacity to recover in the aftermath of the disaster.[204] It is well established that large-scale, intensive agricultural enterprise — the focus of this article's first case study — represents a major driver of land clearance activities.[205] That this kind of prolific, anthropogenic landscape change not only has the potential to compromise biodiversity and long-term food security (as examined above), but also contributed to the devastating outcomes suffered by wild animals over the course of the Black Summer Bushfires, underscores the urgency with which international law, as a *whole*, must embrace a more ecologically consonant approach to conceptualising and protecting the natural environment.

The *SFDRR* is an aspirational, norm-diffusing, framework document. As such, it is not designed to contain guidance at the level of granularity required to inform targeted policy interventions in response to impacts as specific as those arising from the Black Summer Bushfires. In any event, the perplexing

---

198 Ibid.

199 Wildlife and Threatened Species Bushfire Recovery Expert Panel, *Provisional List of Animals Requiring Urgent Management Intervention* (Report, 20 March 2020) 1.

200 John Woinarski et al, 'A Season in Hell: Bushfires Push at Least 20 Threatened Species Closer to Extinction', *Australian National University: ANU College of Science* (Web Page, 13 January 2020) <https://science.anu.edu.au/news-events/news/season-hell-bushfires-push-least-20-threatened-species-closer-extinction>, archived at <https://perma.cc/3XHV-XNX4>.

201 Stephen Phillips, Kirsten Wallis and Amanda Lane, 'Quantifying the Impacts of Bushfire on Populations of Wild Koalas (*Phascolarctos Cinereus*): Insights from the 2019/20 Fire Season' (2021) 22(1) *Ecological Management and Restoration* 80.

202 WWF Australia, *Impacts of the Unprecedented 2019–2020 Bushfires on Australian Animals* (Report, November 2020) 5.

203 Ibid 7.

204 Ibid 39.

205 See, eg, Millennium Ecosystem Assessment, *Ecosystems and Human Well-Being: Current State and Trends* (Island Press, 2005) 96; Food and Agriculture Organization of the United Nations, 'FRA 2020 Remote Sensing Survey' (FAO Forestry Paper No 186, 2022) 47.

ecological outcomes outlined above are, in many ways, the product of manifold, compounding points of dysfunction afflicting humanity's relationship with the natural world, which came into stark focus during the disaster.[206] It follows from this that the sound management of ecosystems in the immediate disaster context is not, without more, a panacea for their plight. Nonetheless, it is clear from a brief survey of the environmental impacts of the Black Summer Bushfires that, to the extent that it serves a function at the intersection of ecosystems and disasters, international law's role is by no means exhausted by the promotion and facilitation of Eco-DRR. That is, it should move beyond simply perceiving ecosystems as a natural source of hazard-mitigating infrastructure which promises to enhance safety outcomes for human communities, to make more nuanced and thorough provision for the independent needs of the plants, animals and other non-human matter they house. Accordingly, animated by a new materialist perspective that attends to the vital, valuable and vulnerable qualities of ecosystems, international disaster law should proactively endorse measures aimed at reducing their exposure and susceptibility to hazards, and enhancing their resilience in the face of catastrophic disruption and capacity to recover from it. The field should develop in the manner contended not only to ensure human security, but for the direct sake and benefit of these complex, vital networks of non-human life.

The recommendations and observations of the Australian Royal Commission in response to the Black Summer Bushfires illustrate the pressing need for such an ecologically responsive shift within the policy subtending international disaster law. One of the major shortcomings in Australian conservation policy revealed by the catastrophe was the paucity of data on the densities, distribution and conservation status of plant and animal species across the continent. The Commission urged governments to develop streamlined processes for the collection and dissemination of such data.[207] It also found that closing 'many important knowledge gaps on wildlife and ecosystem populations and distribution' would require 'ongoing environmental monitoring and research'.[208] As the Commission observed, such data would enable governments to make more substantial provision for 'environment and heritage assets in emergency planning and response': by supplying crucial insights about the location and needs of species and ecological communities, the information would inform and strengthen measures aimed at ensuring these populations' survival during disasters and recovery in their aftermath.[209] Separately, the Royal Commission stressed the urgent imperative of developing best-practice wildlife response and rehabilitation capabilities, and integrating these into formal, mainstream disaster management frameworks.[210]

It must be acknowledged that the Royal Commission also turned its mind to the practice of managing or relying on ecosystems to mitigate disaster risk. In

---

206 See generally WWF Australia (n 202). See also Ashleigh Best, 'The Legal Status of Animals: A Source of their Disaster Vulnerability' (2021) 36(3) *Australian Journal of Emergency Management* 63.

207 *Royal Commission* (n 188) 363 Recommendation 16.1.

208 Ibid 363 [16.48].

209 Ibid 357 [16.20], [16.22].

210 Ibid 357 [16.20], 360–1 [16.34]–[16.35].

particular, it recognised that there is an opportunity to integrate traditional, ecologically sensitive Indigenous land and fire management techniques into mainstream disaster policy in Australia.[211] For example, it identified the crucial role of fuel reduction burns and the associated creation of strategic fire breaks in containing bushfires in Northern Australia.[212] As the Commission affirmed, traditional fire management approaches such as these seek 'to protect, maintain, heal and enhance healthy and ecologically diverse ecosystems, productive landscapes and other cultural values'; they are not exclusively focused on the narrow objective of hazard reduction.[213] As this characterisation suggests, Indigenous fire management practices assume a more reciprocal and less unidirectionally exploitative posture in relation to the natural environment. The emphasis placed upon these by the Royal Commission makes palpably evident the relative ecological impoverishment of Western disaster management techniques. In these ways, the painful experiences and lessons emerging from the Black Summer Bushfires affirm that the reductive conceptualisation of ecosystems as mere protective infrastructure within international disaster law is inadequate; instead, as the catastrophe illustrates, they should be protected not only for the benefits they confer upon human communities, but for their independent, intrinsic worth as vital, valuable and vulnerable networks that contain and sustain diverse life forms.

V CONCLUSION

The genealogies, roles and content of international law on food and agriculture and international disaster law are distinct. Despite this, they both share a common dependence on functioning ecosystems for the realisation of their objectives, the vast majority of which are focused on protecting the interests of humans and guaranteeing their security. As a result of this preoccupation, these fields fail to recognise and make provision for the intrinsic characteristics, capabilities and needs of the very ecosystems with which they interact. As the article claims, this blindness to the rich and dynamic ontologies comprising ecological systems afflicts each of the surveyed areas of doctrine and has potential wider applicability beyond these to the broader corpus of international law. To ascertain the current state of each of the bodies of law in question, the article applied a doctrinal method to the text of those instruments which exemplify the construction and status of ecosystems within the relevant fields of international law. It then established the contours and major claims of the broadly new materialist theoretical framework upon which it would rely to undertake its critique. Next, the article applied the relevant insights from new materialist theory to the areas of doctrine to reveal their inattentiveness to the peculiarities and needs of the dynamic, vibrant, material characteristics of ecosystems. The case study on the international law of food and agriculture revealed a pervasive tendency to conceptualise agricultural systems in terms of their delivery of benefits to human communities, and an associated propensity to overlook their ecological character and broader non-human environmental

---

211 Ibid 396 Recommendation 18.1, Recommendation 18.2.
212 Ibid 390 [18.26].
213 Ibid 387 [18.1].

functions. Subsequently, the case study on international disaster law uncovered the field's circumscription of ecosystems' value to their role in contributing to disaster risk reduction for human communities and failure to recognise and provide for their unique features, capabilities and vulnerabilities. While the examples and arguments proffered by each case study were diverse, they gesture at similar themes: a comparable indifference to the peculiarities of *place* and the individuated qualities of the life forms it supports; an *anthropocentric* orientation and narrow concern for the realisation of human interests; an understanding of *environmentalism* which posits the human as separate from — rather than situated in — the natural world, the latter understood as a resource for strategic or market gain; and relatedly, an *exploitative and extractivist* posture in relation to non-human ontological forms. If international law on food and agriculture and international disaster law are to become ecologically attuned and responsive, these represent some instructive starting points for reform.