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Introduction

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It is an undeniable fact that the number, intensity, and impact of diverse forms of ‘natural’ and ‘human-made’ disasters are on the increase. For instance, during the period 2005 to 2015, it was estimated that more than 700,000 people lost their lives, over 1.4 million were injured, a further 23 million were rendered homeless, and a staggering 144 million people (between 2008 and 2012) were displaced by disasters. Overall, more than 1.5 billion people were affected during this ten-year period alone, with a disproportionate effect on more vulnerable groups as well as poorer communities and nations.¹ The extent of the resultant economic losses are difficult to accurately discern, but as a gauge to the potential impact of such disasters, in 2017 SwissRe estimated that the annual average global cost of disasters had risen to a staggering USD 337 billion (USD 193 billion of which represented uninsured losses), the vast majority of which (USD 330 billion) was attributable to ‘natural’ disaster events, with the remaining costs (USD 7 billion) linked to ‘human-made’ disasters. Major sources of human and economic loss were North Atlantic hurricanes, a record year for wildfires, as well as heavy flooding events.² In all probability, the true scale of the economic and non-economic consequences attributable to all forms of disaster is probably much higher, with a general expectation that the current upward trend is set to continue.

In response, there has been an increased realisation with accompanying action by the international community, especially since the late 1980s and 1990s,³ of the necessity to shift its primary focus away from disaster response, as had previously been the case, to disaster prevention and mitigation including through improved preparedness. The first major instrument reflecting this paradigmatic shift was the Hyogo Framework for Action 2005–2015 (HFA). Following multiple stakeholder engagement, the HFA identified five priorities for action, with underlying guiding principles to progress these, aimed at reducing disaster losses through increased resilience,

¹ United Nations Office for Disaster Risk Reduction (UNISDR), Sendai Framework for Disaster Risk Reduction 2015–2030 (18 March 2015) A/CONF.224/CRP.1, para. 4.

² Swiss Re, ‘At USD 144 billion, global insured losses from disaster events in 2017 were the highest ever, sigma study says’ (Zurich, 10 April 2018). Available at www.swissre.com/media/news_releases/nr20180410_sigma_global_insured_losses_highest_ever.html (accessed 12 July 2018).

³ Key instruments were the United Nations General Assembly (UNGA), Resolution 44/236, International Decade for Natural Disaster Reduction (22 December 1989) A/RES/44/236, Annex: ‘International Framework of Action for the International Decade for Natural Disaster Reduction’; UN, Yokohama Strategy and Plan of Action for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation, adopted at the World Conference on Natural Disaster Reduction, Yokohama, Japan 23–27 May 1994; and, the International Strategy for Disaster Reduction of 1999. See UNGA, Resolution 54/219, International Decade for Natural Disaster Reduction: successor arrangements (3 February 2000) A/RES/54/219.

whether in the form of human lives and livelihoods or other forms of economic, social, environmental, and so forth losses.⁴ Reaching agreement on the HFA as a global roadmap was a significant achievement, though some of its goals and principles were modest and lacked specificity in places.

In contrast, the HFA's successor, the Sendai Framework for Disaster Risk Reduction 2015–2030 (Sendai Framework),⁵ is very ambitious in terms of its sought outcomes,⁶ extensive in its scope,⁷ and more detailed in terms of how its identified goals may be realised, including through its detailed articulation of 17 guiding principles for its progression.⁸ Significantly, it reflects a global shift in terms of its identified priorities from not simply seeking to better *manage disasters*, but also to better understand, manage, and mitigate *disaster risk*, emphasising that although an all-of-society and all-of-state institutional response is needed, the primary responsibility for preventing and reducing disaster risk lies with states. This sea change is reflected in the Framework's four identified Priorities: (1) Understanding disaster risk; (2) Strengthening disaster risk governance to manage disaster risk; (3) Investing in disaster risk reduction for resilience; and (4) Enhancing disaster preparedness for effective response and to 'Build Back Better' in recovery, rehabilitation, and reconstruction.

It has a number of important recurring themes also, such as the pressing need for more innovative, joined up, multi-hazard, as well as multi-sectoral approaches to disaster risk management (DRM). Encouragingly, more references are made to the key role to be played by legal tools in this regard compared with the HFA. This is illustrated by the overarching goal to '[p]revent new and reduce existing disaster risk through the implementation of integrated and inclusive economic, structural, *legal*, social, health, cultural, educational, environmental, technological, political, and institutional measures that prevent and reduce hazard exposure and vulnerability to disaster, increase preparedness for response and recovery, and thus strengthen resilience'.⁹ Legal tools are also acknowledged as having a significant role to play in terms of translating the identified disaster risk reduction (DRR) goals and targets into concrete deliverables, especially at the national and local levels. The Sendai Framework further recognises the need for increased mainstreaming and integration of DRR within, as well as promoting the increased coherence and further development of relevant laws, regulations, and public policies;¹⁰ along with the role of laws and regulations for the 'establishment of necessary mechanisms and incentives to ensure high levels for compliance for 'safety-enhancing' purposes'.¹¹

Despite such positive developments – both more generally in relation to disaster risk mitigation and management, and specifically in relation to the growing recognition of the important role that law has to play in the progression of the related global agenda as reflected within the Sendai Framework – they are relatively modest in nature. In particular, there are a number of

⁴ See further UN, Report of the World Conference on Disaster Reduction (Kobe, Hyogo, Japan, 25 18–22 January 2005) A/CONF.206/6, ch. 1, Resolution 2: 'Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters'.

⁵ United Nations Office for Disaster Risk Reduction (UNISDR), Sendai Framework for Disaster Risk Reduction 2015–2030 (18 March 2015) A/CONF.224/CRP.1.

⁶ There are seven identified global targets, such as substantially reducing global disaster mortality by 2030, reducing direct disaster economic losses, and improving early warning systems. *Ibid.*, para. 18.

⁷ The scope of the Sendai Framework encompasses not only 'natural' and 'human-made' hazards, but also related environmental, technological and biological hazards, and risk, with a strong emphasis throughout on improved health resilience. See, for example, *ibid.*, para. 15.

⁸ *Ibid.*, para. 19.

⁹ *Ibid.*, para. 17 (emphasis added).

¹⁰ *Ibid.*, para. 27(a).

¹¹ *Ibid.*, para. 27(d).

key areas which require further development, investment, and engagement, including in terms of research, scholarship, and multi-stakeholder outreach both *by* and *with* the legal community, two of which are highlighted here.

The first such area concerns the relative dearth of scholarship which currently exists on DRR from a legal perspective. To date, related research has been confined largely to the domains of environmental and climate change issues.¹² This is a pressing issue that the current *Handbook* seeks to begin to redress, especially since law and policy on DRR (what some in this *Handbook* refer to as ‘DRR law’) is currently in a significant, formative period of development, with an accompanying exciting but also daunting responsibility upon the legal community to be more proactively engaged in its careful and considered development. DRR is potentially relevant to most, if not all, legal regimes. This is reflected in the breadth of topics examined in this *Handbook* which engage with multiple legal regimes, including: international disaster law, international disaster response law, international human rights law, international environmental law, land/planning law, global health law, counter-terrorism law, international aviation law, international maritime law, search and rescue law, international cultural heritage law, law of international treaties, as well as national and regional laws and mechanisms. It also examines a number of high priority issues on the global DRR agenda from a legal perspective, such as early warning systems (EWSs), multi-hazard and multi-sectoral approaches, as well as broader matters such as the coherence of the DRR framework with the 2030 Agenda for Sustainable Development Goals and climate change agenda.¹³ The current *Handbook* though does not purport to do more than to scratch the surface on such important topics. All of the legal regimes discussed here require further in-depth research, and there are many more legal regimes yet to be examined.

That said, it is hoped that a key function of this *Handbook* will be to assist in raising the profile of the necessity for increased research and consideration of DRR from a legal perspective among all stakeholders, not least in terms of the current and future development of related law, policy, and practice. At present, another closely related and significant weakness is that although the global DRR agenda, evidenced in the Sendai Framework, is framed around multi-sectorality,¹⁴ in practice this is relatively poor when it comes to engagement between, for instance, the legal, scientific, and technological communities. The reality is that it can be hard to penetrate traditional boundaries and paradigmatic approaches for the purposes of collaboration. Yet such breakthroughs must be achieved if the most innovative, effective DRR measures are to be developed and implemented, with the ultimate goal of reducing devastating human suffering and loss attributable to all forms of disasters. A key hurdle for many – both within the legal community itself as well as for other sectors and stakeholders – is making a paradigmatic shift in thinking with respect to the potential role of legal tools within the DRR space. There is a necessity here not to limit their utility to traditional ‘black letter’ laws and regulations functions; but instead to regard legal tools as essential, dynamic, and constantly evolving instruments of disaster risk mitigation which need to be indivisibly woven into the broader tapestry of multi-sectoral approaches especially within the scientific and technology as well as public sectors.

¹² See especially J. Peel and D. Fisher, *The Role of International Environmental Law in Disaster Risk Reduction* (Leiden; Boston: Brill Nijhoff, 2016).

¹³ See UNGA, Resolution 70/1 (adopted 25 September 2015), Transforming our world: the 2030 Agenda for Sustainable Development (21 October 2015) A/RES/70/1.

¹⁴ Sendai Framework, paras. 7, 27(g), and 33(b).

With such contextual issues in mind, the *Handbook* is framed around three principal research questions that each of the contributors was asked to respond to one or more of: (1) What ‘soft’ and ‘hard’ law DRR related norms currently exist within international law, whether more generally or within specific legal regimes?; (2) How will/should DRR related law and policy develop within specific fields of law?; and (3) What are the current and potential law, policy, and/or practice implications of findings in (1) and/or (2) above, especially in relation to improving the coherence of DRR law at national/regional/global levels, and associated implementation and enforcement mechanisms? In a number of chapters, these issues are illustrated through regional and/or country-specific case studies.

In terms of structure, there are six key sections. The first section, on the ‘International Law Framework and DRR’, seeks to offer an overview of the current international legal landscape on DRR – including key concepts, principles, and legal norms – which are relevant to and recur throughout all of the *Handbook*. This links in closely with the second section, on ‘Communication, Early Warning Systems, and DRR’, which also examines legal principles of broad applicability from international and regional normative perspectives, but with a particular focus on how these are developing in relation to effective communication, information dissemination, as well as the establishment of EWSs in response to identified high-risk hazards. The third section, ‘Regional and National Approaches’, continues the theme of examining overarching legal principles and developments, from a regional and national perspective but with the potential to better inform broader international law developments on DRR law. The remaining sections then focus on particular, topic-specific, issues, namely: ‘Air, Sea, and DRR’, ‘Health, Cultural Property/Natural Heritage, and DRR’, and ‘Catastrophic Events and DRR’. In terms of its methodology, the book is primarily doctrinal in nature, examining a broad and diverse range of both binding ‘hard’ and non-binding ‘soft’ law sources and instruments. The focus now turns to giving a brief overview of each of the individual chapter contributions.

1. INTERNATIONAL LAW FRAMEWORK AND DRR

Michael D. Cooper (Chapter 2) seeks to integrate social science research into DRR legal discourse by developing a theoretical framework to answer the important question of ‘what makes a disaster?’. His starting premise is that maintaining a distinction between ‘natural’ and ‘human-made’ disaster is no longer defensible, and that the notion of a ‘disaster’ is a social construct. While this assertion is well-accepted among social scientists, the notion has not yet penetrated the disaster law and DRR communities. The author therefore seeks to collect, categorise, and convey essential arguments that support the ‘disaster-as-social-construct’ hypothesis. Arguments are organised under seven distinct ‘dimensions’ of disaster, each beginning with the letter ‘v’ – respectively: values, volition, velocity, vicinity, vision, victims, and vulnerability. These seven dimensions, the building blocks of disaster, are distinct yet interrelated, cross-cutting, and mutually reinforcing. In deconstructing disaster, the author contributes to ‘Priority 1’ of the Sendai Framework, namely: ‘understanding disaster risk’. Each of the seven dimensions of disaster is explored and illustrated, and at the end of each section, the extent to which the Sendai Framework internalises and operationalises relevant arguments is considered. This perspective assists in better comprehending the multi-dimensional building blocks of ‘disaster’ which can shape the development and implementation of law, policy, and practice addressing disaster risk.

Efforts by academics and legal practitioners to implement DRR through international law present significant opportunities as well as challenges. Marie Aronsson-Storrier (Chapter 3) examines the international legal foundations of DRR through the principles of prevention, mitigation, and preparedness. Following a discussion of how the different principles – which

are often also referred to as ‘phases’ of the ‘disaster management cycle’¹⁵ – have developed in DRR policy and the extent to which they are grounded in binding international law, she finds that their meaning, as well as the relationship between them, are more complex than is often described within legal scholarship. Therefore, any attempt to establish international legal obligations relating to DRR should not seek to establish general binding obligations fitting into the structure of the specific principles, or phases, of prevention, mitigation, and preparedness as defined by the UN Office on Disaster Risk Reduction (UNISDR)¹⁶ and the Open-ended Intergovernmental Expert Working Group on Indicators and Terminology relating to Disaster Risk Reduction.¹⁷ Rather the focus should be on exploring the extent to which international law provides obligations relating to the *prevention and minimisation of disaster losses*. This approach opens up conceptual spaces to account for measures not accurately fitting into the specific principles or phases (such as EWSs). This more functional approach provides a clearer analysis of existing obligations, as well as identifies gaps to be addressed in the future.

The discussion then turns to a detailed examination by Arnold N. Pronto (Chapter 4) of the procedural history of the inclusion of DRR in draft article 9 of the International Law Commission (ILC) Draft Articles on the Protection of Persons in the Event of Disasters (ILC Draft Articles).¹⁸ The chapter illuminates how the approach by states towards DRR has changed over the near decade that the ILC Draft Articles were developed. This has ranged from an initial reluctance by some states to include DRR at all within the scope of the Draft Articles to the later focus on details as to how such a provision should be worded. Understanding this process paves the way for analysis of the unexplored consequences of the inclusion of DRR within the ILC Draft Articles, and what this might mean for the future, especially in terms of law development. Encouraging further study on the matter, Pronto also highlights the possibility of a future binding treaty on DRR.

Another closely related legal principle is then evaluated by Hugo Cahueñas-Muñoz (Chapter 5), who explores the regulation of cooperation in DRR, based on the Sendai Framework.¹⁹ Noting that the proposed draft article on ‘Cooperation for Disaster Risk Reduction’ was excluded from the ILC Draft Articles, he considers existing obligations relating to cooperation in DRR from the perspective of international human rights law, international environmental law, and climate change law in order to identify current and potential implications of these norms which may facilitate increased coherence in international cooperation on DRR issues. In so doing, Cahueñas-Muñoz identifies elements and mechanisms that could contribute to the implementation and enforcement of relevant measures in the absence of a binding convention regulating cooperation in relation to DRR.

In Chapter 6, Michael Eburn, Andrew Collins, and Karen da Costa turn the focus towards Priority 2 of the Sendai Framework, ‘[s]trengthening disaster risk governance to manage disaster risk’, and the effects of international law on local governance. At the heart of Priority 2 lies the

¹⁵ There is no universally agreed approach to what phases make up the disaster management cycle. Generally, though, it comprises prevention, mitigation, preparedness, response, and recovery/reconstruction.

¹⁶ UNISDR, *Living with Risk: A Global Review of Disaster Reduction Initiatives*, vol. II: Annexes (Geneva: UN, 2004). Available at www.unisdr.org/files/657_lwr21.pdf (accessed 11 July 2018).

¹⁷ See UNGA, Report of the open-ended intergovernmental expert working group on indicators and terminology relating to disaster risk reduction (1 December 2016) *A/71/644*.

¹⁸ ILC, ‘Draft articles on the protection of persons in the event of disasters, with commentaries’, adopted by the ILC at its sixty-eighth session and submitted to the General Assembly as a part of the Commission’s report covering the work of that session. UNGA, Report of the International Law Commission (New York: 2 May–10 June and 4 July–12 August 2016) *A/71/10*.

¹⁹ See Sendai Framework, para. 6.

development of laws, regulations, and public policies at the national and local levels. While acknowledging the importance of international law in creating consensus and setting high-level goals, they argue that international law can only ever be part of the solution. In order to achieve effective DRR governance, it is essential to consider the implementation of international law and policy at the national as well as at the local levels. The arguments provided in this contribution are important to consider not only when operating within domestic or local governance, but also when working with and developing international law and policy governing DRR.

2. COMMUNICATION, EARLY WARNING SYSTEMS, AND DRR

In the initial contribution to this section, Simon Whitbourn (Chapter 7) explores how the raising of disaster awareness by improving the provision of information on disaster risk and enhancing early warning mechanisms is a key thread underlying the Sendai Framework's Priorities for Action. This is essential both horizontally – at the international level between states – and vertically – by and between national authorities and in respect of individuals within a state's territory. Its importance has been well recognised, most recently in the Report of the Open-ended Intergovernmental Expert Working Group on Indicators and Terminology relating to Disaster Risk Reduction and specifically the Sendai Framework's Global Target G.²⁰ More specifically, a primary focus of the chapter is to identify in more detail the existing duties, mentioned by the ILC in the context of the Draft Articles, to inform or notify 'other states and other assisting actors that have a mandated role' at the 'onset of a disaster' as part of an affected state's obligation to cooperate, whilst also analysing these against the current state of the law.²¹ In doing so, the chapter identifies a number of existing obligations on states to inform and warn; considers the extent to which these may be restricted to 'human-made' hazards and therefore be of limited application to other types of disaster; and discusses how they fit within accepted duties of cooperation. The chapter concludes that, although duties to notify, inform, and warn are relatively well developed compared to other aspects of DRR, their importance in reducing the risk of disaster and enabling effective response is such that the ILC should have gone further in identifying and proposing more specific duties across all phases of the disaster cycle and in respect of all types of disaster.

The discussion in Chapter 8 then turns to examining some of the challenges associated with translating the Sendai goals into practice. In particular, Silvia Venier and Francesca Capone examine one especially sensitive legal issue related to the Sendai Framework Target G on Multi-Hazard Early Warning Systems (MH-EWS), namely how to determine who bears the ultimate responsibility for producing and distributing accurate and timely emergency warnings.²² Complex challenges connected to the attribution of this specific task may stem from a number of factors, including the need to coordinate different authorities, the multiplicity of actors involved in disaster prevention and response, and the exponential increase of information shared through different channels. The chapter investigates the potential tension, emerging at both the theoretical and practical levels, between the importance of coherent warnings coming from one authoritative voice and the benefits of more dispersed information sharing. This contribution begins by offering some introductory remarks on the role of MH-EWS as key components of

²⁰ See UNGA, Report of the Open-ended Intergovernmental Expert Working Group on Indicators and Terminology relating to Disaster Risk Reduction (1 December 2016) A/71/644.

²¹ See ILC Draft Articles, art. 8, commentary, para. 5.

²² Sendai Framework, para. 18(d).

DRR strategies. It then provides an overview of the duty to warn as an emerging international obligation and clarifies the contours of the ‘Single Official Voice Principle’ (SOVP) as applicable to emergency warnings. The SOVP, which was developed in 1995 by the World Meteorological Organization, requests that individual specialist agencies take a coordinated approach when issuing warnings and that, if an event relates to more than one specialist agency, joint warnings are issued on the basis of an agreed assessment of the hazard situation. The chapter further explores how international organisations have addressed the tension between authoritative and dispersed information sharing. Finally, it examines the legal basis for issuing emergency warnings in selected European states, in order to identify common elements and the role of private actors in emergency communication. The conclusive part provides some recommendations for the further development of the frameworks governing EWSs.

Further issues relating to the SOVP are then explored by Stefano Silingardi (Chapter 9). His analytical starting position is that the use of information and technologies of EWSs are widely recognised to be among ‘the most prominent types of contemporary disaster risk reduction efforts’, reflected in the text of the ILC Draft Articles, as well as Priorities 1 and 4 of the Sendai Framework. He explores such issues, notably the SOVP, through a number of case studies of states’ practices in order to gauge the level of their commitment to this principle (including the ‘Deutsche Wetterdienst’, the Japan Meteorological Agency, the Chinese Meteorological Authority, the United Kingdom’s Natural Hazard Partnership, and the 2010 Swiss Federal Council ‘Ordinance on the alert and alarm’). Furthermore, he analyses how communication at the European Union (EU) level could be underpinned and augmented by its commitment to this principle, especially with regard to the implementation of the European Flood Awareness System. This was launched in 2003 as one of the instruments to improve preparedness for floods within national services as well as the European Civil Protection through pan-European monitoring and forecasting. Other similar initiatives, such as those undertaken, since 2015, by the Economic and Social Commission for Asia and Pacific are also taken into account by way of comparison.

The focus in Chapter 10 then turns to a different aspect of EWSs, namely access to and the dissemination of disaster-related information. Marlies Hesselman’s starting position is that the Sendai Framework formulates a broad range of ambitious (non-binding) objectives for the improvement of DRR, including access to risk information and the establishment of early warning mechanisms. Sendai’s Priority 1 in particular stresses the active dissemination of various types of information to affected populations, with the accompanying requirement for increased education and awareness, tailored towards the needs of specific audiences. This chapter analyses how binding regional and international human rights treaties comprise of specific rights and obligations related to access to disaster risk information, early warning, education, and awareness, especially keeping in mind that many recent DRR instruments (notably here, the Sendai Framework and ILC Draft Articles) were adopted in a non-binding fashion and/or without a clear (people-centred) implementation machinery. Hence, the need to understand how the Sendai Framework’s implementation might be strengthened by reference to existing binding standards, noting that human rights standards are now commonly mentioned in new instruments as a central component to their implementation. The chapter concludes that a broad range of relevant human rights and obligations have been recognised to date, often with surprising levels of detail, including for the benefit of specific groups/persons. Additionally, affected persons from all over the world can rely upon at least one international human rights accountability mechanism to raise salient concerns, thereby giving important (non-binding) DRR commitments further legal ‘teeth’ or ‘bite’ than might otherwise be the case. At the same

time, the chapter also concludes that there is still plenty of scope for improvement regarding the usage of various human rights accountability mechanisms, providing some recommendations in this respect.

3. REGIONAL AND NATIONAL APPROACHES

While the Sendai Framework adopts a whole of global community approach to DRR, in the end it positions states to take the lead both individually and in concert. In this section, the promise and challenges specifically of regional and national DRR approaches are explored from diverse perspectives. In the opening chapters, both W. John Hopkins (Chapter 11) and Dug Cubie (Chapter 12) observe that substantive regional approaches to DRR are just beginning to gain momentum, yet they hold real potential for advancing Sendai's objectives. Hopkins employs a comparative lens to assess the broad range of institutional and legal developments to date within the EU, Association of Southeast Asian Nations (ASEAN), and the Pacific Island Forum. Despite a widespread tendency to view DRR regional efforts as more homogenous in nature, Hopkins demonstrates that each case study represents vastly different depths of institutional and legal obligations as well as end goals. He repeatedly cautions that one size cannot – and should not – fit all, given each world region's respective distinctiveness. Still, Hopkins' review leads him to the ultimate conclusion that if the Sendai Framework is going to have any modicum of success in relation to the domestic implementation of DRR via regional approaches, then such groupings will have to commit to more robust forms of institutionalism and 'harder' legal commitments. Such arrangements must also be fostered within an atmosphere of profound mutual trust, given DRR's connection to more traditional Westphalian state concerns. These elements already exist within the EU, and to a far lesser extent, ASEAN. Accordingly, they serve as possible prototypes for other parts of the world seeking to pursue DRR-oriented cooperation.

In the following chapter, Cubie shares Hopkins' view that regional institutions can serve as important intermediaries for translating the Sendai Framework's goals to the state level if done correctly, which involves 'binding commitments and robust structures at the regional level' that serve 'as a bridge between domestic and global aspirations'.²³ Cubie finds a useful model from outside the DRR universe, that of the United Nations Environment Programme's Regional Seas Programme (RSP).²⁴ Dating back to 1974, the author asserts that the RSP provides a deep well of experience for Sendai to draw upon in promoting coherence among global, regional, and state-level interests in the implementation of international commitments. While avoiding the overdrawing of parallels between the two regimes, Cubie finds in particular that the RSP's 'Regional Action Plans', in which the international level establishes institutional, legal, and financial guardrails for regional cooperation on shared marine environments, is a potential template for the Sendai Framework. Cubie proposes an analogous set of 'Regional DRR Action Plans', that would not only enhance coherence between the Sendai agenda and regional efforts but would also facilitate opportunities for greater cross-region dialogue and more consistent benchmarking of progress related to Sendai's key measures.

Yet another approach to advancing DRR efforts on the regional level, this time borrowed from the burgeoning domain of multi-country insurance risk pools, is the subject of the next chapter by Morten Broberg and Erica Hovani (Chapter 13). The co-authors begin by highlighting the

²³ D. Cubie, Chapter 4 of this *Handbook*, conclusion.

²⁴ United Nations Environment Programme, 'Regional Seas Programme'. Available at www.unenvironment.org/explore-topics/oceans-seas/what-we-do/working-regional-seas/regional-seas-programmes (accessed 12 July 2018).

importance the Sendai Framework places on national capacity building in the areas of risk transfer, sharing, and insurance but also noting that the framework provides few specifics as to how this end aim might be achieved. Three risk-pooling case studies from the Global South – the Caribbean Catastrophe Risk Insurance Facility, Pacific Catastrophe Risk Assessment, and Financing Initiative and African Risk Capacity – are examined for their potential applicability to the DRR sector chiefly within the context of climate change impacts. The authors find that such mechanisms possess many positive qualities spanning far beyond that of providing post-disaster compensation. These advantages include their promotion of a societal resilience perspective and a more holistic approach to cost-benefit analysis, while possessing the potential to ameliorate the suffering of those impacted by having compensation processes already in place. Still, Broberg and Hovani caution that for such an initiative to succeed, interested states must proceed with care, including drafting sound insurance policies and recognising the financial challenges faced by poorer states in participating. Pool member countries even run the risk that humanitarian donors may curtail additional assistance in light of the existence of such pools. These and other important considerations will need to be taken into account by the DRR sector before aggressively moving forward in this vein.

Eloísa Dutari and Cássius G. Chai (Chapter 14) delve into strategies regarding steps that national governments might adopt in order to incentivise the private sector and local communities to participate in DRR related activities in order to turn ambitious globally and regionally adopted frameworks and goals into more local realities. As the authors maintain, not only does the Sendai Framework consider such wider engagement as critical for its successful implementation, but it is also recognised as essential for the fullest realisation of other cross-cutting legal frameworks, including by and for the Sustainable Development Goals. The co-authors explore such conceptual issues through, and base their recommendations upon, recent Brazilian state practice as representative of common issues facing the wider Latin American region especially. In doing so, they discover that much more progress is needed in such areas as data gathering in relation to global indicators framed around the Sendai Framework's goals and targets, but that current significant inhibitors to achieving more progress include insufficient capacity and resources. Important insights are gained too from a review of the 2015 Mariana Mining Dam collapse, considered to be the worst environmental disaster in Brazil's history. This case study flags up many significant issues of DRR concern, such as in relation to poor governmental and corporate governance structures and mechanisms, as well as inadequate EWSs to disseminate information to local populations who live in high-risk hazard areas, such as in the vicinity of a dam.

Against the backdrop of the 'Build Back Better' ideal embraced by the Sendai Framework, Daniel Fitzpatrick and Caroline Compton (Chapter 15) focus their lens upon issues surrounding national land use planning and policy implementation, and principally official efforts to permanently relocate populations living in hazard prone environs. The Philippine government's 'Recovery after Yolanda' (RAY) initiative, in which it instituted no-build policies in elevated risk zones and attempted to move 200,000 plus households after Typhoon Yolanda struck in 2013, is employed as a highly instructive case study on such measures. The co-authors ultimately assert that the Philippine experience with RAY serves as a significant cautionary tale for advocates of resettlement as DRR in general. Based on the largely failed Philippine effort – occurring in a country recognised globally for its progressive disaster management policies – Fitzpatrick and Compton are concerned that Sendai overestimates national capacity to effectively execute relocation planning, creating further hardship in its wake. Moreover, the Sendai Framework's heavy reliance on technical approaches to DRR fails to recognise the inherent political, cultural,

and historical underpinnings of settlement patterns; such blind spots will not only undermine the efficacy of DRR undertakings but may in fact achieve the very opposite result. As the authors conclude, when it comes to the current DRR paradigm around land use and resettlement planning: ‘Somewhat perversely, international instruments such as the Sendai Framework may contribute to the creation of risk’.²⁵

4. AIR, SEA, AND DRR

Contributors in this section look to the air and the seas, assessing not only the DRR landscape within both spaces but also the ways in which the respective legal regimes may progress the Sendai Framework’s agenda. Wanlu ‘Laura’ Zhang (Chapter 16) focuses her attention upon the civil aviation sector, a domain in which ‘DRR is the everlasting goal’. Specifically highlighting DRR concerns pertaining to civil aviation in conflict zones (like the 2014 shooting down of Malaysia Airlines Flight 17), the author frames her exploration based on Sendai’s four priority areas, entailing risk assessment, governance, investment, and preparedness, respectively. Zhang finds that when it comes to minimising risks for civil aviation within conflictual contexts, Sendai has much to contribute to the international aviation law field. In her conclusion, Zhang urges relevant stakeholders (including governments, the International Civil Aviation Organization (ICAO) and airline carriers) to further their understanding of the inherent risks involved within this specific aviation environment and encourages high-level buy-in of the ICAO’s standards and recommended practices. Providing additional funding for DRR measures and enhancing preparedness by exchanging safety information within the sector are also suggested in line with Sendai’s recommendations, serving to make a sector known for its strong record on safety even more so.

The need for DRR measures in relation to an increasingly traversed Arctic Ocean, particularly by cruise ships, is the focus of the next study by Stefan Kirchner (Chapter 17). Similar to Zhang’s attention to international aviation law, Kirchner looks to build natural bridges between Sendai’s purposes and the development to date of maritime safety laws and rules as they pertain to this particular geography. Kirchner explains that the opening of new Arctic Ocean shipping lines due to climate change is truly a case of legally uncharted territory along with the geographic. Yet currently existing international shipping legal frameworks – such as the International Code of Safety for Ships Operating in Polar Waters (more popularly known as the Polar Code),²⁶ and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers²⁷ – provide a strong foundation for the advancement of the Sendai Framework’s overarching agenda. Kirchner also encourages greater socialisation of the potential hazards surrounding cruise shipping in the Arctic Ocean, especially in the realm of human error, and urges further preparedness efforts by cruise ship crews and passengers alike.

While Zhang and Kirchner explore how the Sendai Framework might inform DRR approaches for international civil aviation and cruise shipping in the Arctic Ocean, Simon Marsden’s contribution (Chapter 18) flips the perspective. It delves into how international search and rescue law in non-urban contexts – specifically at the nexus of EWSs agreements and maritime, civil

²⁵ D. Fitzpatrick and C. Compton, Chapter 15 of this *Handbook*, conclusion.

²⁶ International Maritime Organization, International Code of Safety for Ships Operating in Polar Waters (Polar Code), in force 1 January 2017, MEPC 68/21/Add. 1. Available at www.imo.org/en/MediaCentre/HotTopics/polar/Documents/POLAR%20CODE%20TEXT%20AS%20ADOPTED.pdf (accessed 21 May 2018).

²⁷ International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 7 July 1978, in force 28 April 1984, 1361 UNTS 2.

aviation, and Arctic connected regimes – may help fill in what Marsden terms ‘Sendai gaps’. These are inadequacies that the Sendai Framework identifies as remaining despite the positive DRR gains made to date, which it seeks to address. These include insufficient institutional arrangements, regulation, and coordination mechanisms, especially at the regional level. The author explores how search and rescue law may assist in addressing such weaknesses. More specifically, Marsden contends that the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, and its related EWS provisions provide a remedy to the latter issue in particular, by navigating a pathway to regional cooperation that still remains sensitive to states’ concerns over sovereignty.²⁸ More generally, the search and rescue domain’s approach to EWSs also provides a useful frame of reference for the Sendai Framework moving forward.

5. HEALTH, CULTURAL PROPERTY/NATURAL HERITAGE, AND DRR

This section considers important, but commonly under-researched, issues in international law, including from a DRR perspective, regarding global health and cultural property and natural heritage rights.

The first chapter in this section, by Katja Samuel and Rosalind Cornforth (Chapter 19), undertakes novel research in exploring how the ambitious Sendai Framework goal of more innovative and dynamic multi-sectoral DRR engagement might be realised in practice between the legal and scientific communities. Specifically, the authors examine both the necessity as well as accompanying benefits of better integrating existing legal approaches and tools with scientific ones. They undertake this through a critique of the current systems-based approach to EWSs developed by the UNISDR in 2006 which continues to inform governmental and intergovernmental policies and approaches. This systems-based approach comprises of: (1) risk knowledge, (2) monitoring, (3) warning communication, and (4) response capacity; whereas, a legal approach to DRR, including EWSs, is framed around different considerations of: (1) the prevention of harm, (2) the protection of core rights, and (3) accountability for wrongful acts or omissions to states or individuals, resulting in appropriate reparation. Despite the initial differences between these approaches, the chapter examines how in fact the legal elements can and should be mapped on to the four limb systems-based approach. The associated benefits would include the strengthening of governance; the bringing of increased clarity on standards, definitions, and parameters, including on but not limited to EWSs; the facilitation of further early warning mechanisms development; and ensuring increased protection to those groups most vulnerable before, during, and following a disaster event. Though the research is conducted through the prism of global health and EWSs, the key findings are of broader applicability to multi-sectoral DRR engagement.

In the following chapter, health themes continue but from a different DRR perspective. Christy Shucksmith-Wesley (Chapter 20) stresses the importance of human rights in mitigating vulnerability and exposure to hazards, with a specific focus on the right to health. Human rights instruments – such as the 1966 International Covenant on Economic, Social and Cultural Rights²⁹ and the 1979 Convention on the Elimination of Discrimination against Women³⁰ – create

²⁸ Arctic Council, Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, Nuuk, 12 May 2011, in force 19 January 2013, 50 ILM 1119.

²⁹ International Covenant on Economic, Social and Cultural Rights, New York, 16 December 1966, in force 3 January 1976, 993 UNTS 3.

³⁰ Convention for the Elimination of Discrimination against Women, New York, 18 December 1979, in force 3 September 1981, 1249 UNTS 13.

binding obligations upon states, which are also embedded in the Sendai Framework. She argues that, in situations where states are not able to meet these obligations, other actors – notably here, the International Federation of the Red Cross and Red Crescent Societies (IFRC) – can play an important role in filling these important gaps and thus protect a disaster-affected population.³¹ Exploring the relationships between the state, the IFRC, and an affected population, Shucksmith-Wesley uses the example of emergency healthcare for women in the aftermath of the 2015 Nepal earthquake to argue that non-state organisations, including the IFRC (and, indeed, the Red Cross National Societies), can progress human rights obligations through their mandates.

The next topic discussed is one that in recent times has attracted increased international political and media attention – for instance due to the criminal and destructive activities of terrorist groups such as Islamic State – yet on which there remains a relative paucity of legal scholarship, even more so from a DRR perspective. Giulio Bartolini (Chapter 21) examines the development of DRR law in relation to the protection of cultural property and natural heritage. A key chapter focus is that despite being subject to a number of international instruments over the last decade, there has been very limited attention paid to the protection of cultural heritage in relation to disasters. In order to address this significant gap within existing literature, Bartolini first analyses international cultural heritage law in order to examine the extent to which this body of law, in particular the 1972 Convention Concerning the Protection of the World Cultural and Natural Heritage, may provide relevant measures in order to prevent and mitigate damage to cultural heritage in times of disasters.³² He then turns to examining these issues through the prism of international disaster law, in order to explore the extent to which the very definition of disaster accounts for losses related to cultural heritage. As Bartolini points out, specific attention to the protection of cultural heritage should not be taken for granted within international disaster law. Nonetheless, as his analysis also makes clear, the protection of cultural heritage is indeed already embedded to some extent within DRR instruments, including the Sendai Framework. This is at a time when institutions – such as the UN Educational, Scientific and Cultural Organization – have increasing capacity to consider disasters and DRR principles within their practice and standard-setting activities. These developments, while still relatively new, are nonetheless promising, including from the perspective of better mainstreaming the protection of cultural property and natural heritage into DRR governance and vice versa.

6. CATASTROPHIC EVENTS AND DRR

The final section turns to a different but increasingly timely topic, namely DRR through the lens of catastrophic disasters whether ‘natural’ or ‘human-made’ in character. An important related area of growing concern concerns ‘multi-hazard’ risks, a theme explored in both chapters.

Emika Tokunaga (Chapter 22) uses the Fukushima Daiichi nuclear disaster (Fukushima nuclear disaster) of 2011, and a critical evaluation of the responses of the Japanese national and local governments thereto, as a case study for exploring the obligations of affected states relating to the evacuation of nuclear disaster victims under international human rights law and within the Sendai Framework. The Fukushima nuclear disaster occurred when an earthquake, followed by a tsunami, led to damage to the Fukushima nuclear power plant with resultant high levels of

³¹ The role of other actors is highlighted, for example, in Sendai Framework, para. 48(e), and ILC Draft Articles, art. 7.

³² Convention for the Protection of the World Cultural and Natural Heritage, Paris, 16 November 1972, in force 17 December 1975, 1037 UNTS, No. 15511.

radioactive contamination. At the time of writing, more than 50,000 people are still displaced as a result of this disaster. Tokunaga focuses especially on those human rights obligations – the right to life, the right to liberty of movement, and the right to health – which form the primary legal basis of obligations upon affected states to effectively evacuate their affected populations in situations of radiation emergencies. In doing so, the author highlights a number of previous and ongoing failures by the Japanese national government to fully comply with its international obligations as well as widely accepted standards such as in relation to acceptable and safe levels of radiation that any affected population should be subjected to. Tokunaga also highlights other issues of concern, notably poor pre-disaster planning and public information dissemination on, for example, existing hazards and steps to be taken in the event of a disaster. An especially contentious issue at the time of writing relates to the withdrawal of governmental financial assistance to ‘voluntary’ opposed to ‘mandatory’ evacuees, which may effectively force many persons falling within the former category to return to areas with unacceptably high levels of radioactive contamination (by international standards) or else remain in safer zones but with the prospect of worsening financial hardship.

In the final chapter (Chapter 23), Katja L.H. Samuel, William C. Banks, and Daphné Richemond-Barak explore ways in which current, more conventional, approaches to a terrorist attack triggering a catastrophic disaster event – including a low probability, high impact Black Swan scenario – might be improved, especially in terms of disaster preparedness and response. In doing so, they critique ways in which traditional conceptual and institutional lines of separation between security/counter-terrorism and DRM paradigms might be softened in order to enable more innovative, multi-sectoral, law, policy and practice approaches to be developed and implemented. For the purposes of disaster preparedness and response (opposed to, for instance, crime prevention and criminal justice), they suggest that instead of focusing on whether or not a terrorist attack was maliciously caused, that a preferred focus from a DRM perspective might be to focus more on the potential impact of a significant terrorist attack. In this way, the authors further explore the potential benefits of approaching a terrorist attack through a multi-hazard lens, especially since a major attack will often trigger secondary hazards, such as technological or environmental ones, the impact of which may be worse than the initial physical attack triggering them. In terms of additional possible steps that might be taken, the chapter identifies the critical need for law and policy makers, as well as other public and private sector stakeholders, to not limit the function and utility of the law to traditional ‘black letter’ roles; but instead to regard and use existing and developing legal instruments as tools of disaster risk mitigation, especially by mapping the proposed changes onto the hybrid and developing body of disaster law. One possibility could be the emergence of a new sub-category of ‘terrorism and catastrophic disaster’ legal norms which is able to better reconcile the prevention, preparedness, and response needs of both existing security/counter-terrorism and DRM paradigms.