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Asia-Pacific Disaster Management

Comparative and Socio-legal Perspectives

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[1] See http://blogs.usyd.edu.au/japaneselaw/2011/11/anniversaryconference.html and (including the Final Program, Abstracts and Speaker bios) http://sydney.edu.au/news/law/457.html?eventcategoryid=39&eventid=9063.

the *Journal of Japanese Law*,[2] and organised a smaller follow-up seminar in Sendai on 9 February 2013.[3]

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Sydney, NSW, Australia — Simon Butt
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April 2013

[2] Their papers, along with several others related to Japan's 2011 disasters as well as a Preface, are published in Issue No. 34 and reproduced at: http://sydney.edu.au/law/anjel/content/anjel_research_pap.html.

[3] See http://www.law.tohoku.ac.jp/kenkyuukai/mitsui/.

Abbreviations

'3/11'	Great East Japan (triple) disaster of 11 March 2011
AC	Alternating current
ADR	Alternative Dispute Resolution
AICF	Asbestos Injuries Compensation Fund (NSW)
APEC	Asia-Pacific Economic Cooperation
ASEAN	Association of Southeast Asian Nations
AusAID	Australian Agency for International Development
BAKORNAS PB	Badan Koordinasi Nasional Penanggulangan Bencana (National Coordination Board for Disaster Management, Indonesia)
BORA	Bill of Rights Act 1990 (NZ)
BPK	Badan Pemeriksa Keuangan (Supreme Audit Agency, Indonesia)
BPKP	Badan Pengawasan Keuangan dan Pembangunan (Financial and Development Supervisory Board, Indonesia)
BRR	Badan Rehabilitasi dan Rekonstruksi (Rehabilitation and Reconstruction Agency, Indonesia)
BT	Great Christchurch Buildings Trust (New Zealand)
CBD	Central business district
CCDU	Christchurch Central Development Unit (New Zealand)
CCLEP	California Center for Environmental Law and Policy
CDEM	Civil Defence Emergency Management (NZ)
CERA	Canterbury Earthquake Recovery Authority (NZ)
COAG	Council of Australian Governments
CPC	Communist Party of China
CPT	Church Property Trustees (New Zealand)
CRPD	Convention on the Rights of Persons with Disabilities 2008

CSC	Convention on Supplementary Compensation 1997
dBA	A-weighted decibel
DDT	Dust Diseases Tribunal (NSW)
DMA	Disaster Management Authority (Badan Nasional Penanggulangan Bencana (BNPB))
DML	Disaster Management Law 2007 (Indonesia)
DPA	Disabled Persons Assembly
DPJ	Democratic Party of Japan
EQC	Earthquake Commission (NZ)
ESCAP	Economic and Social Council, Economic and Social Commission for Asia and the Pacific
EU	European Union
GAM	Gerakan Aceh Merdeka (Free Aceh Movement, Indonesia)
GDP	Gross Domestic Product
HDI	Human Development Index
HRA	Human Rights Act 1993 (NZ)
IAEA	International Atomic Energy Agency
IASC	Inter-Agency Standing Committee
ICCPR	International Covenant on Civil and Political Rights 1966
ICESCR	International Covenant on Economic, Social and Cultural Rights 1966
ICRC	International Committee of the Red Cross
IHDP	International Human Dimensions Program
ILC	International Law Commission
JAEC	Japan Atomic Energy Commission
JAPCO	Japan Atomic Power Company
JNES	Japan Nuclear Energy Safety Organization
JPY	Japanese Yen
KEPCO	Kansai Electric Power Company
KETRA	Katrina Emergency Tax Relief Act 2005 (US)
KPK	Komisi Pemberantasan Korupsi (Corruption Eradication Committee, Indonesia)
Ldn	Day-night average sound level
LDP	Liberal Democratic Party (Japan)
LNG	Liquefied Natural Gas
METI	Ministry of Economy, Trade and Industry (Japan)
MEXT	Ministry of Education, Culture, Sports, Science and Technology (Japan)
MHLW	Ministry of Health, Labour and Welfare (Japan)
MoUs	Memoranda of Understanding
mSv	Millisieverts

NDA	Nuclear Damages Act (Law No. 147 of 1961, Japan)
NDRC	National Disaster Reduction Committee (China)
NEDO	New Energy and Industrial Technology Development Organization (Japan)
NGOs	Non-governmental organisations
NHAs	Neighbourhood associations
NHK	Nippon Hoso Kyokai (Japan Broadcasting Corporation)
NICNAS	National Industrial Chemicals Notification and Assessment Scheme (Australia)
NISA	Nuclear and Industrial Safety Agency (Japan)
NPOs	Non-profit organisations
NRC	Nuclear Regulation Commission (US)
NSC	Nuclear Safety Commission (Japan)
NSW	New South Wales
NVNAD	Nippon Volunteer Network Active in Disaster
NZ	New Zealand
OECD	Organisation for Economic Co-operation and Development
OIC	Order in Council
PERD	Post-earthquake related deaths
PLA	People's Liberation Army (China)
PWA	Public Works Act 1981 (NZ)
RDC	Reconstruction Design Council (Japan)
RDMAs	Regional Disaster Management Authorities (NZ)
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation 2006 (EU)
RMA	Resource Management Act 1991 (NZ)
RPS	Regional Policy Statement 1998 Canterbury (NZ)
SARS	Severe acute respiratory syndrome
Satlak PB	Satuan Pelaksana Penanggulangan Bencana (Provincial Coordinating Boards for Disaster Management, Indonesia)
TEPCO	Tokyo Electric Power Company
TNI	Indonesian National Armed Forces
UDHR	Universal Declaration of Human Rights
UDS	Urban Development Strategy (NZ)
UN	United Nations
UN-DESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
UNISDR	United Nations International Strategy for Disaster Reduction

UNOCHA	United Nations Office for the Coordination of Humanitarian Affairs
US	United States of America
WHO	World Health Organization

Contents

Chapter 1
Disaster Management: Socio-Legal and Asia-Pacific Perspectives

Luke Nottage, Hitoshi Nasu, and Simon Butt

1.1 Disasters

A disaster can be defined as 'a serious disruption of the functioning of society, which poses a significant, widespread threat to human life, health, property or the environment, whether arising from accident, nature or human activity, whether developing suddenly or as a result of long-term processes, but excluding armed conflict'.[1] This is the view taken by the United Nations (UN) International Strategy for Disaster Reduction (UNISDR) as well as the Red Cross and Red Crescent societies.[2] Examining 'emergency risk regulation', Alemanno suggests that a disaster comprises:

> a natural or man-made [or manufactured] hazard resulting in an event of substantial extent causing significant physical damage or destruction, loss of life, or drastic change to the natural environment . . .
>
> Typically, one speaks of crisis or disaster when a threat is perceived against the core values or self-sustaining functions of a social system, which calls for urgent remedial action under conditions of uncertainty. Yet although the category of disaster at first may seem

For helpful feedback on earlier drafts, we thank especially Lloyd Burton, Jeff Kingston, Andrew Pardieck and Rick Wallace. We particularly thank Diana Hu for superlative research assistance in compiling Appendices A and B.

[1] Verchick (2010), p. 6.

[2] On the UNISDR, see http://www.unisdr.org/.

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unproblematic it is an elastic concept centered on the following common-place three-part characterization: sudden, significant and natural.[3]

Aldrich elaborates the latter point further, focusing on the role of 'social capital' or networking that fosters community resilience in recovery from large-scale catastrophes. He considers a disaster to be 'an event that suspends normal activities and threatens or causes severe community-wide damage'.[4]

These international organisations and commentators, along with several others,[5] note that the lines between 'natural' and 'manufactured' risks are becoming increasingly blurred. Examples include the 'volcanic ash crisis' that disrupted travel throughout Europe in 2010, and Japan's devastating earthquake, tsunami and subsequent nuclear power plant meltdown in 2011 (outlined in Table 1 in this chapter).[6] With Hurricane Katrina in 2005, much destruction in and around New Orleans 'occurred precisely because of human attempts to subvert or artificially control nature' (especially by constructing levees and waterways to allow development closer to the shoreline).[7] Other research has suggested that construction of China's colossal Zipingu Dam may have helped trigger the 2008 Sichuan Earthquake.[8] Drilling for natural gas was also the likely trigger for 'Lusi', the massive mud volcano that has displaced 13,000 families in Indonesia.[9] Arguably, global warming was a contributing factor to the world's most lethal disaster over the last decade: the 2003 heat wave throughout Europe, which resulted in 30,000–50,000 fatalities.[10] Appendix B briefly outlines the timing and impact of recent catastrophes in Asia-Pacific jurisdictions.[11]

This book mainly considers relatively *sudden* disasters or catastrophes, especially those with a significant *natural* cause. However, Japan's recent experience with the Fukushima nuclear power plant suggests how a nuclear accident might

[3] Alemanno (2011), p. xxi.

[4] Aldrich (2012b), p. 3. After helpfully reviewing the intellectual history behind notions of 'social capital', Aldrich defines it as 'the resources available through bonding, bridging, and linking social networks along with the norms and information transmitted through those connections', focusing then on 'the ways social capital accesses or alters public policies' (p. 33).

[5] For example Hutter (2010), p. 8. More broadly, the Organisation for Economic Cooperation and Development (OECD) highlights the growing complexity of contemporary 'systemic' risks: OECD (2003), pp. 49–52.

[6] Alemanno (2011). On the '3/11' or 'triple disasters' in Japan, see also Japan Times (2012), Birmingham and McNeill (2012) and Claremont (2013), in this volume.

[7] Aldrich (2012b), p. 3. For an overview of the Hurricane Katrina devastation, see also pp. 130–134.

[8] Verchick (2010), p. 38. Sichuan was also struck by a 7.0 magnitude earthquake on 20 April 2013, killing at least 196 people and injuring more than 11,000: Chan (2013). On disaster management in China generally, see also Bath (2013), in this volume.

[9] See Butt (2013), in this volume.

[10] Farber (2011), p. 2.

[11] That list focuses on 'environmental disasters', which destroy 'important environmental amenities or [those] in which harm to human interests is mediated by an environmental change': Farber (2011), p. 2.

Table 1 Disaster law—an overview

	Types of law		
Disaster management	Public law	Private law	International law
Mitigation	**Constitution** (for example local/central government powers,[a] electoral law[b])		
	Urban planning law (for example coastal settlements)		
	Environmental law generally[c]	**Tort law** (indirectly)	**Customary international law** (for example state responsibility), **treaties**[d] and **soft law**[e]
	Safety regulation[f] (for example seawalls, earthquake-resistance[g])	**Product liability law**[h] (including private enforcement mechanisms)[j]	**Trade agreements**, **Memoranda of Understanding** (MoUs)[i]
	Competition law (for example on bid-rigging for public works)		
	Nuclear plant licensing laws[k]		
Relief	**Constitution** (for example on emergency measures or military deployments,[l] local versus central government powers[m])		**Human rights treaties** (for example on children, women)[n]; 1994 Convention on Nuclear Safety[o]
	Tax/NGO laws[p]		
	Quarantine or immigration laws		**MoUs** or possible addenda to trade agreements (allowing temporary ingress of foreign products and personnel)
	Health and welfare laws		**WHO Laws**[q]
	Nuclear accident response laws		Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency[r]
	Criminal law (for example against looters)		

(continued)

Table 1 (continued)

Disaster management	Types of law: Public law	Private law	International law
		Contract and consumer law (for example terminating existing contracts),[s] **property law**	
		Insolvency law[t]	
Recovery	**Nuclear accident compensation laws**[u]	**Insurance law**[v]	1960 Paris Convention and 1963 Vienna Convention[w]
	Government 'guidelines', compensation funds[x]	**Tort law** (against private parties and sometimes the state)[y]	
	Government support for Alternative Dispute Resolution[z]	**Dispute resolution systems** (for example Court mediation/ litigation)	Hague conventions for cross-border litigation[aa]
		Consumer law (for example frauds, supply of credit, mortgages[bb])	
	Zoning law, community-enhancing laws[cc] and other **administrative law** (for example **privacy law**[dd])		

[a]Rheuben (2011). [b]Ramseyer (2012). [c]Takahashi et al. (2013) and Kabashima (2013). [d]Birnie et al. (2009). On climate change measures, see also Saul et al. (2012). [e]For example, the 'First Responder' guidelines regarding disposal of dead bodies: Johns (2012). [f]Generally Nottage (2010). [g]Nottage (2006). [h]Osaka (2012). [i]For example, regarding accident information, as with consumer product safety hazards recently: see Nottage (2009b); Nottage (2011). [j]Kozuka (2013). [k]Pardieck (2013). [l]Ames and Koguchi-Ames (2012) and Yates and Bergin (2011). [m]See generally Samuels (2013), pp. 151–179. [n]Office of the UN High Commissioner for Human Rights and UN Development Programme (2007); compare with White and Grieve (2013), in this volume and de Guttry et al. (2012). [o]See also Cook (2013), in this volume. [p]See for example Avenell (2012); Kawato et al. (2012); Burch (2013), in this volume. [q]Constitution of the World Health Organisation and International Health Regulations 2005. [r]Cook (2013), in this volume. [s]Morita (2013). [t]Steele and Chun (2013). [u]Weitzdörfer (2013), in this volume. [v]Kozuka (2012, 2013). [w]Cook (2013), in this volume. [x]Morita (2013). [y]Weitzdörfer (2013), in this volume. Tort and/or criminal sanctions may even sometimes be attached to individuals helping governments in disaster management, as with six scientists recently convicted of manslaughter for failing to predict an earthquake that struck L'Aquila (Italy) in 2009: cf. McGowan (2012). [z]Rheuben (2013), in this volume; see also Foote (2013). [aa]See http://www.hcch.net/index_en.php. [bb]See for example Kabashima (2013). [cc]Aldrich (2012a, b). [dd]Impacting, for example, on the retention and sharing of health records, see in Japan for example Tohoku Medical Megabank Organization (undated) and Thia (2011). On privacy law in Japan, see generally Lawson (2006). In New Zealand recently, see White and Grieve (2013), in this volume.

escalate even without any natural event such as an earthquake or resultant tsunami. Human errors caused earlier nuclear plant accidents in Chernobyl in the Ukraine in 1986, and at Pennsylvania's Three Mile Island in the US in 1979.[12] Rheuben (2013), in this volume also compares these sudden disasters with slower-onset disasters—namely diseases and environmental pollution—caused by asbestos products particularly in Australia,[13] to explore the different degrees to which governments become actively involved in responding to widespread harm.

One key research question addressed by several contributors to this volume is whether attitudes, preparedness and responses to disasters differ significantly depending on whether the disaster is more or less 'natural'. Japan certainly did extremely well in preparing and responding to the magnitude 9.0 earthquake that struck on 11 March 2011, and quite well regarding the consequent tsunami, but performed poorly in anticipating and dealing with the related accidents at the Fukushima nuclear power plant.[14] Duus notes that during the Tokugawa shogunate era (1603–1868), measures to cope with fires paved the way for similar effective techniques to cope with other natural disasters such as earthquakes. The Meiji government subsequently extended these techniques nationwide as aspects of a modern centralised state—and a new 'imagined community' on a national scale.[15]

There is now evidence of the growing frequency and impact of natural disasters world-wide, particularly in the Asia-Pacific region, as well as heightened perceptions or fears of some types of disaster risks. One major cause of disasters is environmental degradation.[16] For example, dam construction limits silting downstream, leaving fewer protective islands ('natural levees') to protect against storm surges and causing delta lands to subside.[17] Buffers against tsunami are weakened by deforestation in coastal areas, and possibly also by dying reefs. Inland deforestation results in more landslides and wildfires. Adverse impact on the environment is exacerbated by climate change, which causes the sea level to rise as well as more

[12] See, respectively, Gerstein (2008), pp. 92–125; Chiles (2002), pp. 39–57. See also Rees (1994) and Perrow (1999).

[13] In Japan, see Nottage (2006); and more generally Miyamoto et al. (2011).

[14] See generally Anderson (2011) and Yasumura et al. (2012). This is not to say that preparedness and short-term responses regarding the 2011 tsunami, which reached heights of between 3.5 to 9.3 m when it hit Japan's coastline, have not been questioned. One concern is that some 500 schoolchildren were among over 18,000 killed or still missing. More generally, several victims' groups have pursued civil claims against officials for negligently failing to initiate safe evacuations, and the police were also prompted to investigate Jin Sato, mayor of Minamisanriku (a heavily-hit town), for the potential offence of criminal negligence causing death. See Samuels (2013), pp. 3 and 44. However, the Japanese government also highlights examples of very successful preparedness and evacuations from schools: see Government of Japan Public Relations Office (2013).

[15] Duus (2012), pp. 180–181.

[16] Verchick (2010), pp. 29–40.

[17] In the Bengal Delta, a storm surge killed 138,000 in 1991. Cyclones killed around 1,000 in the Godavari delta in 1996, and 10,000 in 1999 in a neighbouring delta in India. See further Appendix B.

volatile temperature fluctuations. These are increasingly regarded as global 'threat multipliers' that worsen existing vulnerabilities and instability.[18] Another cause, however, is partly 'man-made' in a different sense: population pressures.[19] More people are living closer to rivers and shorelines, with growing urbanisation and industrialisation, and this leads to more severe impact from natural disasters even in developed countries like the US.[20]

The literature on *risk assessment*, underpinned especially by disciplines such as engineering and the natural sciences, emphasises that 'hazards' combine with 'inventories' (of people, infrastructure and the physical environment) to generate 'vulnerability' and consequent losses. The latter can be direct (such as deaths, injuries and damage to facilities) as well as indirect (including foregone income or growth).[21]

Recent data shows that more people were affected by natural disasters worldwide between 1990 and 2010, compared to the two prior decades pre-1990, although the number of deaths (primarily from earthquakes) continues to fluctuate without showing such a clear upward trend. The World Bank suggests that one explanation is greater exposure to hazards, as half the world's population now lives in cities (compared to 30 % in 1950). In addition, there has been better reporting of disasters. Both factors also probably underpin growing damages estimated from disasters since the 1990s, which have risen in spurts. The most devastating events are storms, earthquakes, and then floods. Damage costs tend to be higher in wealthier countries, reflecting higher-value physical infrastructure and indirect losses.[22]

However, fatalities from disasters are particularly acute in developing countries, due to less effective infrastructure, emergency response and health care. The total impact also falls disproportionately on the poor *within* states, as well as on women, children and discriminated groups. This has been evident in the developing countries devastated by the Indian Ocean (or Asian 'Boxing Day') tsunami in 2004, Cyclone Nargis in Burma (Myanmar) in 2008, and the higher impact on certain schools and rural villages compared to metropolitan Chengdu following the

[18] Farber (2011), pp. 15–19. See also Saul et al. (2012).

[19] See also generally OECD (2003), pp. 38–42.

[20] A major problem following Hurricane Katrina, for example, was contamination resulting from fuels, chemicals and other products stockpiled in the severely flooded urban areas: Verchick (2010), pp. 132–135.

[21] Kunreuther and Useem (2009), pp. 3–4. Recent preliminary research, however, indicates considerable resilience across disparate countries within Asia—namely China, Burma (Myanmar) and Iran—in rebuilding families after recent natural disasters: James (2013). On earthquake risks concerning Iran's sole nuclear reactor, see also http://www.smh.com.au/world/quake-too-close-to-irans-reactor-for-comfort-20130412-2hqoq.html.

[22] World Bank (2010), pp. 26–30. Earthquakes are the deadliest events globally—except in Africa, where droughts kill the most people. See also the growing impact of 'natural' and 'technological' disasters outlined in OECD (2003), pp. 33–37.

2008 earthquake in Sichuan.[23] Yet similar effects on vulnerable groups are evident in developed countries too, as highlighted in the aftermath of Hurricane Katrina and a week-long heat wave in Chicago that killed over 700 residents.[24] In Japan, the 2011 tsunami hit the elderly and infirm particularly heavily, given that the mostly rural Tohoku area tends to have a greater aged population than the rest of the country.[25]

Some argue that contemporary elites sometimes take advantage of high-profile shocks, such as natural disasters but also terrorist attacks and economic crises, to impose drastic free-market 'solutions'. This general theory of 'disaster capitalism'[26] appears to be overstated, but some developers and (especially local) governments do seem to have profited from the 2004 Indian Ocean tsunami by clearing out coastal villages, for example, in some parts of Sri Lanka.[27]

More generally, over 20 years ago Beck argued presciently that we increasingly live in a 'risk society' characterised by a peculiarly modern belief in rationality, calculability and science.[28] This creates new risks—viewed as the anticipation of catastrophe—and greater awareness of other risks, while heightening feelings of uncertainty as well as highlighting persistent limits in the human capacity to control risks. Such tensions have been exacerbated as risks become increasingly global—involving new technologies with regional or world-wide reach, as well as increasing interdependence between the local and the global—and as more opportunities emerge to 'produce' risks for political gains.[29] It does appear that contemporary societies encounter novel and greater risks, but also a new way of 'understanding' the world.[30]

Typically adopting a more micro-level perspective, other theories of risk (and associated disasters) increasingly emphasise *risk perception*: the psychological and emotional factors associated with risk, which render more complex what was originally considered the more 'objective' field of *risk assessment*. From the

[23] Verchick (2010), pp. 111–116. On the tsunami, see also Aldrich (2012a, b), pp. 91–95; Jayasuriya and McCawley (2011). Focusing on Indonesia, see Samadhi (2013), in this volume and Butt (2013), in this volume. On disasters in China, see Bath (2013), in this volume.

[24] Farber (2011), pp. 21–23.

[25] Anderson (2011). On the impact on women, see also Ito (2012). In New Zealand, see White and Grieve (2013), in this volume.

[26] Klein (2007).

[27] Verchick (2010), pp. 152–154. The aftermath of Japan's triple disasters in 2011 may also suggest examples of 'disaster developmentalism'. That is, there are concerns that the government is excessively prioritising larger established Japanese firms for remedial work projects, compared to smaller and more innovative firms (including foreign firms), especially regarding decontamination from the nuclear accident. See Tabuchi (2013).

[28] Beck (1992). The increasing awareness of the vulnerability of certain groups in disaster situations, and the human rights implications, can also be associated with a modernist worldview: see generally Tanase (2010), especially pp. 95–105.

[29] Beck (2009). But compare O'Malley (2008).

[30] Hutter (2010), pp. 4–11. See also for example Boin (2010), pp. 233–234. Bostrom and Cirkovic (2008).

1970s, decision scientists and psychologists began to demonstrate that individuals tended to be much more concerned about certain types of risks, especially those they were personally unfamiliar with or those involving new technologies. Such research has also increasingly shown that people perceive low-probability and high-consequence events very differently from experts, deploying various biases and heuristics (or rules of thumb) instead of the probabilistic assessments expected and advocated by disciplines such as economics.[31] Five now widely-recognised phenomena are 'availability', 'representativeness', 'confirmation bias', 'anchoring' and 'overconfidence'.[32] Others include 'hindsight bias', the 'conjunction fallacy', the 'affect heuristic' and 'scope neglect'.[33] Several of these, as well as other departures from economically rational behaviour, are related to people's general intuitive tendency to react more strongly to losses than gains.[34]

Such 'subjective' factors in decision-making by individuals complicate strategies for *risk management*, developed by economists and other policy analysts to reduce future losses from disasters and to facilitate recovery. Kunreuther and Useem therefore suggest various hybrid improvements for risk-management strategies, encompassing: risk forecasting, communication of risk information, the design of economic incentives, private–public partnerships, reinsurance and other financial instruments, resilience and sustainability (especially in developing

[31] Kunreuther and Useem (2009), pp. 6–8.

[32] Cleary (2009), p.70 (original emphasis):

- **Availability:** We tend to interpret any story through the lens of a superficially similar account. We recall unusual, emotionally charged events more easily and unconsciously adjust the specifics of the new case, and of our recollections, to make the two fit. This distortion often leads to our misjudging the probability of an event, as things that we can recall easily seem more likely.
- **Representativeness**: We judge the substantial similarity of events based on superficial, perhaps insignificant, resemblances. We also tend to see *patterns* in circumstances where none exist.
- **Confirmation bias**: We underpin an assumption by focusing on instances that confirm it, while ignoring those that don't.
- **Anchoring**: We cling mentally to a number or "fact" that we have absorbed in a particular context, and employ it more generally across a presumed field, even when it is irrelevant or misleading in another context.
- **Overconfidence**: We tend to overestimate the probability of our success in actions that we plan.

[33] Yudkowsky (2008). He also outlines another bias, relevant to management of global catastrophic risks, which derives instead from the wider field of social psychology: 'bystander apathy', whereby larger numbers of people are *less* likely to act in emergencies.

[34] Kahneman (2011), especially pp. 282–286. This summarises 'prospect theory', premised not only on loss aversion, but also decision-making made relative to a reference point—such as one's level of wealth, which may be subject to the 'anchoring' heuristic—and a principle of diminishing sensitivity to sensory dimensions as well as the evaluation of changes in wealth. According to this theory, in mixed gambles (where losses and gains are possible), loss aversion results in very conservative choices; but when faced with bad choices, comparing a sure loss to a larger but merely probable loss, diminishing sensitivity leads to risk-seeking behaviour.

countries), and building leadership for averting and responding to disasters before it is needed.[35] In a similar vein, noting the political tension implicit in a democratic system if economists and other public policy experts view risks differently to the general public, Kahneman also favours a compromise solution: 'Psychology should inform the design of risk policies that combine the experts' knowledge with the public's emotions and intuitions'.[36]

1.2 Disaster Management

This volume takes a broad approach to 'disaster management', which we divide generally into:

1. Disaster mitigation (including prevention);
2. Relief (emergency and subsequent short-term responses); and
3. Recovery (longer-term post-disaster assistance, including compensation and reconstruction).[37]

While useful for conceptual and practical purposes, these three aspects or phases are not completely independent. For example, a generous government-supported compensation scheme for a nuclear accident or liberal zoning rules in coastal areas can create incentives for nuclear plant operators not to take sufficient precautions to minimise risks of accidents, or citizens building too close to tsunami-prone coastlines. A more holistic view of disaster mitigation, relief and recovery may also help identify new possibilities for effective disaster management. For example, Leonard and Howitt urge more attention to certain recovery activities *before* a major event arises, just as policy-makers increasingly prepare in advance for relief efforts that can be implemented soon after a disaster strikes.[38] These *ex ante* measures could include identifying or revisiting regulations that might need to be suspended to allow rapid rebuilding, developing financial arrangements to allow better access to resources for recovery efforts, and measures to bolster neighbourhood-based leadership. Unlike disaster mitigation measures, such 'advance recovery' actions are not necessarily aimed at reducing the consequential harm from the hazard (or indeed its likelihood); instead, they aim 'to make whatever recovery *does* need to take place more efficient, rapid and effective'.[39]

[35] Kunreuther and Useem (2009), pp. 13–17. On hazard information-sharing in the context of the Fukushima nuclear power plant disaster, see Aronson (2013).

[36] Kahneman (2011), p. 145.

[37] Compare also Alemanno (2011), p. xxii; Leonard and Howitt (2009), pp. 24–25; OECD (2003) and McCawley (2011).

[38] Leonard and Howitt (2009).

[39] Leonard and Howitt (2009), p. 26 (original emphasis). Another example may be a 'template' or general principles for establishing compensation funds or other relief and recovery measures: see Verchick (2010), pp. 178–182. A similar approach is urged, in decision-making more generally, by

In Chap. 2 of this volume, focusing primarily on relief and recovery in Japan, Reich examines patterns of 'care, compensation and clean-up' as well as how disasters can progress from 'private' to 'public', and 'political' issues.[40] Another key research question explored by several contributors is whether such patterns or stages vary significantly across countries. Rheuben in Chap. 5, for example, suggests that a more 'hands-off' approach to compensation issues may be taken by Australia and other jurisdictions that expose their government to less potential liability for allegedly not adequately preparing for or responding to disasters. Other chapters focus more on disaster mitigation and preparedness, such as Nasu on emerging risks from nanotechnology.

Generally, researchers and policy-makers are increasingly placing emphasis on such *ex ante* questions. In the US, for example, both Hurricane Katrina in 2005 and the 11 September 2001 terrorist attacks revealed that the government was alarmingly under-prepared for large-scale disasters, and that its structures remained heavily focused on *ex post* issues such as disaster relief.[41]

Disaster management in a broader sense has consequently become a burgeoning field in many developed countries, and more recently in parts of the developing world. Important research centres, often established after major natural disasters and increasingly interested in disaster mitigation or planning problems, are now found in the US (such as the Natural Hazards Centre at the University of Colorado, since 1976[42]; and the Pacific Disasters Centre, affiliated with the University of Hawai'i, since 2006),[43] Australia (the Centre for Disaster Studies at James Cook University, 1979),[44] Zambia (the African Centre for Disaster Studies, 2002),[45] and

Taleb (2012): given the possibility of 'black swans' (highly uncertain but dramatic occurrences) and other difficulties in predicting major adverse events, far more attention should be paid to mechanisms that facilitate dealing with their consequences. See also, on fostering resilience generally, Zolli and Healy (2012).

[40] Reich (1991). See also Reich (2013), in this volume.

[41] Nolon and Rodriguez (2007), p. 1, adding that:

> If there is an overarching philosophy of disaster mitigation and relief, it is essentially this: government ought to respond rapidly, compassionately and efficiently to minimize, and ultimately help compensate for, the injuries and other losses incurred by well-meaning citizens resulting from acts of God.

[42] http://www.colorado.edu/hazards/. Collaborating with a Centre established in 2008 at the North Dakota State University: http://www.ndsu.edu/cdsem/.

[43] http://www.pdc.org/iweb/history.jsp?subg=1 (first established in the early 1990s, after Hurricane Iriki devastated Kauai). The University has increasingly focused on tsunami research: http://www.soc.hawaii.edu/uhtoday/research/tsunami/index.html. See also the University of Southern California, at http://www.tsunamiresearchcenter.com/.

[44] http://www.jcu.edu.au/cds/about/index.htm (established after cyclones devastated Townsville in 1971 and Darwin in 1974.) On the latter, see Writer (2011), pp. 104–116.

[45] http://acds.co.za/.

India (the Jamsetji Tata Centre for Disaster Management, consolidated in 2006).[46] There are several journals dedicated to disaster studies,[47] as well as looser research networks such as the Law and Society Association's collaborative research network on the 'Jurisprudence of Disasters'.[48] Japan's catastrophes in 2011 have generated major international research conferences in Australia, the US as well as Japan.[49] International and national non-governmental organisations (NGOs) are also active in policy debates in this field.[50]

In addition, nation-states increasingly have specialist agencies responsible generally for disaster management. In Australia, for example, the federal Attorney-General's Department has recently recognised that:

> [M]any hazards and circumstances can give rise to the need for an emergency management response, whether it is bushfires, a terrorist attack or a pandemic. This approach is consistent with the National Security Statement 2008, which takes an all-hazards approach to national security.
>
> In December 2009, COAG [the Council of Australian Governments] agreed to adopt a whole-of-nation resilience-based approach to disaster management, which recognises that a national, coordinated and cooperative effort is needed to enhance Australia's capacity to prepare for, withstand and recover from disasters. The National Emergency Management Committee subsequently developed the National Strategy for Disaster Resilience, which was adopted by COAG on 13 February 2011.
>
> The purpose of the Strategy is to provide high-level guidance on disaster management to federal, state, territory and local governments, business and community leaders and the not-for-profit sector.[51]

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[46] Partly in the wake of the 2004 Indian Ocean Tsunami: see generally http://www.tiss.edu/TopMenuBar/academic/centres-of-schools/centres-of-school-of-habitat-studies/jamsetji-tata-centre-for-disaster-management.

[47] See for example *Disasters* (since 1977), *International Journal of Mass Emergencies and Disasters* (since 1983), *Disaster Prevention and Management* (since 1994), *Australasian Journal of Disaster and Trauma Studies* (since 1997), and recently the *International Journal of Disaster Resilience in the Built Environment* (since 2010).

[48] Established from a seminar hosted by the headquarters for the Research Committee on the Sociology of Law, within the International Sociological Association: http://jurisprudenceofdisasters.org/about-us/.

[49] See Nottage (2013); as well as Cornell University conference on '3.11.12 Japan's Earthquake and Tsunami One Year Later' (http://eap.einaudi.cornell.edu/3-11-2012_conference) and the ACCEL conference on 'Climate change, catastrophic risk and disaster law' (http://sydney.edu.au/news/law/457.html?eventid=9840).

[50] In response to the Fukushima nuclear plant meltdown, for example, see Greenpeace (2012).

[51] At http://www.em.gov.au/AboutAGD/Ourorganisation/Pages/default.aspx. The National Strategy can be found at http://www.em.gov.au/Publications/Program%20publications/Pages/NationalStrategyforDisasterResilience.aspx; and COAG (comprising leaders of federal, state and territory governments, as well as the President of the Australian Local Government Association), at http://www.coag.gov.au/. Eburn (2011) has urged greater leadership from the federal government. Comparing bushfire disaster management in Australia and the US, see also Burton (2013). On recent floods, particularly in Queensland, see Queensland Floods Commission of Inquiry (2012); and McGowan (2012), pointing out that damages from floods and cyclones exceeded Australian $7.5 billion but Queensland's allocation of national funding for disaster mitigation was only Australian $9 million. For other disasters in Australia, see generally Writer (2011).

Currently, the Attorney-General also serves as Minister for Emergency Management, and liaises with state and territory government counterparts and officials within Australia's federal system of government.[52] The National Strategy has been developed by the Australia-New Zealand Emergency Management Committee, and centres on six principles aimed at 'consistent messaging about disaster resilience':[53]

- **Disasters will happen**
  Natural disasters are inevitable, unpredictable and significantly impact communities and the economy.
- **Disaster resilience is your business**
  Governments, businesses, not-for-profit, communities and individuals all have a role to play and to be prepared.
- **Connected communities are resilient communities**
  Connected communities are ready to look after each other in times of crisis when immediate assistance may not be available.
- **Know your risk**
  Every Australian should know how to prepare for any natural disaster.
- **Get ready - then act**
  Reduce the effects of future disasters by knowing what to do.
- **Learn from experience**
  We reduce the effects of future disasters by learning from past experiences.

As illustrated by the input into the 2011 Strategy from New Zealand, a particularly close economic and diplomatic partner,[54] Australia increasingly collaborates with other countries in making and implementing disaster management policy. The main avenue is the Australian Agency for International Development (AusAID), which almost doubled its grants for 'disaster risk reduction' in developing countries between 2009 and 2011.[55] AusAID emphasises the Asia-Pacific, and in December 2011 signed a Memorandum of Understanding with its counterpart in Japan to coordinate efforts in the region, including in the field of disaster management.[56]

AusAID also established in 2008 the Australia–Indonesia Facility for Disaster Reduction, with the Indonesian government. The Facility has partnerships with the UN, the Association of South East Asian Nations (ASEAN) and the Asia Pacific Economic Cooperation (APEC) forum. All of these are more broadly engaged in

[52] The Attorney-General is similar to a Minister of Justice found in many other Asia-Pacific jurisdictions. On the particular problems for disaster management faced by the US federal system of government, see for example Hunter (2009).

[53] Australian Government Attorney General's Office (2011) (emphasis in original). See also Bergin (2011).

[54] See generally Nottage (2009b).

[55] From Australian $55 to $111 million: AusAID (2012).

[56] Japan International Cooperation Agency (2011).

disaster management activities, along with other international bodies such as the World Bank and the World Health Organisation (WHO), as outlined in Appendix A.[57] AusAID also supports research for the UNISDR's biennial Global Assessment Report, as well as the University of New South Wales in a review of Community-Based Disaster Risk Management initiatives.[58]

The Australian Strategic Policy Institute, established by the federal government in 2001, has also recently completed research into disaster management. A report published in February 2011 assessed various approaches for Australia to effectively finance disaster preparedness and recovery.[59] Another report published in December 2011 notes that Australia, Japan and the US are actively promoting disaster risk management as a key component of their Asia–Pacific relations and regional military engagement strategies.[60] Defence forces are increasingly involved in cross-border disaster relief operations and, in doing so, are also paying growing attention to longer-term recovery issues in the affected communities.

Similar government entities in other countries that are engaged in disaster management increasingly deal with their counterparts abroad, as well as international organisations (including NGOs) and researchers specialising in disaster studies. Collectively they have formed a significant 'epistemic community', not unlike those found in various areas of 'global business regulation'.[61] The close links between (inter-)governmental bodies also provide a good example of contemporary 'trans-governmentalism'.[62]

1.3 Socio-Legal Perspectives

1.3.1 Social Sciences and the Humanities in Disaster Studies

As an intellectual field, 'disaster studies' emerged not only from the natural sciences and applied disciplines like engineering, but also a range of social sciences—the focus of the present volume. Philosophers, for example, have long been challenged by natural disasters. Voltaire was deeply moved by the huge

[57] See AusAID (2012).

[58] AusAID (2012). Curiously, however, Australian government officials were not directly represented on the Steering Group of the OECD Futures Project on Emerging Systemic Risks—the Australian delegate was from the ANZ Bank: OECD (2003), p. 285.

[59] Mortimer et al. (2011).

[60] Yates and Bergin (2011). On the widely-reported 'Operation Tomodachi' in 2011 after Japan's triple disasters, involving primarily US military forces (numbering around 20,000) and Japanese forces (100,000—half Japan's total troop strength) but also some Australian input, see Ames and Koguchi-Ames (2012) and more broadly Samuels (2013), pp. 80–109.

[61] See generally Braithwaite and Drahos (2000).

[62] Slaughter (2001).

Lisbon earthquake and tsunami in 1755.[63] Williams James found a 'moral equivalent of war', in promoting more selfless and purposeful citizenship, in the responses of many residents and the broader community to the San Francisco earthquake of 1906. Large-scale disasters, such as the massive accidental explosion in Halifax harbour (in Canada) in 1917, also led to significant advances in the field of sociology.[64] They have also directly or indirectly influenced major works of literature, such as the account by a Nobel laureate of the impact from radiation caused by the atomic bombing of Hiroshima.[65] A rich genre of science fiction involves imagined future catastrophes, particularly those caused by new technologies, as described by Suter (2013), in this volume. Such literary works serve to frame the general public's risk perceptions, but can also assist policy-makers in 'scenario planning' for disasters.[66]

Disasters have also played major roles in developing more instrumentalist disciplines, such as logistics and medical science—often linked to the development of military capabilities for rapid deployment in response to emergencies.[67] More recently, especially as *ex ante* issues in disaster management attract more attention, economic analysis has become a major part of disaster research and policy-making. For example, Posner argues that catastrophic risks need to be dealt with through innovative applications of cost–benefit analysis, as well as a scientifically literate legal profession, enhanced international cooperation and a pragmatic attitude toward civil liberties.[68] In addressing 'worst case scenarios', Sunstein draws extensively on 'behavioural economics' to suggest ways in which experts might counter the heuristics and biases in risk perception and other 'irrationalities' in individuals' decision-making, which have been increasingly highlighted by psychologists (as mentioned above).[69]

However, such attempts to re-assert the advantages of cost–benefit analysis in disaster management are attracting growing concern. Some scholars have highlighted persistent 'market failures' in ecosystem services, due to ignorance, a

[63] Verchick (2010), pp. 1–2.

[64] Solnit (2009), pp. 49–57, 73–81.

[65] Oe (1995) (originally published in 1965, and translated into English in 1981). Following Japan's 2011 disasters, see also, for example, Ehrlich (2013). The diffusion of e-publishing has also already resulted in a plethora of more impressionistic accounts, often freely downloadable to e-readers from websites such as Amazon.com.

[66] Verchick (2010), pp. 239–45. As Albert Einstein once remarked: 'imagination is more important than knowledge': Verchick (2010), p. 142.

[67] Such connections underpin the 'militarisation' of disaster preparedness and relief in recent years, including planning for climate change impact. See, for example, Bergin (2011) and Saul et al. (2012), pp. 220–221.

[68] Posner (2004). See also Posner (2008).

[69] Above, n 31 and ensuing text. One of his longstanding concerns is the 'availability cascade', whereby popular discussion of a risk becomes self-feeding and results in individuals overweighting its importance. See Sunstein (2007), and more generally Sunstein and Thaler (2008). In 2009, Sunstein was appointed head of the White House's Office of Information and Regulatory Affairs, charged with advising US President Obama on risk regulation policy.

narrow view of economics and lack of service-based markets. More broadly, the economic analysis of catastrophes suffers from conceptual and practical problems associated with 'monetisation' (the attempted quantification of costs and benefits in monetary terms), setting appropriate discount rates for long-term risks in dealing with uncertainty.[70] Influenced also by insights from the environmental sciences, Verchick therefore advocates a more 'precautionary approach' to disaster risk management. One variant of this approach is the 'feasibility principle': providing the maximum level of protection that can be achieved by the available technology unless the cost of that protection would threaten the financial viability of a regulated industry. Another is 'open-ended balancing', where regulators 'consider a variety of qualitative and quantitative factors without converting them into any universal currency . . . and without even assigning them relative weights'.[71]

Other scholars, such as Kahneman, have also recently invoked political theory to take issue with behavioural economists such as Sunstein who urge more 'government by experts'.[72] Even more so than Kahneman, Kahan strongly criticises Sunstein for elevating the experts of risk regulation above citizens without giving their 'irrational' risk perceptions sufficient credence, particularly given that such perceptions appear to be systematically linked to distinct worldviews or personal value preferences. Kahan argues that such perceptions deserve more respect in a liberal democracy that seeks to generate policy choices that are not simply dictated by the preferences of the majority of voters—let alone, decisions by unelected experts.[73]

Another strand of empirically-informed political science, 'social capital' theory,[74] provides further challenges to conventional economic approaches to disaster risk management. Comparing sub-communities afflicted by the Indian Ocean Tsunami (2004), earthquakes in Tokyo (1923) and Kobe (1995), and Hurricane Katrina in New Orleans (2005), Aldrich shows that the most significant determinant of post-disaster recovery is the extent of community bonds, rather than income levels or degree of physical harm suffered.[75]

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[70] Verchick (2010), pp. 45–54, 205–208. See also Ackerman and Heinzerling (2004), especially pp. 117–152.

[71] Verchick (2010), pp. 198–199.

[72] Kahneman (2011).

[73] Kahan (2007). He also argues that Sunstein's approach is deficient on an empirical basis, as well as normatively. Kahan's empirical studies into perceptions of various risks, including nanotechnology, contradict Sunstein's view that providing more information (for example via 'objective' experts) will result in less polarisation of views among the general public and therefore better (and more legitimate) policy choices. Instead, polarisation diminishes if the expert is readily associated with the individual's distinct worldview. See, with further references, Nottage and Kozuka (2012), pp. 143–144.

[74] See also generally Leigh (2010).

[75] Aldrich (2012b) especially pp. 149–151. Communities enjoying higher social capital benefitted because it provided 'informal insurance', a means of overcoming collective action problems, and a way to enhance the 'voice' of survivors—reducing the probability of their leaving disaster zones. Conversely, this sometimes generated downsides for less connected or minority groups. For a general outline of the Kobe earthquake, see Aldrich (2012b) pp. 74–77.

1.3.2 The Role of Law in Disaster Studies: The Poor Cousin?

The discipline of law is a relative late-comer to the field of disaster studies. Yet various aspects of the legal system are obviously implicated in the approaches to disaster management taken by other social (and natural) sciences. Political science, for example, needs to take into account constitutional and administrative law principles and practices, including fundamental human rights. This corpus of domestic law is increasingly intertwined with obligations created by international law. Both can be mobilised, and increasingly are being mobilised, when preparing for and responding to disasters. Often this is a positive development, but sometimes the encroachment of the law—domestically[76] or internationally[77]—can have adverse effects. For better or worse, the law also generally injects its own distinctive normative structures and values, such as institutional competence, reasonableness and due process, into the ways in which risks and other social realities are viewed and addressed.[78]

Overall, Farber argues that 'disaster law' has emerged as a new overarching field that 'provides a comprehensive look at how to handle risks rather than limiting itself to specific mechanisms such as compensation', which has been a primary concern of tort and insurance law. He also points out that disaster law 'involves public risks, which inherently affect multiple individuals and interests, rather than personal risks that can be managed purely through individual responses'. Because of these parallels, Farber argues that disaster law can benefit particularly from scholarship in environmental law, which emerged earlier (particularly in the 1970s) and which mostly 'involves principles for determining the seriousness of risks and the extent to which society should invest in reducing those risks'.[79] Yet he suggests that environmental law 'has the most to teach disaster law about management and prevention', while disaster law helps to emphasise 'issues of unequal risk exposure and . . . compensation as a supplement to risk mitigation'.[80]

The legal dimensions to disaster management also implicate issues of *ex ante* regulatory design, including health and welfare laws as well as anti-discrimination law both at the domestic and international levels.[81] Disaster law further highlights

[76] For a summary of recent conflicting views on the historical impact of US law in disaster management, see Nolon and Rodriguez (2007), pp. 4–5.

[77] See for example the spread of cholera via Nepalese soldiers brought in by the UN to assist with disaster recovery in Haiti after the 2010 earthquake, a situation ostensibly protected by its Status of Forces Agreement: McGeough (2013).

[78] For a 'systems theory' approach to this phenomenon, for example, see generally Teubner (1993). On this theory, the extra complexity created by the coupling of law with other social sub-systems (such as the political sphere or the scientific world) may help stabilise societies overall at a national level, but these interactions are seriously threatened by external forces such as globalisation: Teubner (2010).

[79] Farber (2011), p. 8.

[80] Farber (2011), p. 3. See also generally Farber et al. (2010).

[81] Verchick (2010), pp. 166–189.

questions about how to regulate in emergency situations, another *ex ante* matter. In this volume, for example, Nasu adopts a security perspective to consider the management of potential disasters arising from or exacerbated by the use of new technologies, such as nanotechnology.

Overall, focusing on recent literature on Japanese law and disasters,[82] Table 1 indicates the broad scope of contemporary 'disaster law'—multiple fields of public, private and international law impacting on disaster mitigation, relief and recovery.

1.3.3 Linking Law and Society

To connect law with socio-economic or political behaviour, and to better explain and plan for disasters, a comparative perspective can be particularly useful. In the case of Japan, for example, three major theories are often deployed to tease out the linkage.[83] First, a 'culturalist' approach argues that 'the Japanese don't like law': instead, they defer to Tokugawa-era cultural norms of harmony, and to social superiors including the government. This is an older theory, especially popular during the 1970s and 1980s among foreign commentators on Japanese law and society, but 'neo-culturalist' theories have experienced somewhat of a revival in recent years.[84]

Following the 2011 earthquake and tsunami, it is hard to ignore the strength of cultural norms as major factors in socio-economic behaviour in Japan—although people everywhere do tend to respond surprisingly positively to disaster situations, especially in the short-term aftermath.[85] Admittedly, there are some indications of increases in theft and other crimes in the Tohoku region,[86] but these seem small relative to reports from some other countries in the aftermath of disasters.[87] There have also been far fewer requests for consultation with legal professionals than after the 1995 Kobe earthquake, despite the latter causing only around one third of fatalities as compared to the Tohoku disaster (with 15,883 dead and 2,681 still 'missing' as of 10 April 2013).[88] However, the Tohoku region is far more rural and has a notable paucity of legal professionals, making it more difficult to even learn about legal issues—let alone to find help in resolving them.[89]

[82] For a succinct recent overview of the myriad legal issues arising from the 2011 disasters, see also Yodoyabashi Yamagami Godo (2011).

[83] On general theories on law in Japan, with further references, see generally Abe and Nottage (2012).

[84] Nottage (2009a).

[85] Solnit (2009). See also Sun (2011) and Aldrich (2012b), pp. 51–52.

[86] Kozuka (2012).

[87] Generally, post-disaster crime rates also depend on the types of losses incurred: comparing the aftermath of the Kanto and Kobe earthquakes, for example, see Hirayama (2012).

[88] National Police Agency of Japan (2013). On consultations, see Ii (2013).

[89] Leflar et al. (2011), updated in Leflar et al. (2012).