



Durham E-Theses

Whose Responsibility is it Anyway? Accountability and Standpoints for Disaster Risk Reduction in Nepal

RAMKUMAR, SHEENA

How to cite:

RAMKUMAR, SHEENA (2022) *Whose Responsibility is it Anyway? Accountability and Standpoints for Disaster Risk Reduction in Nepal*, Durham theses, Durham University. Available at Durham E-Theses Online: <http://etheses.dur.ac.uk/14928/>

Use policy

The full-text may be used and/or reproduced, and given to third parties in any format or medium, without prior permission or charge, for personal research or study, educational, or not-for-profit purposes provided that:

- a full bibliographic reference is made to the original source
- a [link](#) is made to the metadata record in Durham E-Theses
- the full-text is not changed in any way

The full-text must not be sold in any format or medium without the formal permission of the copyright holders.

Please consult the [full Durham E-Theses policy](#) for further details.

Academic Support Office, Durham University, University Office, Old Elvet, Durham DH1 3HP
e-mail: e-theses.admin@dur.ac.uk Tel: +44 0191 334 6107
<http://etheses.dur.ac.uk>

Whose Responsibility is it Anyway?
Accountability and Standpoints for Disaster Risk Reduction in Nepal

Sheena Ramkumar

Abstract

Generalisation, universal knowledge claims, and recommendations within disaster studies are problematic because they lead to miscommunication and the misapplication of actionable knowledge. The consequences and impacts thereof are not often considered by experts; forgone as irrelevant to the academic division of labour. There is a disconnect between expert assertions for disaster risk reduction (DRR) and their practical suitability for laypersons. Experts currently assert independently of the context within which protective action measures (PAMs) are to be used, measures unconnected to the people for whom they are developed. This has knock-on effects for DRR: much expert-generated science and policy remains unused, unimplemented, and sometimes misapplied.

I use philosophical accounts of assertion and epistemic blame to highlight the epistemic relationship between experts and laypersons. This relationship includes responsibilities and agreements between epistemic agents. Since multilevel DRR knowledge still transfers top-down from experts to laypersons, if experts impair the epistemic relationship, they can be held epistemically blameworthy. To address the pervasiveness of top-down systems, I analyse the epistemic framings and narratives currently shaping DRR, and more specifically PAMs and campaigns. I deconstruct universal perspectives that dominate the epistemic processes of generating, disseminating, and implementing DRR knowledge and specifically for co-seismic landslide PAMs for Nepal.

I argue for more inclusive, contextual, and epistemically responsible DRR. Co-production of knowledge should begin from the standpoints of marginalised persons who may have an epistemic advantage due to their socio-politically marginalised positions. Often these epistemic contributions are left out of DRR efforts because marginalised persons are rarely afforded equal, if any, epistemic agency, which results in epistemic gaps and a large pool of relevant knowledge remaining unincorporated and unused in DRR research and policy.

Whose Responsibility is it Anyway?
Accountability and Standpoints for Disaster Risk
Reduction in Nepal

Sheena Ramkumar

Thesis submitted for the degree of
Doctor of Philosophy

Department of Geography
Durham University, UK
2022

Table of Contents

List of Figures	6
List of Tables	8
List of Acronyms and Abbreviations	9
Statement of Copyright.....	12
Acknowledgements.....	13
Dedication	15
Chapter 0 Introduction	16
0.1. Context and Justification for the Thesis.....	16
0.2. Aims and Objectives.....	21
0.3. Definitions and Notes on Terms used within the Thesis	24
0.4. Thesis Structure	34
0.5. Summary	37
Chapter 1 Methodology	39
1.1. Introduction	39
1.2. Chapter Methodologies	40
1.3. The Evolution of My Research Approach	45
1.4. My Positionality as a Researcher	52
1.5. Fieldwork Site Maps.....	57
Chapter 2 Assertion, Contextual Knowledge, and Epistemic Blame.....	61
2.1. Introduction	61
2.2. Norms of Assertion	63
2.2.1. The Reasonable to Believe Norm of Assertion (RTBNA).....	63
2.2.2. The Knowledge Norm of Assertion (KNA).....	65
2.2.3. The Certainty Norm of Assertion (CNA).....	66
2.3. Contextualism and Assertion	68
2.3.1 DeRose – KNA Untenable Without Contextualism.....	71
2.3.2 Simion on Overriding Norms and Prudential Concerns.....	72
2.4. Issues, Objections, and Rebuttals	73
2.4.1 Issues Faced by the Norms of Assertion	73
2.4.1.1. Objections to the KNA	74
2.4.1.2. Exceptions to the KNA	75
2.4.1.3 KNA can be Overridden by Prudential Norms	76

2.4.2. Issues Faced by Contextualists.....	82
2.4.3. Whose Context and Stakes Matter?	85
2.5. Epistemic Blame	86
2.6. Conclusion.....	92
Chapter 3 Rationality and Responsibility in Multilevel Disaster Risk Reduction Decision making.....	94
3.1. Introduction	94
3.2. Rationality, Decision-Making Theories, and Heuristics	99
3.2.1 Rational Choice Theory	101
3.2.2. Expected Utility Theory.....	103
3.2.3. Heuristics.....	104
3.2.4. Summary	110
3.3. The Sendai Framework for Disaster Risk Reduction (SFDRR)	112
3.3.1. SFDRR Critique and Analysis	114
3.4. DRR Governance, Governments, and Governmentality	120
3.4.1 Critique and Analysis of DRR Governance, Governments, and Governmentality	123
3.4.2. Further Marginalisation of Marginalised Groups by Governments	124
3.4.3. Summary	126
3.5. Vulnerability Paradigm Perspectives that Attempt to Include Local Voices, Cultures, and Contexts	127
3.5.1. Epistemological, Institutional, and Strategic Gaps in Disaster Risk Reduction ...	129
3.5.2. Geopower and Assemblage Theory.....	133
3.6. Conclusion.....	135
Chapter 4 A Critical Analysis of Generalisation for Universal Applicability within DRR and for PAMs	137
4.1. Introduction	137
4.2. Analysis of Shared Issues in Hazard and Vulnerability Paradigm Perspectives	138
4.3. Protective Action Measures and Campaigns	145
4.4. Critical Analysis of Landslide PAMs.....	153
4.4.1. Pollock & Wartman (2020)	154
4.4.2. Milledge et al. (2018, 2019)	160
4.4.3 Synthesis	171
4.5. Possible Challenges to Co-production of Knowledge	173
4.6. Conclusion.....	175

Chapter 5 Factors that Impact the Implementation and Performance of PAMs: Nepal.....	177
5.1 Introduction	177
5.2. Building Codes and Infrastructure	180
5.2.1. Analysis of Building Codes and Infrastructure Reconstruction	183
5.3. DRR Governance and Government Structures	188
5.3.1. Analysis of DRR Governance and Government Structures	192
5.4. Use of Science	197
5.4.1. Analysis of the Use of Science	200
5.5. Education	200
5.5.1. Analysis of Education	207
5.6. Culture.....	209
5.6.1. Analysis of Culture	212
5.7. Conclusion.....	214
Chapter 6 Factors that Impact the Implementation and Performance of PAMs: Aotearoa (New Zealand).....	217
6.1. Introduction	217
6.2. Building Codes and Infrastructure	220
6.2.1. Analysis of Building Codes and Infrastructure	221
6.3. DRR Governance and Government Structures	223
6.3.1. Analysis of DRR Governance and Government Structures	225
6.4. Use of Science	227
6.4.1. Waiiau (Franz Josef) Case Study	227
6.4.1.a. Proposed Plan Change 7–Managing Fault Rupture Risk in Westland	233
6.4.1.b. Provincial Growth Fund (PGF).....	233
6.4.2. Analysis of Science	235
6.5. Education	237
6.5.1. Analysis of Education	241
6.6. Culture.....	243
6.5.1. Analysis of Culture	244
6.7. Conclusion.....	246
Chapter 7 Epistemic Injustice within Disaster Risk Reduction & Standpoint Theory as a Methodology.....	248
7.1. Introduction	248
7.2 Epistemic Injustice	251

7.3. Standpoint Theory as a Methodology	254
7.3.1. Possible Critiques of Standpoint Theory.....	256
7.3.2. Standpoint Theory Applied to DRR in Nepal.....	257
7.4. Epistemic Injustice(s) within DRR	258
7.4.1. Issues with Terminology as resulting in Epistemic Injustices within DRR	261
7.5. Division of Labour वर्णाश्रम Varṇa āśrama Vs the Corrupted Caste System.....	269
7.6. Intertwined Ontology and Epistemology, Standpoints on Disaster, and Protective Action Measures	274
7.7. Culture, Neo-liberal Governmentality, and their Impacts on DRR	288
7.8. Conclusion.....	295
Chapter 8 Synthesis and Conclusion	298
8.1. Chapter-by-chapter Summary	298
8.2. Synthesis	307
8.2.1. Proposal	307
8.2.2. The Question of Accountability and Responsibility Within DRR	311
8.2.3. Future Research	314
Appendices.....	318
Appendix 1. An Overview of the Slow-onset Disaster Literature	318
Appendix 2. Consent Form.....	321
Appendix 3. Participant Information Sheet with Privacy Notice	322
Bibliography	326

List of Figures

Figure 0.1.	The five components of vulnerability and their linkages	29
Figure 1.1.	Traversing the terrain. Narrow footpaths to villages are often blocked by landslides	46
Figure 1.2.	Often new foot-paths and access routes have to be created	47
Figure 1.3.	In and around Listi village with the access-route on the bottom right and large landslides visible on the left. The person in the picture uses a mobile phone, for conversations when signal strength allows	49
Figure 1.4.	Everyday village scenes in Listi	50
Figure 1.5.	Generous village elder in Listi-Gumba	54
Figure 1.6.	Map of Nepal (inset) with the villages of Listi, Larcha, Tatopani and Kodari	57
Figure 1.7.	The village of Listi	58
Figure 1.8.	The villages of Tatopani and Larcha	59
Figure 1.9.	The village of Kodari	60
Figure 4.1.	Unequal distribution of authorship (based on affiliation of lead authors) for the seven disasters that stirred the greatest interest between 2005 and 2015	141
Figure 4.2.	Google Trends results for 'duck cover and hold earthquake' (blue) and 'doorway earthquake (red)'	150
Figure 4.3.	Transevent and post-event behaviours during earthquakes in Aotearoa, evaluated and analysed by Vinnell et al (2022)	152
Figure 4.4.	A settlement on the way to Listi, showing typical angles from horizontal line to skyline for most settlements	161
Figure 4.5.	Listi Village, located along steep hillsides, slope angles	162
Figure 4.6.	A sample of Secondary School (grade 12) examination results, indicating few students passed	167
Figure 5.1.	The view from Listi village looking out at Listi-Gumba in the upper centre of the picture	178
Figure 5.2.	Approaching the settlement of Larcha with landslides prominent	179
Figure 5.3.	Crossing the Bhote Koshi river with the Larcha settlement and landslides in the background	179

Figure 5.4.	In Listi, a building lost most walls in the earthquake while a window-shutter holds on	181
Figure 5.5.	Dr. A.M. Dixit commenting on a cartoon featuring him during a NSET group interview.	183
Figure 5.6.	A child plays in a building on route to Listi, with landslides prominent.	185
Figure 5.7.	Buildings in Listi in the foreground, using brick and corrugated galvanised iron sheets and in the background, timber frames on brick	187
Figure 5.8.	A collage of images from Listi-Gumba where the Gumba (Temple) was destroyed by the Gorkha earthquakes	188
Figure 5.9.	Some examples from the NSET Vulnerability Tour, highlighting buildings that are particularly vulnerable to earthquakes	202
Figure 5.10.	A shake-table demonstration by NSET Nepal	203
Figure 5.11.	Teaching material; a Nepali language flyer illustrating what to do before, during, and after an earthquake	206
Figure 5.12.	Advice for what to do during an earthquake by NSET Nepal	209
Figure 5.13.	Landslides and rainbows as the cows come home in Listi	214
Figure 6.1.	Map of Aotearoa with the area of focus in the red outline	217
Figure 6.2.	Location of epicentres during the Waitaha earthquake sequence	218
Figure 6.3.	Waiau village (centre left) and valley with the Waiho riverbed	228
Figure 6.4.	Hundreds were evacuated after floods swept through Waiau in March 2019	229
Figure 6.5.	The aftermath of the flooding which wiped out the Waiho bridge	230
Figure 6.6.	Waiau's proposed relocation, about 10km away, at Lake Mapourika	232
Figure 7.1.	Lamps and colour maṇḍalas during the तिहार Tihār festival	276
Figure 7.2.	A Nepali Paubhā painting of Viṣṇu surrounded by major deities, showing the Daśāvatāras.	280
Figure 7.3.	A 19th century Nepali Bilampau painting of the activities of Kṛṣṇa.	281
Figure 7.4.	Scenes from the life of Buddha, painted on wood, from the 12th century	282

List of Tables

Table 3.1. An analysis of the three issues with respect to the science-policy interface for DRR.	131
Table 7.1. Classification of Janajati Groups.	289
Table 8.1. My summation of current assumptions within DRR and some proposals.	313

List of Acronyms and Abbreviations

ACAPS	Assessment Capacities Projects
AF8	Alpine Fault magnitude 8
AND	Action on Natural Disasters
BC	Building Code
BCA	Building Consent Authority (Aotearoa)
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
CDEM	Civil Defence Emergency Management (Aotearoa)
CEKA	Contextualism for Expert Knowledge Assertion
CERA	Canterbury Earthquake Recovery Authority (Aotearoa)
CIAA	Commission for the Investigation of Abuse and Authority (Nepal)
CNA	Certainty Norm of Assertion
DCH	Duck, Cover and Hold
DUDBC	Department of Urban Development and Building Construction (Nepal)
EMI	English Medium Instruction
ESD	Earthquake Safety Day
EUT	Expected Utility Theory
GNS	Institute of Geological and Nuclear Sciences Limited (Aotearoa)
GoN	Government of Nepal
HFA	Hyogo Framework for Action
ICIMOD	International Centre for Integrated Mountain Development
IHRR	Institute of Hazard, Risk and Resilience
INGO	International Non-Governmental Organisation
I/NGO	International or National Non-Governmental Organisation
KNA	Knowledge Norm of Assertion
KVERMP	Kathmandu Valley Earthquake Risk Management Project

MBIE	Ministry of Business, Innovation & Employment (Aotearoa)
MCDEM	Ministry of Civil Defense & Emergency Management (US)
MoE	Ministry of Education (Nepal)
MoHA	Ministry of Home Affairs (Nepal)
NBC	National Building Code (Nepal)
NEMA	National Emergency Management Agency (New Zealand)
NGO	Non-Governmental Organisation
NRA	National Reconstruction Authority (Nepal)
NSET	National Society for Earthquake Technology (Nepal)
NSSP	Nepal Safer Schools Project
OECD	Organisation for Economic Co-operation and Development
PA	Practical Action
PAM	Protective Action Measure
PC7	Plan Change 7
PGF	Provincial Growth Fund (Aotearoa)
RTBNA	Reasonable to Believe Norm of Assertion
RCRC	Red Cross and Red Crescent Movement
RCT	Rational Choice Theory
SAFER	South Island Alpine Fault Earthquake Response (Aotearoa)
SDG	Sustainable Development Goal
SFDRR	Sendai Framework for Disaster Risk Reduction
SSB	Social Science Baha
UNDP	United Nations Development Programme
UNDRR	United Nations Office for Disaster Risk Reduction
UNGA	United Nations General Assembly
UN-ISDR	United Nations International Strategy for Disaster Reduction
UN-OCHA	United Nations Office for Coordination of Humanitarian Affairs
USGS	United States Geological Survey

WDC	Westland District Council (Aotearoa)
WCEM	West Coast Emergency Management Group (Aotearoa)
WCRC	West Coast Regional Council (Aotearoa)

Statement of Copyright

The copyright of this thesis rests with the author. No quotation from it should be published without the author's prior written consent and information derived from it should be acknowledged.

Acknowledgements

I am grateful for the opportunity to be part of a multidisciplinary cohort of researchers funded by the Institute of Hazard, Risk, and Resilience (IHRR) through the financial support of Durham University Alumnus. I would like to thank my cohort colleagues and friends, Katy Burrows, Samprada Pradhan, and Gopi Krishna Basyal for the insightful discussions, humour, shared experiences, and companionship during the PhD journey. Thank you especially to Gopi Krishna, for affording me the opportunities to become immersed and interactive within Nepal through his vast understanding and experience and through empathic translation. I acknowledge the contributions of the people I had the privilege to meet during my fieldwork, for all that they generously shared, and made me aware of.

I would like to thank my supervisors, past and present, especially Prof. Alexander Densmore: whenever I recall positive and encouraging experiences within academia, I think of you. Thank you for the sincere, open channels of communication, and for enabling my research under atypical circumstances. Many thanks to Prof. Andres Luque-Ayala and Prof. Katherine Puddifoot for taking on supervision through a change of departments and for enduring through the challenges that such change brings.

Dear Dr. Felipe Morales Carbonell, I could not have done this without you. Thank you for tolerating me, for considering philosophical and other perspectives that you may not endorse, (re)reading never-ending drafts, and for being my best friend and critic. Our lengthy discussions across time zones, engaging debates, and lightbulb moments have illuminated my research in ways I am unable to repay.

I would like to wholeheartedly thank Prof. Rachel Colls for taking the time out of her busy academic schedule and engagements to read full drafts of my thesis and offer practical advice, suggestions, and feedback from a position that is unconnected to the project. I am very grateful for your invaluable insights, contributions, and time shared when it was most needed. Thank you immensely.

My sincerest gratitude to Jaya Bhadra Joan Murphy for far too many things to mention here briefly, but most importantly for our treasured relationship. Thank you dearest MJB for (re)reading, proofreading, and sometimes kindly tearing apart the text to bring forth the essence. Thank you for being so expert and yet so compassionate. This journey has become bearable because of your nurturing presence. I cannot thank you enough.

I would like to acknowledge all their efforts and thank dearest Bhakti Rasa Brian Richardson and Kirtida Tanja Silvennoinen for their steadfast and enlivening association. I cannot imagine a life in Durham without your multidimensional presence and unwavering support. My deepest gratitude to HH Bhakti Caitanya Swami and HDG Srila A.C. Bhaktivedanta Swami Prabhupada, my ever well-wishers.

I would like to express my gratitude to my dearest parents, siblings, family, and friends, especially to my beloved husband Keshavananda Kalki Mansel. I am forever indebted to you, Keshava, for all that you have done and continue to do. I would also like to acknowledge

your endurance through the PhD and all its challenges, as well as your perseverance in reading parts of my work, and your triumph of reading through my thesis, once, entirely. You are my biggest supporter and I thank you so much.

I would like to also acknowledge my family and friends who were with me as I began the PhD but are no longer here due to Covid, and the effects of pandemic lockdowns.

Thank you to my dear Nani (maternal grandmother), Lilavati Singh, who so lovingly nurtured me and patiently taught by example, alongside my Nana (maternal grandfather), Sewsunker Singh. Thank you to my dear Aaja (paternal grandfather), Ramkumar Ramluckhan, for imparting deep wisdom and life lessons. It is a privilege to have had your company; I will always treasure our interactions and growing up with you by my side.

My gratitude to my dearest Mama (maternal uncle) Sandesh Allan Singh for all your unconditional love and sacrifices. I have never known a tougher separation than that from you. I thank you unreservedly for everything.

I would like to acknowledge Laxminath Das for his wisdom, guidance, practical mentoring, and for all the experience in working with marginalised, vulnerable, and at-risk communities through Food for Life, South Africa (NGO); and my dear well-wishing friends RadhaGiridhari Das, Kalindi Devi, and Ashley Rameshwarnath who always put others before themselves and served ceaselessly.

Last, but not least, my gratitude for HH Kadamba Kanana Swami knows no bounds. I am lost without your association and look forward to a time when we might see each other again. Thank you for nurturing my individuality and the chances to grow, but mostly for leading by example, dear flying Dutchman.

Dedication

To Kṛṣṇa Gopāla Giridhārī

For all the opportunities and the empowerment

Chapter 0

Introduction

Societies are complex systems – or clusters of interacting systems – that reproduce themselves: their hierarchies, their culture, their practices, and their structures. Most, if not all, societies reproduce profound injustice. How does this work? And how can the process of social reproduction be effectively disrupted and replaced so that better systems emerge?

An important fact about social reproduction is that we all participate in sustaining unjust institutions and social relations, like it or not. We buy food and clothing; we rent or purchase homes; we transport ourselves from place to place; we raise our children and care for our pets; we rely on healthcare and education systems; we seek meaning, and beauty, and love. From a certain perspective, these are individual acts done for reasons, mostly good reasons, that are relatively transparent to us.

But from another perspective, these actions are moves in complex systems of coordination that offer a limited choice architecture shaped by biological, geographical, demographic, economic, historical, and cultural conditions. The systems distribute burdens and benefits in ways that are unjust; yet the workings and consequences of the systems are not transparent, even to those who have the most power to control them.

Haslanger, 2022, 1.

0.1. Context and Justification for the Thesis

In this chapter, I first contextualise my research in the domain of disaster studies. I set out my aims and objectives, offer definitions and notes on the main concepts and terms used in the thesis, present the thesis structure and a summary of my main arguments.

Scientific knowledge claims and expert assertions have become routinely controversial matters. Take for example the purposefully organised campaigns of disinformation over lead poisoning, asbestos, or tobacco, orchestrated by vested interest groups, backed by some scientists and experts in the medical profession for example, that show a reckless disregard for public safety. Scientists and experts were used by vested interest groups to undermine the public's understanding of climate science (Torcello, 2014; Barnwell¹, 2022). Within disaster studies, expert assertions are also controversial.

¹ See *Big Oil Vs The World*.

In the 2009 L'Aquila earthquake in Italy, disaster risk reduction (DRR) experts supplied incomplete, imprecise, and contradictory seismic hazard risk information to laypersons. Bernardo De Bernardinis former vice-president of the Civil Protection Agency's technical department said: "The scientific community tells us there is no danger, because there is an ongoing discharge of energy. The situation looks favourable.' None of the scientists made an effort to correct Bernardinis's imprecise statements" (Torcello, 2014, online). This "created a false sense of confidence" (GAR, 2022, 126) with fatal consequences; the magnitude 6.3 earthquake, felt throughout central Italy, devastated the city, killed 309 people, injured 1,500, and left 80,000 homeless.

Six Italian scientists and an ex-government official, all members of the National Commission for the Forecast and Prevention of Major Risks, were sentenced to six years in prison after a regional court found them guilty of manslaughter. The experts were accused of "offering an unjustifiably optimistic assessment to the local population a week before the disaster. By then, the area had been hit by some 400 tremors over a period of four months and a local researcher had warned of the risk of a major earthquake" (Hooper, 2012, online).

One of the prosecution's witnesses, Guido Fioravanti, whose father died in the earthquake had called his mother at about 11:00 on the night of the earthquake, straight after the first tremor: "I remember the fear in her voice. On other occasions they would have fled but that night, with my father, they repeated to themselves **what the risk commission had said. And they stayed**" (BBC, 2012). "As a consequence [of the advice] when the earthquake struck [...] **people chose to stay indoors instead of stepping outside** as they otherwise would have done, and died as their homes collapsed" (Abbott & Nosengo, 2014, 171).

Judge Marco Billi published his explanation, which under Italian law, is mandatory within 90 days of a sentencing:

The assertions made concerning the assessment of risks connected to the seismic activity in the area around L'Aquila turned out to be **completely vague, generic and ineffective** [...] 'Science' is not being put on trial for not having succeeded in predicting the earthquake [...]. The task of the accused ... was certainly not to predict the earthquake and indicate the month, day, hour and magnitude, but rather, more realistically, [...] prevention of the risk (Davies, 2013, online).

Laypersons, and the judge alike, know that it is not possible to predict earthquakes, and instead questioned the experts' scientific rigour and risk communication: "did they weigh up

all the risks, and communicate these clearly to the authorities seeking their advice?" (Watts, 2011, online). The experts had also dismissed a local, labelled an "amateur" by the academic journal *Nature* (Abbott & Nosengo, 2014, 171) who had evidence of an impending quake; "geologists dismissed his methods as unsound" (ibid). However, Giampaolo Giuliani, was later invited by the American Geophysical Union (AGU) to present his work to its members. "The evidence Giuliani presented aroused intense interest and debate, and the AGU subsequently invited him to take part, with Chapman University and Nasa, in developing a worldwide seismic early warning system" (Dollar, 2010, online).

Responding to the verdict, De Bernardinis said: "I believe myself to be innocent before God and men. [...] But, **if I am judged** by all stages of the judicial process to be guilty, **I will accept my responsibility**" (BBC, 2012). The seismologists were cleared of manslaughter after appealing, while the government official had his sentence reduced to two years (Abbott & Nosengo, 2014).

Should experts only accept responsibility for the consequences of their assertions when judged by a court of law? L'Aquila is a case about communicating risks to a vulnerable population, where experts offered incomplete, imprecise, and contradictory seismic hazard risk information to laypersons, resulting in fatal consequences as people complied with the advice. Risks were downplayed and scientific uncertainty emphasised instead of issuing responsible warnings. Moreover, the role and significance of local knowledge and experience was minimised by academics and experts. Scientific communication and expert assertions have real consequences for public safety. In this thesis I focus on the relationship between experts and laypersons to draw out and highlight some of the (unintended) consequences of expert assertions. I offer a novel account of epistemic blame to show that there is at the very least an epistemic responsibility to clearly communicate possible risks to laypersons without sacrificing DRR knowledge for economic and political priorities.

In line with the recent Disaster Studies manifesto *Power, Prestige & Forgotten Values* (RADIX, 2019), in this thesis I argue that responsible research begins with more responsible researchers. Responsible DRR begins with more responsible epistemic agents (experts, governments, I/NGOs, boundary organisations etc.). However, these agents increasingly depend on the assertions of scientists and experts:

Over the course of the last century, **science has substantially increased its influence on public decision making** across policy domains. In their role as advisers, some authors claim that scientists have emerged as a fifth branch of government (Jasanoff 1990) [...] **the increasing reliance on scientists and experts does present new challenges such as the unclear responsibility of scientific advisors if policies have adverse effects.** This is perhaps more **consequential** in the reduction of disaster risks compared to most other domains where knowledge and policy are **intertwined** (Lauta, 2014b, in Albris et al., 2020, 3).

Interdisciplinary² projects have brought together varied departments, such as philosophy and geography, for the purpose of gaining insight and producing knowledge that may assist in confronting these challenges. My research is interdisciplinary on a practical level, where philosophically informed approaches are integrated with disaster studies to assist within the domain of DRR.

A conscientious development of assistive research to mitigate risks in Nepali communities necessitated understanding people's daily challenges, along with disaster-related challenges. I conducted fieldwork (see Chapter 1) in Nepal to understand the scope of these issues. Once there, the field itself presented much insight and many challenges in terms of systems of operation in socio-political, economic, cultural, educational, and organisational contexts. I conducted further fieldwork in Aotearoa (New Zealand), which faces similar natural hazards, to understand the perspective, role, and use of DRR knowledge. In the context of both countries, I assess DRR techniques and practices currently in use that are significantly improving risk reduction, while I bring to the fore and discuss cases, such as Protective Action Measures (PAMs), that are perceived as DRR tools but perform poorly in practical contexts. There are significant lessons to learn from the mistakes and issues that arise in practice, and such lessons ought to be taken into account when developing future DRR messaging, guidance, and PAMs. Being aware of issues in practice can potentially assist in future to lessen the repetition of duplicate mistakes or similar patterns of problems that

² Such collaboration necessitates various terminology, as outlined in Stember (1991, 4). Cross-disciplinarity has two or more disciplines cooperating while viewing one discipline from the perspective of the other. In the multidisciplinary approach, different disciplines work collaboratively while drawing on their own disciplinary knowledge. Interdisciplinarity integrates and synthesises knowledge and methods from different disciplines, while transdisciplinarity creates a unity of intellectual frameworks beyond disciplinary perspectives, across different domains (cross-domain working). Transdisciplinarity starts with complex societal problems and can be conceived of as problem-oriented research, as reiterated in the literature (Jahn et al., 2012, Hirsch Hadorn et al., 2008, Mobjörk, 2010, Roux et al., 2006, Russell et al., 2008).

affect knowledge generation and implementation and to reduce margins of error for effective DRR.

While 'developed' and 'developing' countries may be prone to similar physical disasters, the degree of impact of the events varies extensively. Nepal and Aotearoa have in recent years suffered a catastrophic sequence of earthquakes and related natural hazards that were generated or set in motion by earthquakes. Primary hazards such as ground shaking and surface rupture as well as secondary hazards such as landsliding, liquefaction, flooding, and changes in river and groundwater flow pose major risks to life and infrastructure (Datta et al., 2018, 11; Orchiston et al., 2018, 389-90). To mitigate risks from earthquake-triggered landslides, the current context ought to be surveyed and stock taken of significant developments to date, therefore in this thesis I examine both large earthquakes and co-seismic landslides.

Co-seismic landsliding is a highly unpredictable, but almost assured, natural hazard that accompanies high-magnitude earthquakes. Landslides are mass movements that occur on the surface of the land and consist primarily of soil, rock and boulders that cause debris flows, and in some cases, rockfalls. The feeble capacity of an unprotected human body and its inability to withstand heavy impacts by debris, and more often than not, complete burial, means that inevitable fatalities occur as a result. Furthermore, in the Anthropocene age, the unmistakable role of humans, and the interference caused to otherwise natural patterns, compound and influence the increase in landslide occurrence and fatalities (Petley, 2012; Palmer, 2022).

Devastating landslides have resulted from major earthquake events, causing unprecedented damage to infrastructure, and resulting in the loss of several lives. Nevertheless, it is often the case that multi-hazard databases classify a disaster's fatalities by the trigger rather than the cause of death (Petley, 2012; Palmer, 2022). As a result, numerous deaths from landslides are classified (imprecisely) as being due to their earthquake or cyclone trigger, rather than from the landslide itself, which leads to fewer fatalities attributed directly to landsliding, minimal reporting, and an underestimation of landslide impact. Moreover, such an underestimation of true impact results in non-prioritisation of global-scale landslide research and mitigation.

According to Pollock & Wartman (2020, 2): “Human casualties in landslides are often related to the collapse of occupied buildings”, this therefore necessitates observing and analysing both seismic and co-seismic protective messaging and actions as collapse could occur during the sequence of earthquakes or the resultant co-seismic landslides. Earthquake triggered landslides can occur during the earthquake or over the course of a few years thereafter. Earthquakes and co-seismic landslides are linked by the earthquake trigger therefore protective action measures and messaging for both hazards are evaluated and assessed in the thesis, where data is available.

“[T]here remains an absence of readily available information on what is actually useful for decision makers who are tasked with dealing with an earthquake and its cascading hazards, particularly where rapid response times are key” (Williams et al., 2018, 186). This remains an especially pressing issue, mainly because of the painstakingly and ultra-slow rate at which co-seismic landslide inventories are drawn up for academic research purposes, which is starkly contrasted with the requirements for rapid, widespread coverage and identification of broad areas of concern. Literature, understanding, and general communication to populations that are considered to be at high risk are few and far between. Unlike the much publicised and broadcast earthquake, preparation through informative messaging, guidelines of what to do in a landslide, or PAMs concerning landslide safety, are direly lacking, and it is rare that research focuses on investigating the vulnerability of people to co-seismic landslides (Glade, 2003; Lin et al., 2017; Massey et al., 2019; Pollock & Wartman, 2020).

0.2. Aims and Objectives

It would appear that DRR knowledge, guidance, and processes are widely applicable across geographic locations, due to the global internalisation and acceptance of such rationalities. However, this thesis reveals the extent to which these seemingly consistent DRR processes have very different local manifestations.

Aim: This thesis aims to develop an open space for defining what a context sensitive, inclusive approach for effective co-seismic landslide risk reduction in mountainous Nepali communities should include. This qualitative, hybrid, interdisciplinary approach considers

knowledge from a range of sources including cross-sector practitioner, and communal knowledges, as well as scientific and expert knowledge.

There are two main research questions:

Question 1: Can current DRR knowledge processes and outputs be effectively applied in a generalised manner?

Through the methods of deconstruction and critical discourse analysis, I critically interrogate, deconstruct, and analyse the assumptions and practices currently used within DRR.

Objectives

1.1. On the question of universal applicability of knowledge, guidelines, and frameworks in the context of DRR: How do current DRR experts, policy, and decision-makers understand the impact of culture, and inherent power structures that affect the everyday lives and needs of the residents of mountainous Nepali communities? What roles and functions do the government and related structures have in DRR efforts and practices for mountainous Nepali communities, and how effective are government structures in offering assistance and public services for mountainous Nepali communities? (Chapters 3, 4, 5 and 7).

1.2. What are the difficulties and barriers faced by mountainous Nepali communities in their efforts to minimise risks from co-seismic landslides? Chapters 4, 5, and 7. Do these barriers and difficulties differ in other 'developed' DRR contexts (Aotearoa)? Chapter 6.

1.3. What are the recommended ways of guiding action during and after disasters - their limitations/effectiveness? Chapters 4, 5, 6 and 7.

Question 2: What should current and future DRR knowledge and decision-making processes change for more effective DRR in the context of Nepal?

I construct and set out a novel alternative to current DRR methodologies in an applied manner by addressing:

Objectives

2.1. What role should local people have in DRR knowledge processes? Chapter 7.

2.2. What components should be dealt with by experts? Chapters 4, 5, 6 and 7.

2.3. What does fair and just epistemic agency and participation look like? Chapter 7.

I will propose Standpoint theory as a methodology for more inclusive DRR research where co-production of knowledge and a people-centred approach are core. I will argue that socio-political, cultural, and economic factors be taken into account from the initial stages of research.

The epistemic claim or view that there can be a universal applicability of knowledge, guidance, processes, frameworks, and rules still predominates within the domain of DRR as motivated for in the recent literature (Milledge et al., 2019; Pollock & Wartman, 2020). Designed at a global scale, these technocratic approaches exclusively consider scientific knowledge, which results in a top-down transfer of knowledge (Gaillard & Mercer, 2013), and an unbalanced input in the processes of DRR decision-making. Social, cultural, and political factors are always intertwined in any attempt to offer knowledge, education, or expertise for the benefit of society. Case study examples from practitioners show that the universal applicability rationale is flawed, and why the development of knowledge to minimise risk requires that social, cultural, and political contexts be considered from the initial stages. I argue that there is a need to situate DRR knowledge and guidance for particular contexts, if knowledge is to be used effectively. It is for these reasons that I apply Standpoint theory as a methodology for more inclusive DRR.

Milledge et al. (2018) and Pollock & Wartman (2020) among others in the field of DRR seem to advocate for a universality of rules, norms, and guidelines, which they propose could be used in any context that experiences the same geohazards like earthquakes and co-seismic landslides (I discuss this in Chapters 3 and 4). While this may be the case in a field like mathematics where rules are universally the same, I argue that this is not applicable in the domain of DRR, especially where rules, norms, and guidelines serve to inform people and assist dynamic and diverse groups of decision-makers in different contextual circumstances. Furthermore, social, and political factors are always intertwined in any attempt to offer knowledge, education, or expertise for the benefit of society, thus no single generalisation will be applicable in all DRR contexts.

0.3. Definitions and Notes on Terms used within the Thesis

Defining terms is problematic and contentious due to different notions and connotations of use within DRR. “Nietzsche is suggesting that if someone, a philosopher perhaps, thinks that all we need for understanding are clear definitions – that one can get to the essence, identity or meaning of something by summing it up in abstract or logical terms – they are badly mistaken” (Harrison, 2006, 2). While I agree with Nietzsche, in this section I nevertheless aim to offer some epistemic clarity on how I use terms. Contentious and tough-to-define terms are still used in the thesis with the intention of highlighting the problematic aspects of use and perhaps transforming the ways in which some of the terms are used without discarding them altogether.

Landslides

A landslide is “the movement of a mass of rock, earth, or debris down a slope” (Crozier, 1999, 371). Co-seismic landslides are triggered by earthquake events and may continue for extensive periods after the trigger event. This is the basic definition that I use in the thesis.

Froude and Petley (2018) have researched global fatal landslide occurrence from 2004 to 2016. According to the authors: “The data show that in total 55 997 people were killed in 4862 distinct landslide events” (ibid, 2161). Several different global databases are actively maintained, like the EM-DAT International Disaster Database, the NASA Global Landslide Catalogue, and the Global Fatal Landslide Database (GFLD) previously known as the Durham Fatal Landslide Database. “Global disaster databases are also maintained by risk reinsurers, but landslides are often included within broader categories (such as geophysical hazards or within weather-related hazards), and the majority of data are not freely available” (ibid).

Hazard

From a technical perspective, possible definition(s) read: “(Geo)hazard: natural geological processes that impact adversely on people and the built environment. Related to meteorology (rainfall), tectonics (earthquakes and volcanoes), geochemistry (volcanoes), and geomorphology (mass movements). Climate change exacerbates the magnitude and intensity of these hazards” (Dept. of Earth Sciences RHU, 2020). In this definition, there are actually two concepts, ‘hazard’ and ‘geohazard’ being used synonymously; however, not all hazards are geohazards. This is important to note because most technical, scientific

definitions simply focus exclusively on physical hazards. Actually, hazards are not entirely free of human influence (Wisner et al., 2012b), but many frameworks either focus on the human aspect and only slightly reference the physical environment and natural hazards, or focus mainly on the physical aspect with a nod to or very brief engagement with the many underlying risk factors in the human aspects.

The Sendai (and Hyogo) frameworks (UNDRR, 2015, 3) define hazard as:

A potentially damaging physical event, phenomenon or human activity that may cause the loss of life or injury, property damage, social and economic disruption or environmental degradation. Hazards can include latent conditions that may represent future threats and can have different origins: natural (geological, hydrometeorological and biological) or induced by human processes (environmental degradation and technological hazards) (UN-ISDR, Geneva, 2004).

This is the definition that I will use in the thesis.

Disaster

From a hazard-centred perspective, “a disaster is viewed as an extreme event that arises when a hazard agent intersects with a social system” (Perry, 2007, 9). Quarantelli (2000) emphasises the social dimension of disasters, defining them as sudden-onset occasions disrupting routines, causing the adoption of unplanned adjustments, and posing social dangers. Dynes (1998) defines disasters as occasions when norms fail, causing a community to engage in extraordinary efforts to protect its social resources. All the above definitions define disaster as events and sudden-onset occasions; however, several authors take issue with the definition of disaster as an event, unconnected from what happens before and after, and alternatively consider disasters as slow-onset instead (Barton, 1969; Glantz, 1994, 1999; Kelman, 2011; Zaidi, 2018; Staupe-Delgado, 2019). “Slow onset events may turn into a disaster prompted by a rapid onset event [like] when desertification turns into wildfires, or when temperature increase turns into heatwaves” (IDMC, 2018, 6). All disasters are slow-onset from the perspective of history and underlying societal vulnerabilities (Lewis, 1988). For a comprehensive but not exhaustive overview of literary contributions to discussions on slow-onset disasters, see Appendix 1.

Moreover, disasters are social constructs, which are the results of multilevel decisions, and are therefore not ‘natural’. The #NoNaturalDisasters online campaign sets out its aims (emphasis in original):

We want to change the way organisations, politicians, the media and people in **positions of power talk about disasters.**

We want to make sure that when a hazard creates a disaster because of actions taken by humanity (even historic decisions), that those in positions of power **do not blame nature or use it as a convenient tool to avoid responsibility.**

We will work to ensure (before, during and after a disaster) that those with the power to **reduce vulnerability, exposure and risk** are held accountable for their decisions, especially when those decisions increase the damage, loss and suffering associated with disasters.

I use this definition of disasters being social constructions and results of multilevel decisions; and align with the aims above. The term 'natural disaster' is incorrect and misleading; whilst some hazards are natural and unavoidable, disasters have almost always been made by human actions and decisions (Ball, 1976; O' Keefe et al., 1976; Kelman et al., 2016; Chmutina et al., 2017, 2019; Puttick et al., 2018; Kelman, 2020).

Disaster Risk Reduction (DRR) and Disaster Risk Management (DRM)

In the thesis I use DRR as a concept that refers to efforts, application of policies, strategies, and practices that aim to reduce risks. This sits in the broader context of DRM which refers to the processes that strive to achieve DRR, aligning with the UNDRR (2022, online) definition: "Disaster risk reduction is the policy objective of disaster risk management, and its goals and objectives are defined in disaster risk reduction strategies and plans." However, I acknowledge that others may use these terms more interchangeably:

The term 'disaster risk management' (DRM) is often used in the same context, referring to a systematic approach to identifying, assessing, and reducing risks. DRM is more focused on the practical implementation of initiatives to achieve DRR goals, but there is some overlap between the two terms and in practice they are sometimes used quite loosely or flexibly, with very similar meanings (Twigg, 2015, 6).

The UNDRR (2022) defines DRM as the application of DRR policies and strategies to prevent newer disaster risks, reduce existing disaster risks and manage residual risks, contributing to resilience and reduction of disaster losses.

Boundary organisations

Guston (1999, 93) first characterised the notion of a boundary organisation as having three characteristics:

- 1) they provide a space that legitimizes the creation of boundary objects and standardized packages;
- 2) they involve the participation of both principals and agents, as well as specialized (or professionalized) mediators; and
- 3) they exist on the frontier of two relatively distinct social worlds with definite lines of responsibility and accountability as such

I use the third notion as a definition of boundary organisations within the thesis. The function of boundary organisations is to negotiate the contingencies at the boundaries of science, politics, and society. Gustafsson & Lidksog (2018) give a survey of elaborations of the concept and argue that it can be fruitfully combined with the notions of hybrid management (Miller, 2001) and landscape of tension (Parker & Crona, 2012), although they also point to the explanatory limitations of the concept.

Culture(s)

Culture has been conceptualised in many ways, but Sewell (2005) identifies culture as:

- learned behaviour,
- the institutional sphere dedicated to the construction of meaning,
- the realm of agency and creativity (in this case it is opposed to structure),
- a system of symbols and meanings,
- a form of practice,

However, “because culture is so complex, it eludes a clear and simple definition” (Krüger et al., 2015, 4). Bankoff et al. (2015) discuss a definition of culture where some people refer to shared sets of beliefs, attitudes, feelings, experiences, values, and narratives, and their associated behaviours, actions, and practices. I use this as a basic definition in the thesis.

Communities

‘Community’ is used widely in DRM and specifically in DRR, but definition is especially problematic due to the complex nature of ‘community’ and very diverse understandings of it that are difficult to encompass in a single generally used term. The idea of homogeneous, universal communities has been widely criticised, even within DRR (Cannon, 2014; Titz et al., 2018). This generalised formulation has been used and propagated by the Western academic tradition and is unable to represent local realities in diverse non-Western regions (like complex and dynamic mountainous regions of Nepal for example). Cannon (2014)

questions the role of community level work in DRR and argues that there is no such thing as community. This term is simply a convenient entry point for research and policy.

The practice of exclusive inclusion is further perpetuated through two myths that have served formative purposes: one is the myth of 'community' and the other is the romanticising of local/indigenous/traditional knowledge. These two myths further reflect how the discourse on inclusion in disaster risk reduction is grounded in Western ontologies and epistemologies (Gaillard, 2021, 136).

Homogenising differences in communities for the relative 'ease of use' of the generalised term has many implications. Assuming communities are homogenous means intrinsic inequality and unequal power structures are overlooked or not viewed as priorities. Moreover, this serves to favour those already in dominant positions of power and serves the agenda of the depoliticisation of DRR.

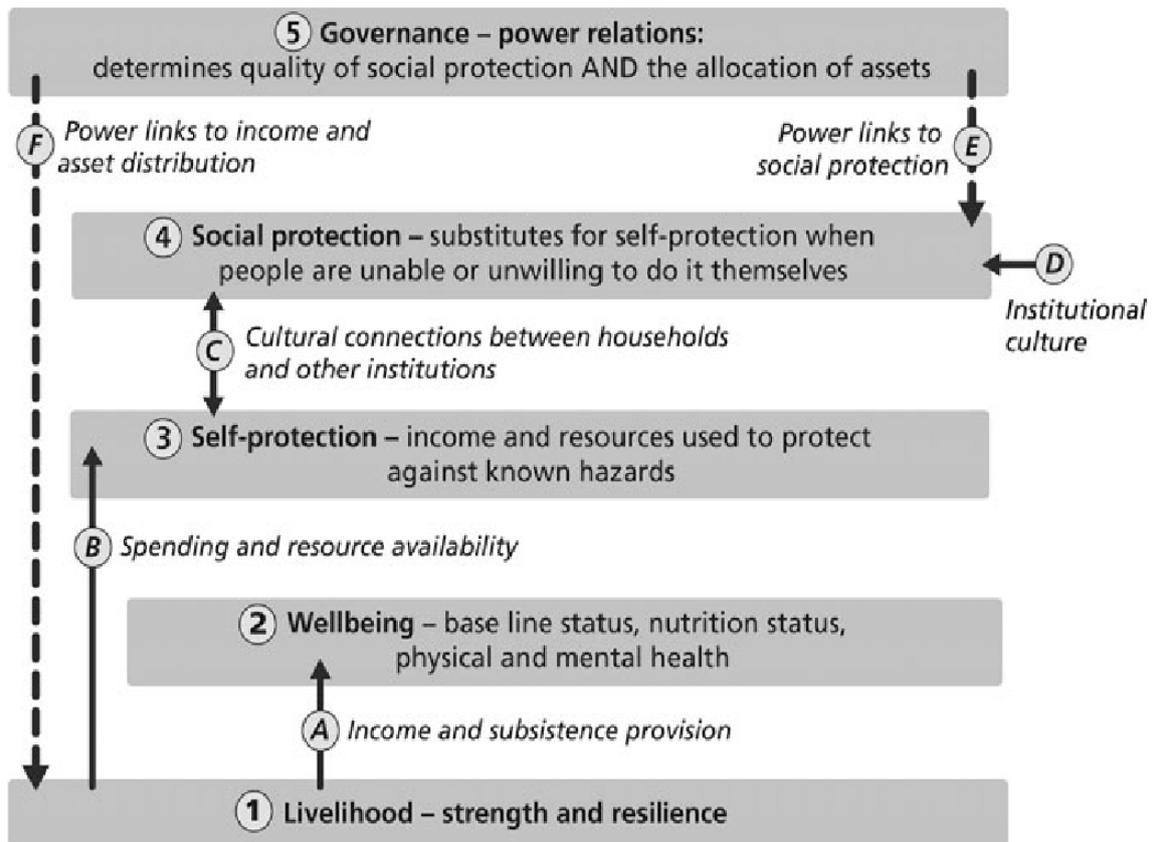
While I recognise the complexities, internal divisions, and associated power dynamics with the term community, from the perspective of social theory, in the thesis I use community as a descriptive category referring to a set of variables as a 'place' where people share common elements linked by geography, (Cohen, 1982; Willmott, 1986; Crow and Allan, 1994) and relationships (not solely based on kinship). These relationships among different groups in heterogeneous communities are defined by norms and beliefs rooted in their religion and culture (Cannon in World Disaster Report, IFRC, 2014). Communities can also link to and be part of much wider societies that are not spatially defined.

Vulnerability

Vulnerability refers to the conditions that increase peoples' susceptibility to the impact of hazards (UNDRR, 2015). According to Twigg (1998, 6), vulnerability "is too complicated to be captured by models and frameworks. There are so many dimensions to it: economic, social, demographic, political and psychological [...] not just a range of immediate causes but – if one analyses the subject fully – a host of root causes too". I agree with and use Twigg's definition of multifaceted, complex, and dynamic conceptualisations of vulnerability, especially when detailed from within the standpoints of vulnerable people. Vulnerability is largely the product of social inequalities, and social factors (like inequalities of gender, race, and socio-economic status etc.) that influence the susceptibility of various groups to harm and that also govern their ability to respond (Cutter, 2003; Cannon et al., 2003; Cannon,

2008; Yarnal, 2007; Bulley, 2013). A people-centred approach to vulnerability incorporates and hinges on relevant interlinking aspects (Figure 0.1) for people and households:

Figure 0.1. The five components of vulnerability and their linkages (Cannon, 2015, 91).



Marginalisation

In the thesis marginalisation refers to experiences of injustice that people placed at the margins of society face. The margins may be geographic, where people are pushed or forced to reside in hazard prone areas, to which they may not have any cultural or familial connection or ties, and where they may be forced to work but are unable to subsist. The margins may be historic due to colonial history and embedded power relations that manifest through socio-cultural discrimination and unequal land and resource distribution. The margins may be factors of vulnerability that heighten exposure and reinforces a cycle of marginalisation. Like Wisner (1993) discusses, marginalised populations are often forced into situations of income generation that may prove hazardous because they have to use limited resources in ways that exacerbate pre-existing vulnerabilities. Susman et al. (1983) point out some of the ways in which marginalised people are forced to respond to disasters that oftentimes appears to be irrational from the outsider perspective to their situations.

Organisation for Economic Co-operation and Development (OECD), Developing/Developed

The OECD, consisting of 38 member countries, is an intergovernmental organisation founded in 1961 to stimulate economic progress and world trade. Most members of the OECD are high-income economies, and they represent 42.8% of global GDP (IMF, 2018). In the thesis I use the term OECD to represent Western economic ‘development’ even though it is problematic (Absell, 2015), and I acknowledge and denote that there are issues with these terms by placing them within single scare quotes. These terms “take on the appearance of timeless, eternal categories valid for all social formations” (Lukács, 1968, 9); however, ‘developing’ and ‘developed’ are highly problematic terms, as many ‘developing’ countries are increasingly dissimilar and face dissimilar challenges but are generalised and lumped together under this umbrella term, which is unrepresentative due to its inherently historical and ideological nature.

Nevertheless, the World Bank produces and uses income classifications to group countries, and ‘developed/developing’ is used in most publications (until 2016) and published aggregate estimates for indicators like poverty rates (Khokhar & Serajuddin, 2015; Nielsen, 2013). Since I draw from and refer to some of this data (and after 2016) in the thesis, the problematic terms are thus kept in single scare quotes.

In 2016, the World Bank stopped using the terms altogether favouring instead the terms ‘lower-, middle- and upper-income’ countries. However, like Abrahams (2019, online) notes:

[...] some advocates of the development agenda—that rich countries have a duty to assist lower-income countries with their development—worry about the implications of that change. There is still gross inequality between countries that needs addressing and the categorisations of developed and developing can help in making the case for that.

Finding a suitable alternative to these terms is just as problematic because classification schemes are convenient for analysis and communication, but these alternatives are also fraught with frequently unquestioned ideological suppositions and all come with different sets of limitations, biases, cultural connotations, issues of exclusion, and so forth. These are

issues inherently attached to the attempted institutionalisation of human development, and the challenges and limitations associated with categorisation of diverse groups of people.

Protective action measures (PAMs)

Protective actions are research-based forms of advice that people can take to prepare for, keep safe during, and recover from a disaster. PAMs are simple actions or heuristics that people can perform during disasters to reduce risks, when decision-making is influenced by duress, panic, and time constraint. Currently, there is a one-size-fits-all approach to the generation and dissemination of PAMs, which is the main dimension that I interrogate in this thesis.

Risk

Risk can be defined as the possibility of loss or injury, and people deal with the risks they face in accordance with their worldviews and ontology. Risk is therefore a social construct, which is the result of societal perceptions, decisions, and actions. Risk is also thus a feature of a specific location and region, a view endorsed and discussed by several authors including Müller-Mahn (2013) and Krüger et al. (2015). Since risk is a social construction, it is therefore always cultural. This is the definition of risk that I use within the thesis. Risk can be interpreted and perceived differently by different people, which is ill-fitted for generalisation.

Resilience

Resilience is derived from *resilio*, Latin to jump back (Klein et al., 2004; Brasset et al., 2013). Adger (1997, 2000a, 2000b) defines resilience as the ability to withstand external shocks or perturbations like socio-political and economic disruptions and geographic displacement. The UNDRR definition of resilience is: “The ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management” (UNDRR, 2015, 2). There are many disputes regarding the basic definition of resilience (Gallopín 2006; Walker & Cooper, 2011; Matyas & Pelling 2012; Tiernan et al. 2019). “After thirty years of academic analysis and debate, the definition of resilience has become so broad as to render it almost meaningless” (Klein et al., 2004). According to: Lewis and Kelman (2010, 2016), Gaillard (2010, 2021), Cannon & Müller-Mahn (2010), Levine et al.

(2012), MacKinnon & Derickson (2012), Reghezza-Zitt et al. (2012), Mitchell & Harris (2012), Tobin (1999), the focus on resilience usurps the attention and provision of resources that should be addressing the root causes of marginalised populations' vulnerability.

Tiernan et al. (2019) highlight the inherent complexity in resilience theory that needs to be addressed if theory is translated into end-user (practitioner) tools. A holistic view and the need to consider potential inter-relationships between factors is recommended by many authors (Cutter et al. 2008; Cutter et al. 2010; Paton 2007; Paton et al. 2013; Paton & Johnston 2017; Tierney & Bruneau 2007; Twigg, 2009). Nevertheless, how inter-relationships can be represented in practical applications is seldom explored in the literature. Moreover, I agree with Chandler (2013, 278) who keenly observes that the 'social' at the heart of this discourse is "devoid of relations of power and reduced to surface appearances of the choices and behavioural practices of individuals".

Chandler (2013) asserts that resilience is used as a heuristic device, which is a particular governing rationality that informs policy with the goal of 'enabling communities' to be responsible for risks. This is how resilience is used in the thesis. "What distinguishes community resilience in this material therefore is that the assignment of a subject of resilience includes a transfer of agency and responsibility" (Bulley, 2013, 266).

Epistemic

Hazlett (2016, 539) discusses the term 'epistemic' to mean "of or relating to knowledge" but is of the opinion that it can be ambiguous because it could also refer to belief. However, there is more of a consensus with most philosophers such as Reed (2016, 551) who use 'epistemic' exclusively in the sense that it "has to do with knowledge" (cf. Littlejohn and Carter, 2021). While I acknowledge that 'epistemic' can refer to much more in depth, detailed aspects of knowledge as Littlejohn and Carter (2021) and Foucault (1970) expound upon, whenever I use 'epistemic' as a qualifier for a term, I denote that I am concerned with an aspect of the term dealing with knowledge. For example, when I discuss 'epistemic injustice' I discuss an aspect of injustice concerned with knowledge, and when I discuss epistemic blame, I focus on aspects of blame concerned with knowledge. Likewise, epistemic norms are norms concerned with knowledge.

Traditionally socio-political factors such as marginalisation and injustice are omitted in discussions of the epistemic and have been left out of the purview or scope of epistemology and analytic philosophy. Standpoint epistemology differs from the traditional omission of these factors and begins from the stand points of the marginalised. Some of the unique interdisciplinary contributions of this thesis is that it contributes to the literature on epistemic injustice in a contextual and applied manner for philosophy, geography, and disaster studies. This application begins with Standpoint epistemology as a methodology for disaster studies to minimise both disaster risks and epistemic injustices. I have developed a novel account of epistemic blame and accountability for expert assertions for use within disaster studies, which further enriches the philosophical literature on epistemic blame, the human geography literature, and hopefully impacts policy and practice within disaster studies.

Responsibility

Responsibility and accountability are defined synonymously: “Socially, peoples' responsibilities are those things for which they are accountable; failure to discharge a responsibility renders one liable to some censure or penalty” (Blackburn, 1996).

Within the thesis responsibility is used to refer to ‘something for which one is responsible’, specifically, responsibility for DRR. This is further unpacked to ascertain who should be called upon to be answerable and liable as the primary agent for DRR, and who is accountable for DRR efforts that go awry, and who might be politically answerable.

In the case of epistemic responsibility, it refers to how agents should be answerable for their epistemic conduct and obligations within epistemic relationships, and how epistemic agents choose for themselves between epistemic conduct that is acceptable or criticisable and blameworthy (Cf. Nettleman 2007; Hieronymi, 2008; Levy & Mandelbaum, 2014; Smith, 2015; Brick, 2020; Millar, 2021; Schmidt, 2021; Boulton, 2021a, 2021b; Piovarchy, 2021).

Hybrid

The term ‘hybrid’ refers to the crossing of two species to form a third, ‘hybrid’ species. Hybridisation can take varied forms, linguistic, cultural, political, racial, etc. The term ‘hybridity’ refers to the creation of new transcultural forms that emerge from the point of interactions and crossings produced by colonisation (Mambrol, 2016). Bhabha’s (1994)

analysis of coloniser–colonised relations stresses their “interdependence and the mutual construction of their subjectivities. It is the ‘in-between’ space that carries the burden and meaning of culture, and this is what makes the notion of hybridity so important”.

The earlier use of the word hybrid was highly problematic: “Hybridity has frequently been used in post-colonial discourse to mean simply cross-cultural ‘exchange’. This use of the term has been widely criticised, since it usually implies negating and neglecting the imbalance and inequality of the power relations it references” (Mambrol, 2016). However, hybridity has come to mean and purport to do the very opposite of its earlier connotations.

Young (1995, 23) draws attention to hybridity as a conscious and politically motivated concern with a deliberate disruption of homogeneity to challenge division and separation. “It is this potential of hybridity to reverse the structures of domination in the colonial situation”. This goes against the conventions of rational either/or choices, and this is how I use the term within the thesis.

0.4. Thesis Structure

This thesis is presented in a hybrid form, and it is therefore structured differently from conventional monodisciplinary theses. The subject matter begins with a philosophy literature review in Chapter 2, where I draw from the literature to also develop and present a novel account of expert assertion for DRR. In Chapter 3, I examine epistemic framings and narratives within disaster studies and discuss literature more closely aligned with geography. However, I also lay out my argument against generalisation for universal applicability in the chapter as the prevalence and issue with generalisation are encountered. Chapter 4 is a critical analysis of paradigm perspectives, knowledge apparatuses, narratives, and epistemic framings which dictate the trajectory of development and dissemination of PAMs. Chapters 5 and 6 are empirical with the supplementation of grey and academic literature where possible. Chapter 7 is an integrated chapter that applies a philosophical approach, standpoint theory, as a methodology for more inclusive and epistemically just DRR. Chapter 8 is the conclusion, where I offer a synthesis of my proposed view, return to the question of accountability and responsibility within DRR, and offer suggestions for future research.

In this thesis I have placed emphasis on parts within quotes by putting them in bold, so text in bold denotes that the emphasis is my own. Where other authors have placed emphasis within quotes this is done in italics, and I denote that in brackets by stating that the emphasis is in the original. I have not put 'non-English' words in italics.

In **Chapter 1**, I set out the methodology in the thesis, track the evolution of my research and data sources, and detail the methods used in my fieldwork. I consider my positionality as a researcher and the reflexive impact in attempting to gain a deeper understanding of the daily lives of people living in areas considered hazard-prone.

In **Chapter 2**, I consider what epistemology has to offer in the methodology it presents and its understanding of what it is to be rational and/or epistemically blameworthy when making decisions under a variety of circumstances. Conversational contexts are often epistemic contexts and may require different levels of knowledge for assertion in different circumstances. Assertion is relevant to DRR and DRM, as these are informational environments that require accurate and pertinent asserters and informants. I discuss how contextualism matters to assertion and the particular implications for scenarios with high and low stakes, especially when applied to DRR. I develop a novel account of epistemic blame for DRR contexts and suggest that epistemic blameworthiness opens avenues for discussions about accountability and responsibility for DRR and DRM.

In **Chapter 3**, I examine rationality, decision-making theories, and heuristics to argue that certain implicitly assumed rationalist perspectives have influenced DRR decision-making. I argue against generalisation for universal applicability, international frameworks being assistive, and neo-liberal approaches. I examine and analyse DRR governance and neo-liberal governmentality. I consider vulnerability paradigm efforts to include local voices, cultures, and contexts. This chapter does not attempt to provide an exhaustive review of all methods and tools; instead, I review a few approaches to illustrate how they manifest within DRR and analyse them further in Chapter 4.

In **Chapter 4**, I analyse hazard-centric and vulnerability perspectives and find that both use generalisation for universal applicability, and a dominant Western construction of DRR epistemology. I extend the analysis of generalisation for universal applicability further to Protective Action Measures (PAMs) used in DRR as a type of heuristic, signalling appropriate

actions to take during events like earthquakes. However, I argue that generalisation for universal applicability, especially with regard to PAMs, is antithetical to the awareness of disasters as social constructs. Therefore, the practical applicability of PAMs in DRR contexts requires a critical analysis.

In **Chapter 5**, I examine factors for closer consideration in developing future PAMs for Nepal. There are five main areas that I discuss and analyse: building codes and infrastructure, DRR governance and governments, the use of science, education, and culture. These factors are equally important and should be considered simultaneously. I build on the conceptual underpinnings and the epistemic framings discussed in Chapter 4 from which PAMs are currently generated and disseminated. PAMs do not arise in a vacuum; rather they require the consideration of several factors prior to and during knowledge generation, dissemination, and implementation processes for effective DRR.

In **Chapter 6**, I examine the case of Aotearoa to understand the perspectives, roles, and use of DRR knowledge in a 'developed' context. As in the previous chapter, there are five main areas for consideration that affect DRR knowledge production, dissemination, and implementation processes, including PAMs. I discuss and analyse building codes and infrastructure, DRR governance and governments, the use of science, education, and culture.

In **Chapter 7**, I offer perspectives and insight from the application of Standpoint Theory as a methodology and as an interdisciplinary tool that can be used within the domain of DRR to formulate a more inclusive approach. I particularly consider how epistemic injustice exists within DRR and is still perpetuated. I present ethnographic perspectives that are supportive of the ontological perspectives of Nepali communities, which differ from standard Western worldviews. Nepali culture is rooted in their intertwined ontology and epistemology and is thus inseparable from a person and their position(s) inside and outside of society. However, practices that are ontologically and historically entrenched are often altered by those in power to retain power and resources, all of which leads to a multitude of injustices. Thus 'culture', in its altered forms, is linked to the injustices faced by vulnerable populations.

In **Chapter 8**, I present a chapter-by-chapter summary of the thesis, a synthesis of my proposed view, and the conclusions of the thesis. I thereafter return to the question of accountability and responsibility within DRR. and offer suggestions for future research.

0.5. Summary

My argument is set up against the concept of generalised and universal knowledge for application within disaster studies for disaster risk reduction. Although there are some examples that are general and universal, such as the rules of mathematics, the situation is drastically different when it comes to the sphere of people. Human beings are individuals with diverse backgrounds and unique living contexts, therefore the idea of a generalised, universal applicability of knowledge to any disaster context where people are involved requires critical evaluation, responsibility, and accountability.

My main arguments against generalisation for universal applicability are that it perpetuates injustices, which are not beneficial for disaster studies and risk reduction. While there are many types of injustices like moral, political, and social, I focus on the epistemic injustices that generalisation perpetuates because I am concerned with knowledge for action and use. If protective action measures are meant to be used and reach their goals, which are minimising disaster risks for people, then this knowledge must be contextualised and produced for local persons and contexts rather than the abstract, impersonal universal.

Another aspect of this argument is that experts should have contextual awareness, which runs through philosophy, geography, and disaster studies. In light of this, I examine protective action measures particularly in the contexts of Nepal and Aotearoa. Although the focus of my project is on Nepal, there is much knowledge from Aotearoa that opens avenues for assessing and critically evaluating generalisations about correlations between economic 'development' and DRR. Contextual awareness can uncover and deconstruct long held generalisations and unfounded DRR assumptions.

I offer a constructive, plausible alternative to current methodologies by applying Standpoint theory as a better suited methodology for the reduction of disaster risks. This is a people-centred approach that aims to be epistemically inclusive and just, and it begins from the point of the unique epistemic perspectives of marginalised people. It includes politics, which

it takes into account from the very beginning and examines social aspects that are usually much hidden in a sanitised sphere when examining protective action measures, rules and messaging. My application of Standpoint theory brings these uncomfortable factors very much into the forefront as the starting point for epistemic processes within disaster studies.

Chapter 1

Methodology

To know the history of science is to recognize the mortality of any claim to universal truth. Every past vision of scientific truth, every model of natural phenomena, has proved in time to be more limited than its adherents claimed. The survival of productive difference in science requires that we put all claims for intellectual hegemony in their proper place – that we understand that such claims are, by their very nature, political rather than scientific.

Keller, 1985, 178-9.

1.1. Introduction

In this chapter, I discuss the methodologies used in this thesis, the evolution of my research approach, and my positionality as a researcher. I thereafter offer some further insight and maps for my fieldwork sites.

This thesis uses an epistemological postmodern methodology that challenges monolithic notions of universal knowledge and generalisations (Hoggart et al., 2002). This is a challenge to the meta-narratives or dominant narrative that structures and legitimises other narratives in the domain of DRR. This approach is postmodern, poststructuralist³ (cf. Sarup, 1993, on Derrida), and deconstructive. I particularly examine the crisis of representation within current DRR research, in the conventional approaches to DRR, and particularly the production and dissemination of PAMs. Thereafter, I take a constructivist approach offering an applied example of a novel methodology for more inclusive and contextual DRR.

Within the field of philosophy, researchers rarely undertake any form of fieldwork, and thus philosophy may be considered a ‘field-less’ discipline. An early career researcher can complete a high quality, defensible thesis without stepping out of an office or away from a desk. My individual fieldwork components, therefore, were undertaken with the intention of gaining broader insights, increased social awareness, and working knowledge in order to

³ I do not endorse the so-called analytic-continental philosophy divide, rather, it should be acknowledged that there is a fair amount of overlap in the subject matter, even if the terminology differs. Additionally, there are also authors like Vanhoutte (2023) who argue that there is no such thing as ‘continental’ philosophy.

offer novel, integrated, and relevant perspectives. There are many limitations to the data from the perspective of human geography, however, my research was conducted when I was still part of the philosophy department, so I have conducted fieldwork based on what I thought would be necessary as a practical case study section for a philosophy thesis. Therefore, it may seem that a human geography research effort was not attempted, and that would be true because my research was conducted from the perspective of philosophical inquiry. This is before a shortage of supervisors triggered a change of departments from philosophy to geography.

1.2. Chapter Methodologies

I begin with a philosophy literature review in **Chapter 2**, in which I draw from theoretical work in analytic philosophy to develop and present a novel account of Expert Knowledge Assertion for DRR.

One may argue that the epistemic concepts I use are Western and therefore antithetical to my arguments, which are geared to advancing a postcolonial agenda within DRR. However, contemporary DRR research, policies, and actions are currently informed by Western discourses and principles, which I discuss and analyse in Chapters 3, 4, 5, and 7. Therefore, my purpose in using these Western constructs is to deconstruct DRR from within, using the very same problematic concepts and terminology, being aware of and highlighting the issues with the terminology, in order to construct a context-sensitive DRR application.

In **Chapter 3**, I examine epistemic framings and narratives within disaster studies and discuss literature more closely aligned with geography. I use deconstruction and discourse analysis as my main methods of reading, analysing, and writing. Deconstruction leads towards an uncovering of and a recognition of the differential impacts and outcomes (Wylie, 2006). The term 'deconstruction' refers to a way of analysing, a 'method', and also an actual process, what is actually happening in academic texts, conversations, government policies, scientific reports, etc.:

... deconstruction is [...] based upon an original understanding of how language, and the meanings and messages conveyed by language, works. [...] Deconstruction destabilizes notions of truth, clarity and certainty through a spectral logic: it differentiates, disturbs, unsettles. [...] The meaning of something is constituted instead by what it is not. To put this another way, the presence of a thing, its

existence, identity, validity, etc., is constituted by what is absent from it, or what is excluded from it (ibid, 300).

I particularly look at inconsistencies and contradictions that are usually uninspected because they are part of the dominant social order. These are often latent and inherently part of the system, wherein differing parts are treated as having a singular, generalised, character, principle, or application.

In **Chapter 3**, I also lay out my argument against generalisation for universal applicability as the prevalence and issues with generalisation are encountered. Universal narratives do not allow space for alternative views of the world. These narratives are actually only representations of certain dominant perspectives and entities rather than a homogenising absolute truth. Lyotard (1979) asserts that postmodernism is a resistance to grand narratives and fixed stabilities of totalising systems of thought, and instead focuses on the fragmented, anecdotal, and marginalised. Further, the credibility of meta-narratives has been challenged by others from various disciplines already, and their work has shown that metanarratives have proven to be much less credible than traditionally assumed:

Poststructuralism is profoundly suspicious of anything that tries to pass itself off as a simple statement of fact, of anything that claims to be true by virtue of being 'obvious', 'natural', or based upon 'common sense'. [...] And as one consequence of the radical way in which it urges us to incessantly question our most rooted assumptions about who we are and how the world is, poststructuralism necessarily pushes us towards inventive and experimental ways of researching and writing. [...] **One particular thing that poststructuralist writers have tended to be critical of is the way in which academic or scholarly knowledge tends to be produced, organized and communicated within both specific institutions such as universities, and education systems more generally.** [...] The notion that the entire purpose of academic study is to make an opaque reality clearer, a complex world more graspable, is very deeply entrenched within western culture. Poststructuralism, however, is very suspicious of this notion, and especially of the systems it entails (Wylie, 2006, 298).

These postmodern and poststructural methods and approaches to neo-liberal governmentality narratives are particularly relevant to my argument and are used especially in Chapters 3 and 7. I use these methods to deconstruct the Western concept of 'community resilience', showing how neo-liberal governmentality narratives are employed to relinquish government responsibility and accountability for DRR. Further, I argue that the idea that English is a superior language for instruction in schools and other educational

establishments that are part of non-Western contexts is faulty, and is the cause of marginalisation, epistemic injustice, and oppression of indigenous persons.

Chapter 4 is a critical discourse analysis of paradigm perspectives, knowledge apparatuses, narratives, and epistemic framings that dictate the trajectory of development and dissemination of PAMs. I use the epistemological postmodern methodology (Hoggart et al., 2002) to further challenge monolithic notions of generalised universal knowledge and the dominant meta-narratives that structure and legitimise other narratives within the domain of DRR, and especially with regard to PAMs. Discourse analysis is a critical method that aims to show how certain narratives are produced, naturalised, and privileged over other narratives and identities that are marginalised, excluded, or silenced.

Moreover, I deconstruct and critically analyse the current approaches that offer knowledge for use as simple heuristics or PAMs through textual analysis. I focus particularly on Milledge et al. (2018, 2019), who specifically deal with co-seismic (and rainfall-induced) landslide guidance for mountainous regions in Nepal, and fundamentally because in my thesis I aim to offer an open space to consider what an inclusive and context-sensitive approach for future research in mountainous Nepali communities should include. I therefore analyse and critique the discourse and underlying assumptions inherent in the texts that offer data-based rule knowledge.

The aims and actions of deconstruction can sometimes be misunderstood, in that some claim that it tries to infer meanings or intentions that are 'not really there', or that it is about reading a text or situation wilfully against the grain:

This misconception arises because deconstruction often sidesteps or ignores what the 'obvious' meaning of things seems to be, what 'common sense' would seem to tell us a situation is saying to us. In fact, deconstruction is about reading texts, events, situations, processes and so on with very close attention, in an effort to be as faithful as possible to them. Its aim is maximum fidelity (Wylie, 2006, 301).

However, the aim of deconstructive analysis is not to render institutions redundant; rather it serves the purpose of opening a space for considering usually unthought of alternatives that are more inclusive of other stakeholders and participants. Poststructuralism does not endorse the conveniences of short cuts to gain simple truths, especially the superficial

construction of accounts seeking to reduce the subject matter of investigations to ahistorical, aspatial, generalised, and homogeneous cases.

Chapters 5 and 6 integrate literature sources with empirical fieldwork, and have been supplemented with grey literature like reports, working papers, evaluations, risk assessments, government documents, and public records where possible. See Appendices 2 and 3 for Participant Information Sheet, Privacy Notice, and sample Consent Form used.

In Nepal (**Chapters 5 and 7**) I conducted my fieldwork within the Bahrabise region of the Sindhupalchok district, in the villages of Listi, Listi-Gumba, Kodari, Tatopani, and Larcha, mountainous communities most heavily affected by earthquakes and co-seismic landslides, with 14 semi-structured and informal interviews. Meeting community members on their terms offered insight into generally overlooked details that impact communities' abilities to function during disasters. Further, I conducted 13 structured and semi-structured individual and group interviews in the Kathmandu Valley area consisting of first-hand accounts from personnel representing local organisations currently most active in terms of earthquake education and awareness, and from organisations that assist in various capacities during and after disasters. The fieldwork also included meetings with various governmental organisations, boundary organisations, and NGOs involved with earthquake safety in Nepal. Throughout the fieldwork, between planned activities, I spent time listening to locals' perceptions and observing regular activities.

My fieldwork in Nepal consists of two components, the first being a three-week group fieldwork component, and the second a two-month individual fieldwork component that was conducted consecutively in 2017. The first component was funded by the IHRR (Institute of Hazard, Risk and Resilience) through AND (Action on Natural Disasters) doctoral funding, while the second component was self-funded. I did intend to return to Nepal in particular and this was discussed in 2019, with IHRR ready to fund this fieldwork component. However, in early 2020 those plans had to change drastically because of the Covid pandemic, strict lockdowns, and travel bans/restrictions in place. Therefore, it was not possible to obtain more empirical evidence during the several lockdowns since 2020 and also in the brief time that remained for the project's completion. This has affected my research plans and impacted the thesis, which required multiple reframings and

restructurings from the ground up. This has resulted in limited but nevertheless relevant empirical evidence, which I use because of the context-sensitive practical examples that the fieldwork is able to offer. I have thus supplemented my arguments with grey literature and the research of other authors where available (in Chapter 7 as well).

My fieldwork in Aotearoa in 2019 for two and a half months was funded by the IHRR and AND funding. In Aotearoa (**Chapter 6**) I travelled through Te Ika-a-Māui Te Waipounamu (the North and South Islands), conducting my fieldwork mainly on Te Waipounamu, focusing on the Alpine fault region, and more specifically, the town of Waiiau (Franz Josef) on the west coast. On the east coast, I focused my fieldwork on Ōtautahi (Christchurch) and Kaikōura. Fieldwork included interviews and meetings with various governmental organisations, NGOs, and boundary organisations involved in DRR, DRM, earthquake safety, education, science, and academia, with some organisational headquarters in cities like Tāmaki Makaurau (Auckland), Ōtepoti (Dunedin), and Te Whanganui a Tara (Wellington). This chapter is based on public records, regional and district council meeting minutes, council meeting agenda reports, scientific consultancy reports, news media reporting, 17 structured, semi-structured and informal individual and group-interviews, field notes, in-field observations, site visits, community working group reports, as well as academic literature and input where possible.

Chapter 7 is an integrated chapter that applies a philosophical approach, standpoint theory, as a methodology for more inclusive and epistemically just DRR. I present ethnographic perspectives in support of the ontological perspectives of Nepali communities, which are different from standard Western worldviews. Although Deleuze (1994; 1990) is especially critical of academic writing seeing itself as representative of the world, he also asserts that “critical and philosophical writing should aim to add to the world, to make it more than it is, rather than less” (Wylie, 2006, 307). A distinctive feature of the thesis is that it draws links between issues of method and epistemology and tries to address some of the methodological issues by offering a constructivist approach. Epistemology and method are closely and complexly intertwined (Hoggart et al., 2002). Constructivist approaches argue that a given idea or target has been socially constructed (Hacking, 1999), for example, the concept of disaster, which is a social construct, rather than a naturally occurring phenomenon. After a process of deconstruction there is a movement towards something

quite distinctive and constructivist. However, it is noteworthy that this does not only involve the application of a 'new' method to the same traditional topics, but in most instances involves the development of new areas of research.

In **Chapter 7**, I apply standpoint theory as a methodology for DRR, after an extensive deconstruction, with the aim of building and presenting an improved and inclusive version of DRR from the ground up, whereby socio-political, cultural, and marginal perspectives are the starting points of research, rather than an afterthought. Moreover, standpoint theory asserts that marginalised perspectives have an epistemic advantage, but these perspectives have not previously been included within DRR as they are not usually accorded epistemic agency or standing that is comparable to the dominant perspectives. It is not that the aim would be to deconstruct and discard DRR narratives, terminology, and epistemic processes, rather the aim is to deconstruct in order to transform the epistemic processes, narratives, and terms of DRR discourse. I do not see my proposal as a panacea, I take a position on issues that have no correct and definitive answers. I do not claim that this is the new 'Truth' but it is one possibility among an almost infinite array of more inclusive possibilities that can be developed.

1.3. The Evolution of My Research Approach

My funding for the project stipulated the geographic area to be focused on, Nepal, and the particular hazard, co-seismic landslides. I began my PhD with the AND project proposal (not my own research design) for 'Developing simple rules to minimise co-seismic landslide hazard'. The main objectives were:

(O1) To develop and test a set of simple rules for communities facing landslide hazards in two contexts:

(O1a) Preparation. Using knowledge on the spatial variation of landslide hazard developed in Durham and elsewhere, and based on recent large earthquakes (Northridge, Chi-Chi, Wenchuan, Nepal), these rules might enable communities to consider landslide hazard when siting key infrastructure.

(O1b) Action in an earthquake. Using data on earthquake-triggered landslide behaviour from camera phone footage, oral and written testimony, the project will

establish: how people in rural Nepali communities behave during an earthquake; the types of hazard that they face; and how these hazards threaten life and infrastructure.

(O2) To defend these rules as 'ecologically rational'; that is, to show that the rules developed in (O1) are adapted to the structure of the environment in which they are used and lead to optimal outcomes (i.e., minimum hazard from landslides).

As outlined above, this began as a top-down, technocratically framed project. While this may have been a 'reasonable' proposal, during my fieldwork in Nepal, I understood that these ideas and approaches did not consider the context adequately and were therefore not suitable for people in the central mountainous regions (see figures 1.1-1.9).

Figure 1.1. Traversing the terrain. Narrow footpaths to villages are often blocked by landslides (Photo credit: author, 2017).



Figure 1.2. Often new foot-paths and access routes have to be created.
(Photo credit: author, 2017)



During my group fieldwork component in Nepal, our team participated in an introductory joint fieldwork visit to understand the risks and hazards adversely affecting mountainous Nepali communities, which have been subject to immense fatalities and destruction since the 2015 Gorkha earthquakes. Over three weeks, we heard first-hand accounts from personnel representing local organisations currently most active in terms of earthquake education and awareness, as well as from organisations that assisted in various capacities during and after the disaster. Part of the fieldwork also included meetings with various governmental organisations and NGOs involved with earthquake safety in Nepal.

Throughout our group fieldwork, I spent time between planned activities, listening to locals' perceptions, and observing the regular residents' activities. I was able to listen, understand, and interact with people within the local districts through translations by my two Nepali AND colleagues, who were thankfully present throughout the fieldwork interactions. My colleagues were staying on in Nepal for various reasons, and we had pre-arranged that our schedules would match for any further vital translations during my individual fieldwork component, before parting ways, as scheduled group fieldwork ended. While translation

seemingly communicates words and their meanings, it also includes culture, social norms, and politics. This understanding was facilitated by my colleagues, especially Gopi Krishna Basyal, who has extensive working experience and knowledge of the local contexts. I stayed for two months to conduct further field research, expressly to gain insight and better understandings of people; I thus gained the realisation that socio-political, cultural, and economic factors influence how any DRR communication is perceived and how knowledge might be disseminated, and possibly implemented.

One of the most striking aspects of my visit to the village of Tatopani was observing rows of locked buildings and nearly completely ruined structures from the 2015 earthquakes and landslides. A number of people had left the area because the hot springs that were once a tourist attraction bringing in some income for local people no longer flowed. Settlement and movement were both evident for enabling basic livelihood needs to be met, rather than the tolerance of risks solely for economic prosperity and profit; livelihoods mean survival for locals, without a large variety of other survival and subsistence options to choose from.

One of the organisations our group visited purported to be 'for the people', but further questioning revealed that their research efforts were solely focused on offering information for governmental decision-making. I was informed that data and DRR information was available on their website for people to use. While in the field, I considered the underlying assumption that since information may be available on organisational websites, this benefited hazard-prone communities and at-risk populations. Meeting members of communities on their terms offered insight into generally overlooked details that enable or constrain communities' access to resources in the everyday and during disasters. In the field, I observed and assessed local community accessibility to computers, or other electronic devices with operational internet facilities, as well as their access to the English language rather than conventionally spoken Nepali or indigenous languages. Hoggart et al. (2002, 304) term this the "convenient neglect of 'uncomfortable facts'". While in the field, the lack of 'conventional' travel and communicative means were plainly visible, which confirmed my concerns about technical access issues, and the unfounded assumptions about access to information.

Figure 1.3. In and around Listi village with the access-route on the bottom right and large landslides visible on the left. The person in the picture uses a mobile phone, for conversations when signal strength allows (Photo credit: author, 2017).



With the group, accommodation and facilities were booked in relatively pleasant areas catering to foreigners with a degree of earthquake-safety and amenities conducive for research. However, during my individual fieldwork I chose to stay in a district that was considered an ordinary residential area. I lived in a house where electricity was cut out as a daily norm, sometimes for several hours. Chilly bucket-baths from a rain collection tank on the building's roof increased my appreciation for hot showers, but I learned that most of the population bucket-bathed in such a manner. During warmer weeks this was tolerable, but during colder weeks that followed, I resorted to heating water in a cooking pot over a gas stove. I learned that for many others, heating water for such activities is often not an option and that fires, hot food and beverages, as well as layers of warm clothes are their means for tolerating the extremities of Himalayan weather. These, among numerous other in-the-field experiences, taught me far more than I could have learnt about the people's localities and lifestyles from behind a comfortable desk in Durham, and which I, as a researcher, should be cognisant of in understanding what should be taken into account when developing effective, practically applicable, knowledge for dissemination and use. "[A]fter the massive Nepal earthquake in April 2015, the impacts on infrastructure and the quality of shelters were

widely studied, and aid donors gave millions of dollars to rebuild parts of Kathmandu. Yet in rural western Nepal, hundreds of villages cope with floods and landslides each year, unnoticed by the outside world” (Gaillard & Peek, 2019, 441). Communication barriers to effective transdisciplinary work in the sectors of government, scientists, academia, and society exist due to an inability to effectively understand the basic needs, interests, and concerns of people within communities. By understanding the multitude of hardships communities face in disaster-prone areas, my scope for consideration expanded beyond the simple rule development context. While people were concerned about hazards like landslides (called *pairo* or *pahiro* locally), they were more concerned about meeting their basic needs, and finding a source of income so that their basic needs would be met.

Figure 1.4. Everyday village scenes in Listi: steep terrain and friendly dealings (Photo credit: author, 2017).



There are major ethical, cultural, and socio-political considerations one ought to be prepared for when going into the field, but one might not be aware of such issues until they are staring the researcher in the face. My project never intended to delve into politics, yet social and political factors are inextricably linked to any offering of knowledge for societal use. While creating an open space for considering what more inclusive and context-sensitive DRR efforts should consider, political and power dynamics will affect and alter the amount of assistance that can be offered.

The issue with the assumption that inclusion can simply mean having the presence of someone from a marginalised group in a focus group (PAR) is that it becomes merely tokenism if the person does not have the required or applicable 'vocabulary' and 'voice' with which to represent themselves about specific issues. Researchers often conduct research with greater concerns for their own interests when gathering data, rather than the interests of marginalised persons. Tokenistic representation is not my aim; rather, more authentic representation is required for epistemic justice within DRR.

The humanities can enhance the engagement with science and society to offer knowledge for use in practical contexts; this knowledge, however, is not free from the socio-political contexts in which it is generated and disseminated. "In both colonial times and the present, the texts generated within the academy, although perhaps intended as purely scholarly tomes, are often given new life as ritual and social manuals for behaviour. The social scientist's proposals thus become not *descriptions* but *prescriptions*" (Hindman, 2009, 264, emphasis in original). This reinforces the value in employing reflexivity, which involves reflecting on the manner in which research is carried out and understanding how the process of conducting research shapes its outcomes. "The under-consideration of reflexivity on assumptions and values – as well as the social norms and practices that sustain them – has been highlighted as a key problem in transdisciplinary sustainability research by an increasing number of scholars" (Popa et al., 2015, 46). Reflexivity should be employed earlier, rather than later in the processes of conducting fieldwork and research.

Having had pertinent experiences of group and individual fieldwork in Nepal, I reflectively reshaped my research enquiry to accommodate and include consideration of situationally influencing factors from the beginning. PAMs for practical use in DRR contexts should

definitely not be developed in vacuum-like office-spaces and then tested, disseminated or implemented in high-risk, hazard-prone areas. Time, place, context, socio-political, cultural, governmental, educational, and economic factors, among others, heavily impact people's decision-making, as well as their openness, and willingness to hear, cooperate, or implement any novel presentation of information and rules (McBride et al., 2019).

Unawareness or removal of situationally influencing factors from the project's outset without duly considering and deliberating on the impact of effects can sometimes prove disastrous during the stages of dissemination and implementation – and fatal during real-time application while facing life-threatening risks.

In light of the need for contextual awareness, I began to examine DRR decision-making in other contexts considered more economically 'developed', like Aotearoa, to assess if there was any merit to the assumption that the more economically developed a country is the better its DRR efforts and policies are. Although the focus of my project is on Nepal, there is much knowledge and significance in the Waiau case study from Aotearoa that opens avenues for assessing and critically evaluating generalisations about correlations between economic 'development' and DRR. Awareness in diverse disaster contexts assisted in uncovering and deconstructing long held generalisations and unfounded DRR assumptions. I chose to examine PAMs particularly in the contexts of Nepal and Aotearoa as unique contexts rather than the traditional generalised comparison and contrast. The presentation of these case studies was never intended to be a like for like comparison, or generalised, rather they serve the purpose of drawing out differential DRR defects in diverse contexts and thereby emphasise difference. Nevertheless, research in both Nepal and Aotearoa was significantly Covid impacted necessitating the extensive use of secondary sources and thus my research approach evolved accordingly.

1.4. My Positionality as a Researcher

Marginalisation is not a homogeneous and universalised experience. People within the same marginalised context perhaps experience the same marginalisation, but it may mean different things to them or translate to different forms of effects. Thus, the experience of such marginalisation may play out differently and lead to very different decision-making

contexts, as people may have different sets of priorities and considerations that they factor in according to their unique circumstances.

This does not mean that collective marginalisation does not exist or cannot be classified as an overarching issue. Rather, it is necessary to be aware that this overarching classification can still take different forms on the individual level.

As a researcher one has to be aware of the biases that one may have; it is also possible to have biases that one is unaware of and may not be able to recognise. Where bias is possible to recognise, I would like to be aware and draw attention to these points.

First, I have experienced government-mandated marginalisation where I was discriminated against based on the colour of my skin and the race that I belong to. I was born in South Africa during the apartheid regime that focused on establishing white supremacy and wrote this into the laws of the land. I had experiences of entrenched discrimination, resistance, and politically motivated death and persecution by the age of ten. The last ten years of apartheid with heightened resistance were my first ten formative years, which helped me understand the magnitude of South Africa's first democratic election in 1994. There have been changes in South Africa, but some things have stayed the same despite the new constitution, or that racial discrimination is no longer governmentally endorsed.

Perhaps, then, on some overarching level I may understand what discrimination based on birth and very separated racial classifications from one's very birth might be like. I do not claim that this experience would be comparable or a justification to claim that I can understand another's experience entirely. Rather, I declare that I am aware of this experience that has fundamentally shaped me as a person. This will affect the ways in which I conduct research, question the construction of knowledge and institutional systems, and how I approach the project of deconstruction.

Being a South African of Indian origin, I come from a double colonised background as my ancestors from British colonised India were taken to British and Dutch colonised South Africa in 1860 by ship to work as 'indentured labourers', a euphemism for slavery. I do think that this may influence my perspectives on colonial and postcolonial understandings.

My first language is English, and second language is Afrikaans as this was mandatory under the apartheid schooling system. English is predominant, as there was no use of any of the marginalised 'native' languages and cultural vernacular in school settings. My parents and grandparents did not speak, read, or write in their own language, which is the outcome of years of colonial rule. I have attempted to learn to read and write Sanskrit and am a beginner. The Nepali language and dialect have some similarities and I can therefore read and understand practical elements like reading a signboard or notices, but the spoken language and interaction were completely novel during my fieldwork.

There is no way that I can fully or properly represent the voice and experiences of the other. I can only listen, ask questions, and formulate a written form of the voice that is presentable in an academic literary context. There are many limitations in doing this, especially from one language to another and from the spoken context to the written context. Those reports are also limited by being a very small section of a few small mountainous communities that I visited a small number of times over a duration of two months.

Figure 1.5. Generous village elder in Listi-Gumba (Photo credit: author, 2017).



During my fieldwork, although I was often mistaken for being Nepali and was spoken to in the local languages, I am still an outsider⁴ to the context, although in Nepal I was not treated

⁴ 'Research is political' and power dynamics between researcher and participant still exists (Hoggart et al., 2002, 230).

like an outsider. Being a person of colour, female, and from a 'developing' country context, there were some points of intersection with local people. Informal dialogue was preferred in mountainous communities, while the interactions in Kathmandu were more formal. Nepali people were also appreciative of my last name because of the translation and meaning⁵ but found it difficult/perplexing to place the name within the stratified hierarchy that they are used to. Nevertheless, due to the caste system, it can be challenging to navigate communication, integration, and collaboration between unequal power structures (Delica-Willison & Gaillard, 2012), but communication remains key for any transformation, which is discussed in Chapter 7.

My data collection and methodology were influenced by the observed shortcomings in the current methodologies that I had thus far encountered in my first field visits to Nepal. This was a common factor within both geography, philosophy and disaster studies where contemporary research, policies, and actions are currently informed by Western discourses and principles. If I had perhaps continued to tow-the-line, following on traditional generalised approaches to research, I doubt it would have been of any benefit to anyone, which is in keeping with the impersonal universalisation of knowledge agenda. My realisation was that I would contribute to narratives produced, naturalised, and privileged over other narratives and identities that are marginalised, excluded, or silenced. However, traditional epistemology and analytic philosophy was just as apolitical and socially exclusionary, hence I needed to learn of other epistemic methodologies that were reflexively aware of the privilege of narratives and resultant epistemic injustices.

I found Standpoint epistemology capable of opening a space for considering usually unthought of alternatives that are more inclusive of other stakeholders and participants and used these guiding principles to collect the different types of data gathered especially through hearing often unheard perspectives. Although limited by Covid's impact, I was able to expand upon the initial semi-structured interview data by following the leads offered by locals and researching further the available primary sources of some of their passing references during informal conversations. This was not a convenient, simple, or

⁵ रामकुमार (Ramkumar) translates and refers to Prince Rāma, and holds meaning for some of the local people (discussed in Chapter 7).

straightforward, undertaking, however, it was essential to avoid the superficial construction of accounts seeking to reduce the subject matter of investigations to ahistorical, aspatial, generalised, and homogeneous cases.

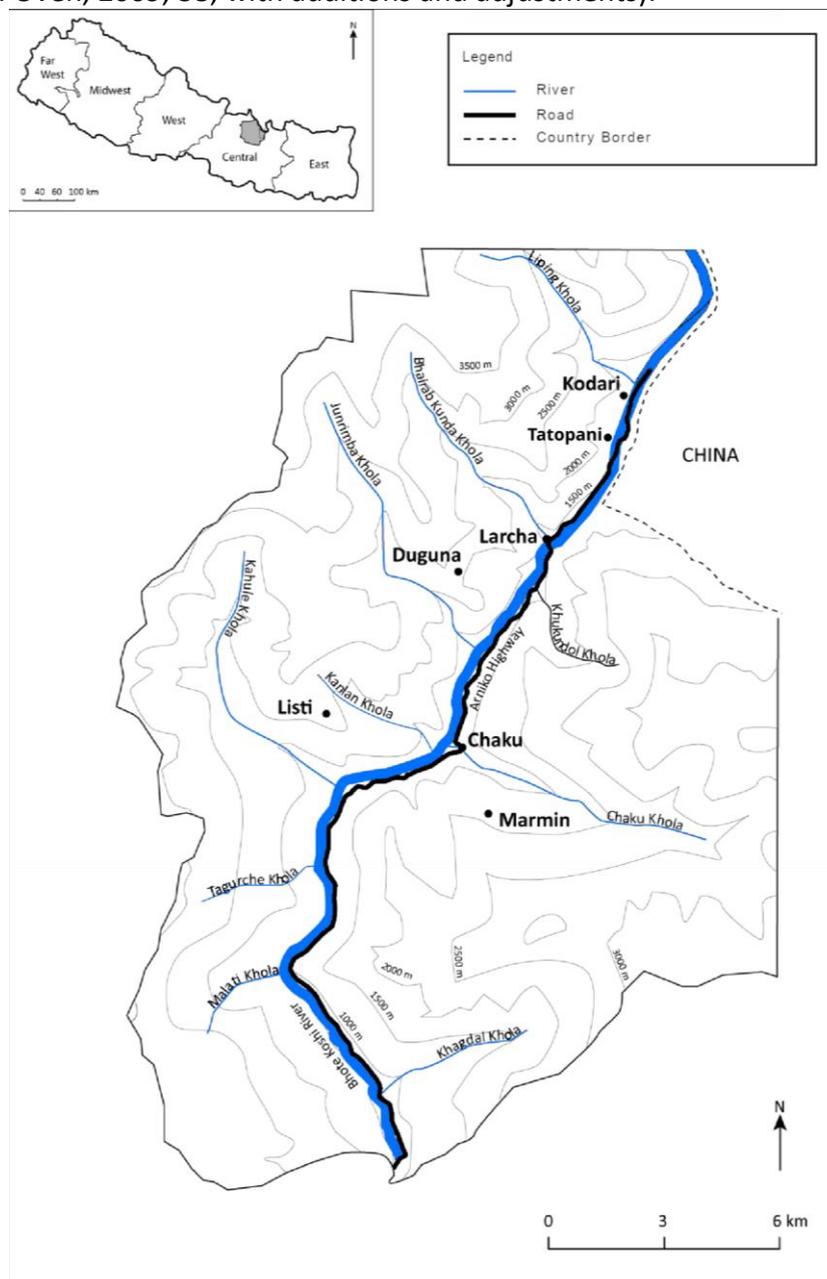
In Aotearoa it was easier to communicate because the dominant spoken language is English. However, this did not mean that there was always a willingness to communicate. Almost everyone involved in Aotearoa's disaster management and DRR knows one another as it is a small country and people have usually communicated with others involved or are colleagues working alongside each other. This has positive and negative consequences, which I experienced simultaneously. People I had interviewed often knew others who had not responded to my repeated requests and sometimes offered possible reasons on their behalf. However, this also meant that without being introduced by someone who was a part of the groups, institutions, or networks I was looking to interview people in, it was sometimes difficult to get any response at all.

There are several difficulties that I encountered with facets of interdisciplinary working and writing when I felt caught between constricting disciplinary norms and expectations. These norms and expectations were usually subject specific and did not transfer well to the tasks of interdisciplinary working or writing, often hindering a proper integration of diverse knowledge types for novel knowledge creation. This had a significant impact on the presentation and layout of my thesis, which experienced the continuous disciplinary tensions between the presentation of 'findings' and the making of claims. Moreover, the expectation of following a rigid, discipline specific 'literature review/theoretical framework-case study-methodology-findings-discussion' ordering did not allow adequate scope for real integration of different knowledge types or methodologies from philosophy, geography, and disaster studies. Therefore, the uncommon and non-traditional layout and presentation of my thesis emerged as a necessity to facilitate integrated working and interdisciplinary writing. While the reader could sometimes feel like they are left piecing the different knowledge types together, the thesis does not rigidly dictate what the reader should think, piece together, or conclude. Rather this presentation is an open space that evokes and stimulates thoughts about various integrated and interconnected factors for DRR that can have multiple conclusions, far more than the core conclusions that I have presented. This

feature of the thesis fits the nature of the investigation and contributes to the unique strengths of the work.

1.5. Fieldwork Site Maps

Figure 1.6. Map of Nepal (inset) with the villages of Listi, Larcha, Tatopani, and Kodari (Map source: Oven, 2009, 38; with additions and adjustments).



These maps are adapted from Oven (2009) whose research was conducted in these areas prior to the 2015 Gorkha Earthquakes. They highlight the village locations in red.

Figure 1.7. The village of Listi, Listikot VDC - 27°53'42.61"N; 85°52'19.03"E (Map source: Oven, 2009, 63).

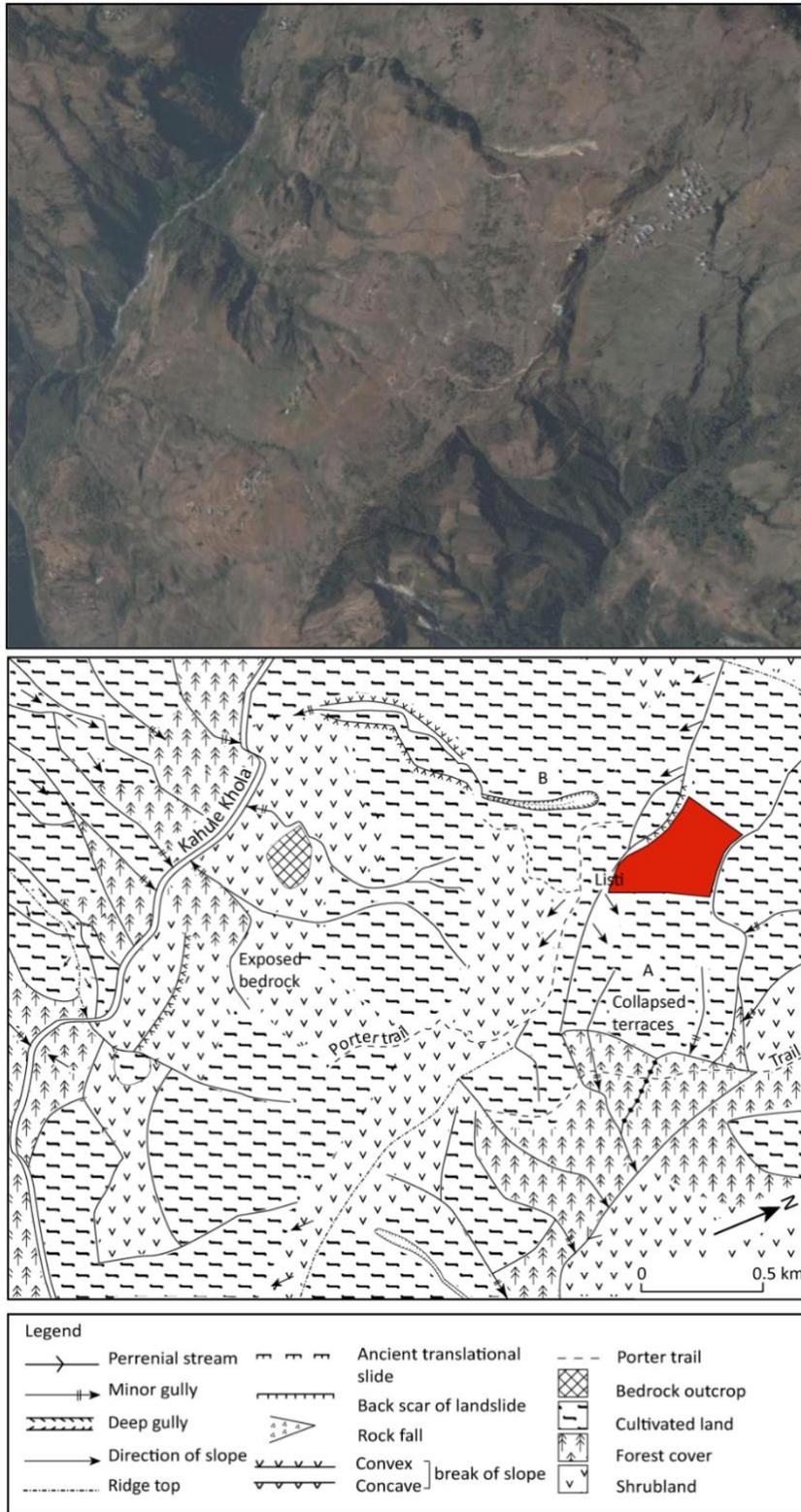


Figure 1.8. The villages of Larcha and Tatopani, Tatopani VDC - 27°55'57.68"N; 85°56'13.00"E (Map source: Oven, 2009, 55).

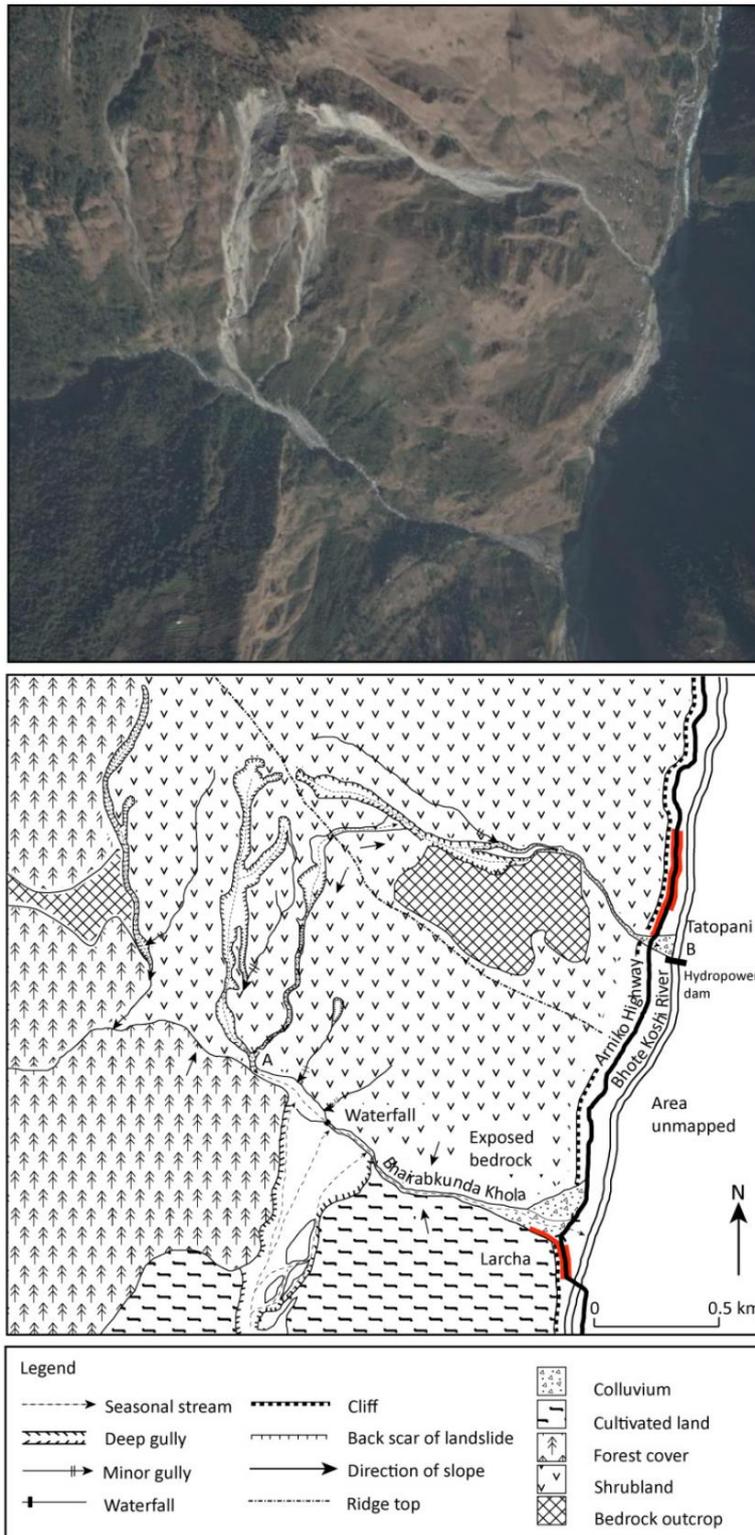
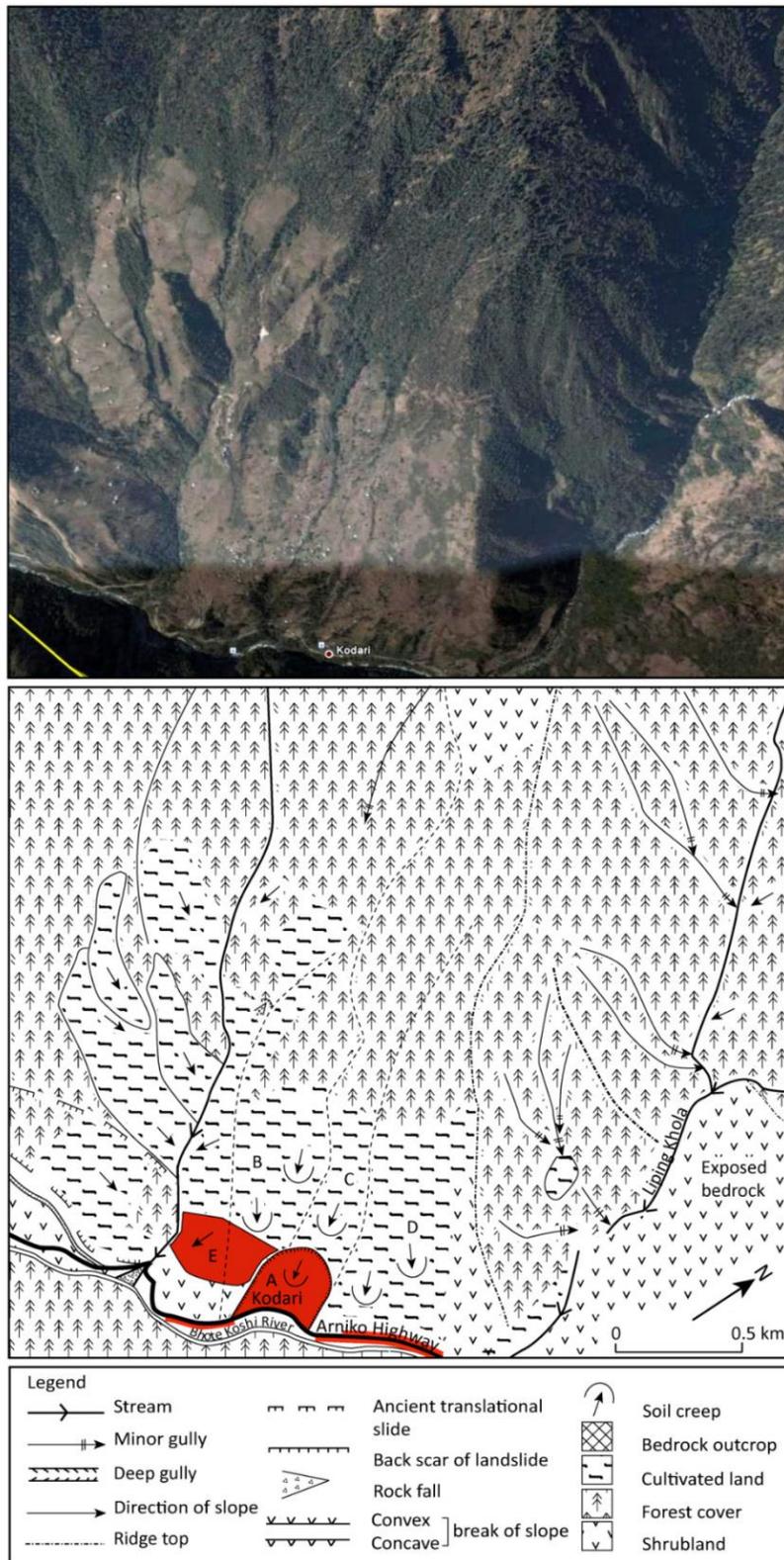


Figure 1.9. The village of Kodari, Tatopani VDC - 27°57'41.37"N; 85°57'23.60"E (Map source: Oven, 2009, 57).



Chapter 2

Assertion, Contextual Knowledge, and Epistemic Blame

2.1. Introduction

Varieties of goal-centred theories, frameworks, and approaches are often encountered in epistemological domains, wherein knowledge is generated and disseminated. Endeavours have a goal, aim, or are directed by a reason; when these are absent, epistemologists refrain from saying that activities constitute reasonable action (Friedman, 2019; Talbot, 2014). Having a goal gives a sense of direction, and other disciplines have also developed goal-centred approaches and theories. Within the domain of disaster risk reduction (DRR) goal-setting features as a key strategy by the United Nations (UN) which has adopted the Sustainable Development Goals (SDGs) as an integral part of the 2030 Agenda for Sustainable Development (UN, 2015).

Similar goal-centred motivations can fruitfully be employed in the development of accounts of epistemic norms and practices, including those governing the speech act of assertion (Williamson, 2000; Sosa, 2000; Latus, 2000; Riggs, 2003; Hawthorne, 2004; Vahid, 2006; Grimm, 2008; Stanley, 2005, 2008; DeRose, 1992, 1998, 2002, 2009; Sylvan, 2013; Kelp, 2014, 2018; Simion, 2015; Kelp & Simion, 2021; Khalifa, 2020; Pagin & Marsili, 2021).

“Asserting is the act of claiming that something is the case [...]. We make assertions to share information, coordinate our actions, defend arguments, and communicate our beliefs and desires. Because of its central role in communication, assertion has been investigated in several disciplines” (Pagin & Marsili, 2021, online). While asserting could have a single aim, sometimes there are several, like essential, fundamental goals, or characteristic, contextually varied goals. Although one person can make an assertion, the speech act is rarely practised in isolation; rather, it is used as a communicative tool conveying the intended message between parties. Assertion is a type of action that has its own kind of normativity, which has led many (Lackey, 2007; Williamson, 2000; DeRose, 2009; Stanley, 2008; among others) to propose strong or weak norms for assertion. In this chapter, I will take the approach of examining norms of assertion in degrees of increasing strictness. Norms governing assertion are rules that need to be complied with in order to offer epistemically proper assertions (assertions that reach their epistemic goals).

The norm of assertion literature matters to DRR and disaster risk management (DRM) as these are both communicative contexts. Especially within the domains of DRR and more broadly in DRM processes assertion is used as a communicative apparatus striving to achieve its primary communicative goals by conveying the intended message(s) between parties like experts and laypersons. Since laypersons' DRR decision-making hinges on experts' knowledgeable assertions, if experts fall short of the normative ideal of that epistemic relationship, impairing it, I will show that they can be held epistemically blameworthy.

In this chapter, I consider what epistemology has to offer in terms of the methodology it presents and its understanding of what it is to be rational and/or epistemically blameworthy when making assertions under a variety of decision-making circumstances. I initially examine three norms of assertion in degrees of increasing strictness requirements with relevant examples in section 2.2. Conversational contexts are most often epistemic contexts and may require different levels of knowledge in different circumstances. Assertion, as I have just argued, is important in the context of DRR and DRM, as they are informational environments that require accurate and pertinent asserters and informants. Without understanding the decision-making context(s), one would not generally be inclined to define a class of decision-makers under duress and at risk as less than ideally rational or blameworthy, where norm breaking is associated with epistemic blameworthiness. This is discussed further in the language of geography and disaster studies in the next chapter where the major assertion of a certain paradigm is that disasters are results of extreme natural events, and because of an insufficiency in the risk perceptions of affected people, they fail to 'adjust' to these events.

In section 2.3, I discuss how contextualism matters to assertion and the particular implications for scenarios with high and low stakes, especially when applied later to DRR. In section 2.4, I consider and analyse prominent issues, objections, and rebuttals to the norm of assertion literature and contextualist perspectives and focus on exceptions to norms that are sometimes overridden or suspended, according to context. This may lead to inquiries into what kinds of exceptions there can be. In section 2.5, I develop a novel account of epistemic blame for DRR contexts and suggest that this account of epistemic blameworthiness opens avenues for discussions about accountability and responsibility for DRR and DRM.

PAMs constitute an important kind of DRR knowledge, which is actionable and has consequences. The goal of PAMs is to reduce risks and keep people safe by performance of specific actions during hazard events. If PAMs are not achieving their goals (Chapter 5) this requires an examination of the epistemic processes as well as the contextual factors. If expert assertions are currently made as if they were knowledgeable or certain but were made without proper contextual support and evidence, they would violate the appropriate norms of expert assertion, and be held epistemically blameworthy.

2.2. Norms of Assertion

In this section I examine the main views in the literature concerning the norms of assertion. Norms governing assertion are rules that need to be complied with in order to offer epistemically proper assertions, similar to following rules in order to properly perform in certain types of competitive sports. The norm of assertion literature matters as a theoretical underpinning for showing how varying degrees of normative requirements apply in contexts with different stakes, especially when applied later to DRR. In this section, I show how plausible this idea is by identifying three norms of assertion, outlined in order of increasing levels of strictness.

These are the Reasonable To Believe Norm (RTBNA) proposed by Lackey (2007), in which one need only have a reasonable belief to make an epistemically sound assertion. The Knowledge Norm (KNA) promoted by Williamson (1996, 2000), DeRose (2002, 2009), Turri (2011, 2014, 2016) Slote (1979), Unger (1975), Moore (1962), and others, wherein one ought to assert only on the basis of knowledge, and the Certainty Norm (CNA) endorsed by Stanley (2008), wherein one ought to be epistemically certain in order to assert.

2.2.1. The Reasonable to Believe Norm of Assertion (RTBNA)

According to defenders of the RTBNA one may assert properly on the basis of less than knowledge and proper assertion could only require some form of justified belief. One should assert that p only if one reasonably believes that p .

According to Lackey's version (2007, 608):

RTBNA: One should assert that p only if (i) it is reasonable for one to believe that p, and (ii) if one asserted that p, one would assert that p at least in part because it is reasonable for one to believe that p.

Lackey's RTBNA argument can be formulated along these lines:

1. Breaking norms equates to blameworthiness.
2. According to the KNA, we should only assert what we know.
3. If you assert what you do not know, then you are blameworthy.
4. In some cases, you assert what you do not know, but are not blameworthy.
5. Therefore, KNA is false.

The argument's crucial step is premise 4, so Lackey's (2007) three main cases are worth examining:

1. **Racist Juror:** A juror is able to put aside his racist inclinations and judge the defendant based on the evidence. Thus, despite his inclinations, which may have led him to assert otherwise, shortly after leaving the courthouse, he asserts that the accused did not commit the alleged crime, asserting seemingly contrary to his beliefs.
2. **Distraught Doctor:** Sebastian is a paediatrician who has extensively researched childhood vaccines, accepting the scientific evidence that there is no link between vaccines and autism. Yet when his daughter is diagnosed with autism, Sebastian abandons his previous beliefs regarding vaccines. However, when asked about the link between vaccines and autism, he asserts contrary to these beliefs and follows the scientific evidence.
3. **Creationist Teacher:** Deeply religious Stella puts aside her creationist beliefs in favour of the evolutionary theory in order to be a dutiful teacher. Despite her lack of belief, she asserts to her students what is best supported according to the syllabus.

Lackey (2007) sees all these as cases of 'selfless assertion', wherein the subjects assert according to the best available evidence, leaving aside their personal beliefs. In virtue of asserting based on the best available evidence, they are not blameworthy. I discuss epistemic blameworthiness in further detail later in this chapter. Lackey uses the above cases to show that the norm of assertion is something other than knowledge: since the subjects are asserting without having knowledge (because they lack belief) and yet are not

blameworthy, the norm for proper assertion must be one other than the KNA. In these cases, a norm weaker than KNA suffices for the subjects' assertions to be proper. Lackey goes further and claims that this supports the RTBNA: the subjects' assertions are proper because it would be reasonable for them to believe in what they are asserting.

Most objections to the KNA stem from the idea that it is too strict. A major critique is that the KNA is too strong a requirement for assertion and that one might assert properly on the basis of less than knowledge. According to Lackey (2007), the KNA should be replaced with a weaker norm, and she thus developed the RTBNA, motivating that justification norms provide a better case than formulations of KNA. Since the RTBNA is a weaker norm, all the cases that KNA gives as proper will also be proper in RTBNA cases.

2.2.2. The Knowledge Norm of Assertion (KNA)

The basic formulation of the KNA is that one should assert that p only if one knows that p . However, formulations may sometimes differ according to this view's different proponents. I focus on Williamson's account of the KNA. In *Knowing and Asserting* (1996) Williamson argues that assertion is stringently governed by a single norm, following the schema: **C**: One ought to assert p if and only if $C(p)$. Williamson adds further that $C(p)$ should be understood as 'p is known'. With this, Williamson (2000, 243) supports:

KNA: One ought to assert p if and only if one knows that p

Williamson defends this view on the basis of three arguments:

i) Cases of epistemic luck. These are cases where one comes to believe truly by chance, accident, guessing, hunches, intuitions, or mere coincidences. In these cases, one is considered lucky, but not necessarily to be in possession of knowledge. For Williamson, in such cases one should not assert what one truly believes, because one does not know it. For example, one ought not to assert that one has won the lottery (before knowing the outcome) because one cannot know this due to the unlikelihood of the outcome. It is epistemically wrong to assert that one has not won the lottery on the basis of the unlikelihood of winning it, because one in fact does not have knowledge of the outcome.

ii) Moorean assertions of the form 'p but I don't know p' are impermissible; for example, if someone asserts that 'I know my name, but I do not know that I know my name', that

person would be making an impermissible assertion. There is something intuitively wrong with such claims.

iii) Challenges to assertions that take the forms ‘how do you know?’, ‘do you know that?’ and ‘you don’t know that’ seem acceptable. One would reasonably challenge an assertion that seems to be made without good reasons. For example, when it seems unlikely that the person could have any evidence about the matter, like ‘you have £ 0.108 in your left pocket, and forgot to feed your canaries’, one feels entitled to question ‘how do you know?’ So it seems that asserters are required to know what they assert. This would be explained if the norm of assertion was KNA. Further, this may act as a deterrent for making baseless, unjustified assertions, especially if the one making an assertion would lack the reasons to back those assertions.

Williamson further advocates that if one violates KNA, then one ceases to engage in assertion; “Only knowledge warrants assertion” (Williamson, 2000, 243). Hawthorne (2004, 23) concurs: “[T]he practice of assertion is constituted by the rule/requirement that one assert something only if one knows it”.

Meanwhile, the KNA’s rival accounts identify C with weaker epistemic properties: knowledge-level justification (Douven 2006, 2009; Lackey 2007, 2008; Neta, 2009), or knowledge-level justified belief (Kvanvig 2009, 2010). A prominent exception is Stanley (2008) whose rival account requires that one is certain, requiring stronger epistemic properties, which I will now examine.

2.2.3. The Certainty Norm of Assertion (CNA)

Some authors propose that the norm of assertion is stricter than knowledge. Stanley (2008, 3) supports this and the thesis that assertion requires certainty, which “is instead far better explained by the hypothesis that we adhere to norms that connect subjective and epistemic certainty with the speech act of assertion”.

CNA: Assert that p only if you are certain that p

When one asserts vows, oaths, declarations, verdicts, orders, or demands, these are generally held to be certain and declarative of such certainty. Although more recently the swearing of oaths, as practised in professional contexts, is often considered merely a

symbolic rite of passage, they usually have their legal and binding aspect cemented in the form of a code of professional conventions of ethics and practice. Furthermore, there are penalties for rule breaking, which also vary according to the context. The transgression of professional rules constitutes malpractice, which covers a wide range of retributions, from legal action to civil penalties, while in cases of assertion, norm violators are also generally seen as blameworthy and subject to criticism.

Consider courtroom cases: when a judge declares sentences or passes a court order, demanding that one comply with what the order stipulates or else face severe penalties, these types of assertions are much stronger than assertions of knowledge alone. This serves to establish a claim beyond any reasonable doubt.

In light of such cases, Stanley's (2008, 48) account requires that one be epistemically certain when one asserts: "one is certain of a proposition p if and only if one knows that p (or is in a position to know that p) on the basis of evidence that gives one the highest degree of justification for one's belief that p". Stanley (2008) argues as follows:

First, there are some Moore-type propositions involving certainty, like 'dogs bark, but I'm not certain that they do', which seem odd and whose oddity the KNA cannot explain. Someone might assert that even if they knew that dogs bark, they cannot be certain of this.

Second, a reasonable challenge to an assertion seems to be 'are you sure?' In this case, it seems like the challenger is asking for reasons to believe one is certain of what one is asserting, not merely that one knows.

Thus far, I have discussed the RTBNA, KNA, and CNA in order of increasing requirements of norm strictness, for the purpose of presenting an array of cases and examples wherein: sometimes less than knowledge may suffice for an assertion to be considered proper, sometimes knowledge may be required, and in some cases more than knowledge is required. Even if one does not accept the CNA as the norm for assertion, this variability might nonetheless give some reasons to take a context-sensitive approach. I return to this point in section 2.5 where I show how the norm for expert assertion is sensitive to context. I lay the ground for that next by showing what the relationship is between context and assertion.

2.3. Contextualism and Assertion

In epistemology, contextualism indicates an extensive array of positions according to which the standards of knowledge or justification are somehow relative to context. More specifically, the type of contextualism I focus on is an account about knowledge attributions and denials, relative to the context of the attributor, rather than the subject. Attributor Contextualism (AC) maintains that the truth of a knowledge attribution depends on facts about the conversational context in which the attribution of knowledge is made. I focus on AC because the epistemic relationship between experts and laypersons in DRR is characterised by and based on knowledge attributions and denials relative to the context of the attributor (expert), rather than the subject (layperson). One of AC's most notable champions is DeRose (1992, 2002, 2009) whose account is my primary focus; other prominent contextualists include Cohen (2000) and Lewis (1996). Contextualist theories hold that key epistemic concepts like 'knowledge' and 'justification' are context relative.

Contextualism: Knowledge is indexical. The attributor's context affects the truth conditions of knowledge ascriptions.

This kind of context-sensitivity does not only affect knowledge ascriptions. It is also plausible as a view concerning the epistemic norms of assertion:

Assertion contextualism: The degree of warrant necessary for epistemically proper assertion varies with contextual features.

DeRose (2002) endorses a version of assertion contextualism, which I will return to in section 2.3.1. Stanley (2008), who champions the CNA, elaborates in line with contextual ideas:

[W]hen we allow someone who is uncertain of *p* to be described as knowing that *p*, we are allowing the term 'know' to be used loosely [...] Unger acknowledges that we do not flinch when attributing knowledge that *p* to those who are clearly not certain that *p*. His response is to argue that we are speaking loosely (not in accord with the literal meanings of the terms), and the fact that we are speaking loosely emerges when we place focal stress on the relevant expressions [...]. However, Fred Dretske (1972) argued that stressing a term does not affect the meaning of sentences of which that term is a part (Stanley, 2008, 42-43).

I will apply the contextualist concepts of varying contexts and stakes in my account of DRR expert epistemic blameworthiness, in section 2.5.

Meanings tend to shift according to the context in which the assertion is made. We can see the need for a contextualist semantics in the following cases:

Example 1: A certain brand of car can be seen as being big for a car, and the planet Mercury can be seen as small (compared to other planets). However, while Mercury is small, it is certainly bigger than any brand of car.

Example 2: Gopal is tall for an 8-year-old, but not as tall as a professional basketballer. Tallness in the context of 8-year-olds differs vastly from the context of tallness for basketball players.

According to contextualism, knowledge has different standards, depending on the context in which assertions are made. One would then naturally question what governs such shifts; clearly, we need to know what standards we ought to apply, when such standards vary (i.e., are raised), or lowered, and how these standards affect whether or not in a given context we can be attributed as having knowledge. “Rather than rejecting one of these intuitions as mistaken, contextualism attempts to explain away the apparent inconsistency of our intuitions by arguing that they reflect the contextually varying truth-conditions for knowledge ascriptions” (Cohen, 2005, 57). Contextualists generally appeal to paired cases wherein the standards for knowledge vary in different conversational contexts. Different standards govern what knowledge is in:

a) **Low-stakes scenarios**, where there is not much at stake or at risk, and

b) **High-stakes-scenarios**, where the stakes are significantly higher due to the risk or corresponding hinging factors of what is at stake

Thus, the contextualist will allow that one speaker can truthfully say ‘S knows that P’, while another speaker, in a different context wherein higher standards are in place, can truthfully say ‘S doesn’t know that P’, though both speakers are talking about the same S and the same P at the same time (DeRose, 2009, 3).

Contextualists often cite the Bank Cases (DeRose, 1992, 913):

Bank Case A. My wife and I are driving home on a Friday afternoon. We plan to stop at the bank on the way home to deposit our pay checks, but as we drive past the bank, we notice very long queues, as there often are on Friday afternoons. Although we generally like to deposit our pay checks as soon as possible, it is not especially important in this case that

they be deposited right away, so I suggest that we drive straight home and deposit our pay checks on Saturday morning. My wife says "Maybe the bank won't be open tomorrow. Lots of banks are closed on Saturdays." I reply, "No, I know it'll be open. I was just there two weeks ago on Saturday. It's open until noon."

Bank Case B. My wife and I drive past the bank on a Friday afternoon, as in Case A, and notice very long queues. I again suggest that we deposit our pay checks on Saturday morning, explaining that I was at the bank on Saturday morning only two weeks ago and discovered that it was open until noon. However, in this case, we have just written a very large and important check. If our pay checks are not deposited into our checking account before Monday morning, the important check we wrote will bounce, leaving us in a very bad situation, and the bank is closed on Sunday. My wife reminds me of these facts. She then says, "Banks do change their hours. Do you know the bank will be open tomorrow?" Remaining as confident as I was before that the bank will be open then, still, I reply, "Well, no. I'd better go in and make sure."

In the above cases, contextualists claim that the intuitive variation in assertibility is straightforwardly explained by the context sensitivity of knowledge. Due to a change in context, in the second Bank Case, one fails to know the proposition, 'I know that the bank will be open', and therefore one is not in a position to assert and cannot assert it.

But one thing one cannot do is to assert that not-P! In the 'high standards' Bank Case, for example, the epistemic standards seem too elevated for me to properly declare flat-out, 'The Bank is open on Saturdays.' But, of course, neither am I in any position to say, 'The Bank is not open on Saturdays'! I am not in a position to say that even according to the more relaxed standards governing the 'low standards' Bank Case and, unsurprisingly, the rise in standards does not make it easier to make the assertion (DeRose, 2002, 189).

The case of a besotted lover who would readily believe anything his beloved would tell him to be true, even if what she says is actually false raises further questions about contextual conditions. According to DeRose (2009) this example can be explained through the Subjunctive Conditionals Account: we tend to think that we do not know P, if we would continue to believe P, even if it were false. How to then ascertain if one's beliefs are sensitive or insensitive to such contexts? DeRose (2009) has a Rule of Sensitivity: when

someone asserts S knows that P, the standards are raised to such a level, that S's belief in P must be sensitive.

The different varieties of questions when inquiring about contextualism seem to boil down to language. This may then seem to be the purpose of contextualism: to be clearer about the way in which language is used. To a certain degree, contextualism is a theory concerned with semantics or the study of meaning. Semantics focuses on the relation between signifiers like words and their denotation. Contextualism's critics (e.g. Simion, 2015, 2019) contend that the phenomena appealed to defend contextualism can be explained in terms of pragmatic factors, without having to change the semantics of concepts such as knowledge. Contextualism's critics deal with cases on the level of pragmatics, but for contextualists the semantic dimension includes certain pragmatic factors.

2.3.1 DeRose – KNA Untenable Without Contextualism

DeRose (2002) links contextualism and the KNA quite tightly: "To be positioned to assert that P, one must know that P according to the standards for knowledge that are in place as one makes one's assertion" (ibid, 182). If the standards for when one is in a position to warrantably assert that P are the same as those that constitute a truth condition for 'I know that P,' then if the former standards vary with context, so do the latter. "In short: The knowledge account of assertion together with the context sensitivity of assertibility... yields contextualism about knowledge" (DeRose, 2002, 187; 2009, 106). In this view, knowledge remains the norm of assertion, yet DeRose addresses a concern about just how to determine the amount of warrant or justification one needs to possess in order to assert. "The context-variability in what we are positioned to assert is just what the knowledge account of assertion would lead us to expect if what counts as knowledge is a context variable matter" (DeRose, 2002, 181). Furthermore, DeRose argues that the KNA demands a contextualist account of knowledge:

What of the advocate of the knowledge account of assertion who does not accept contextualism? Such a character is in serious trouble. Given invariantism about knowledge, the knowledge account of assertion is an untenable attempt to rest a madly swaying distinction upon a stubbornly fixed foundation. [...] The knowledge account of assertion demands a contextualist account of knowledge and is simply incredible without it (ibid, 182).

To motivate his view about contextual knowledge attributions, DeRose (2011) then presents his 'impossibility claim' combined with the general plausibility of KNA.

DeRose's Impossibility Claim: KNA is untenable without accepting the context sensitivity of knowledge.

DeRose thinks this view is advantageous because it can explain the intuitive variability of assertibility with stakes, while still keeping the KNA. However, there have been several responses to DeRose's impossibility claim, most notably by Hawthorne (2004), and Simion (2015) who claims that DeRose's Impossibility Claim is false.

2.3.2 Simion on Overriding Norms and Prudential Concerns

I now examine Simion's (2015, 2019) view, and draw upon her account of criticisability and blameworthiness. Simion is concerned with epistemic factors and 'practical context sensitivity' of the norm of assertion, and classifies assertion as a type of action, governed by norms of several types (in virtue of being a kind of action): prudential, moral etc. Actions may be subject to 'all-things-considered' evaluations; for example, even though an act conforms to norm X, it may be all-things-considered improper.

Simion (2015) illustrates this by citing the example of Brown's (2010) Bald case, wherein although my boss is bald, it is improper for me to assert what I know due to prudential concerns. Simion (2015, 4) argues that by default, our intuitions are not tracking epistemic propriety; they usually track all-things-considered propriety. Requirements according to a particular norm are defeasible: they can be overridden by more stringent requirements stepping-in. Simion considers two ways in which norms are overridden:

Override 1: Make my token action all-things-considered inappropriate, even though norm X is respected.

Override 2: Modify up or down the standards for all-things-considered proper token action.

If default intuitions do not track epistemic propriety, there is a concern, which Simion (2015, 5) highlights: "how is one to distinguish the requirements of the norm one is interested in (for us: epistemic norms) from the requirements of further norms stepping-in & overriding it?" Brown (2010) has offered an Epistemic Support Principle (ESP): if a norm N affects the amount of epistemic support needed for proper assertion, then N is an epistemic norm.

However, a principle like ESP cannot work, as evidenced for example, in the case of traffic norms.

Suppose a parallel principle for traffic norms: If a norm N affects the conditions of driving, then N is a traffic norm. This principle would be easily falsified in case someone had to drive over the speed limit to defuse a bomb: there, a moral norm would require her to override general traffic-related content regulating the conditions for driving. This, however, would not make a traffic norm out of the moral norm. The same is true for different kinds of norms, so it seems like an ESP defender would have to defend the particularity of epistemic norms, and it is doubtful that he would succeed (Simion, 2015).

I think Simion's ideas concerning overriding and prudential concerns are useful, because they show how there can be exceptions to epistemic norms. Her account later distinguishes between blameworthiness and criticisability, yielding a means of establishing the conditions for excuses and exceptions.

2.4. Issues, Objections, and Rebuttals

2.4.1 Issues Faced by the Norms of Assertion

The previous sections showed how some authors defend the case for different norms of assertion; I now survey some arguments against the Knowledge Norm (KNA). Similar lines of argumentation are presented against both the Certainty Norm (CNA), in that it is too strict, and the Reasonable To Believe Norm (RTBNA) in that it is not strict enough for assertion. This means that by considering objections to KNA I will be responding at the same time to objections to the other two views. In addition to several objections, I consider scenarios where the KNA is overridden by different norms, or replaced by others, cases with prudential concerns, and moreover, cases where the stakes require more than knowledge. In the DRR domain the expert and layperson relationship may require more than knowledge in high-stakes contexts.

2.4.1.1. Objections to the KNA

The prevalent criticism of the KNA is that it is too strict, and that very few assertions could be classified as epistemically proper, or as assertions at all, on the account of Williamson (2000) and others. Engel (2008, 108-109) puts the issue like this:

KN norm on assertion seems sometimes to be the view that our assertions should be so serious that only a Victorian clergyman - or an overly scrupulous scientist - could actually make assertions. [...] we may ask: is not the norm KN too strong? Who will be ever able to obey it? [...] there are actually many propositions (perhaps most of our beliefs) upon which we can have only a very high degree of belief, and no certainty or knowledge: if it were required that we know them, we would be entitled to assert nothing, or most of our assertions would fail.

Another objection is that it is acceptable to assert things that you reasonably, but falsely, believe to be true, whereas you cannot know something false. In response, Williamson (2000) suggests that such assertions are reasonable but nevertheless impermissible. You might reasonably but falsely believe Q, in which case your assertion would be reasonable despite being impermissible, just as you might reasonably but falsely believe that you were obeying the speed limit, in which case your driving speed would be reasonable despite being impermissible. From this perspective, the popular criticism mistakes a reasonable assertion for a permissible one (Turri, 2011).

DeRose (2002), uses a similar strategy distinguishing between primary and secondary propriety in following a rule. Like other rules, a kind of secondary propriety/impropriety arises with respect to the KNA. In terms of this rule, those who appropriately assert, will actually obey it in a primary sense, while those breaking this rule in a blameless manner assert what they do not know, but reasonably thought they did, would be asserting properly in some secondary sense. Turri (2011, 43) argues that this move does not work:

First, this manoeuvre places even more weight on what many consider to be the weakest link in the overall defence of the simple knowledge account - namely, leaning on the permissible/ unreasonable distinction, and accusing opponents of bungling it when considering particular cases - and so comes at a cost.

Turri (2011) expresses a further concern with how the KNA is used, highlighting an interesting and valid point from an all-things-considered perspective. An executioner might be authorised to kill a prisoner, but it would be impermissible for the executioner to fatally beat the prisoner with a tyre iron before he has his last rites. Permissibly killing the prisoner

requires that the executioner kill the prisoner in the appointed way. In general, when we may A, it's because we have permission to A in some specific way.

While this does seem to place an even more stringent condition on the already strict KNA, it is important to consider that 'how you know' matters. The KNA requires one to know what one is asserting, while norms like the CNA require more than knowledge, i.e., certainty to assert. KNA is stringent, but it fails to take into account the manner in which the norm is employed. It is a straightforward norm, but it governs a practice that is seldom straightforward in context-sensitive settings similar to Turri's (2011) executioner case. Defenders of the KNA have sought to address similar concerns, and many of these attempts take the form of KNA having exceptions, or being overridden, depending on particulars of the context.

2.4.1.2. Exceptions to the KNA

There are two ways in which a norm like KNA can have exceptions: depending on the context, sometimes they are overridden, and sometimes they are suspended. When exceptions might follow the pattern of overriding, precedence is given to some norms over others, as in the case of a violation of a norm in order to satisfy another, more applicable norm. A prudential norm could, for example, override an epistemic norm, depending on the case context.

Consider traffic norms⁶ regulating traffic flow and speed in different zones. In some areas, the norms stipulate that the speed be maintained at 60 km/h. In general, these speed limits are followed, as this assists in maintaining standards of safety and organisation. Nevertheless, unforeseen events or emergency-type situations occasionally occur, prompting the violation of certain traffic norms like speed regulation. Hence, general traffic norms may then be overridden due to the urgent context of perhaps a medical emergency wherein someone having a heart attack needs to be immediately driven to the ER (or a safety emergency wherein police officers are involved in high-speed chases to apprehend wanted criminals). Under such circumstances, it is the priority of the ambulance driver or layperson to get the patient to the hospital as soon as possible. There may be some

⁶ Example borrowed from Simion (2015), explanation and analysis my own.

instances of highly inclement weather situations, or a case of general vehicle breakdown and malfunctioning of some sort, and one might be forced to slow down and drive at speeds considerably lower than the general norm dictates. Further, the driver in these cases would be quite heavily criticisable if they had chosen instead to cling stubbornly to following the general norm; considering the prudential concerns of risk, or moral concerns, such as the value of the patient's life, violating the speed-limit would be the proper thing to do.

In the case of violating traffic norms, the speed-limit norm is overridden by prudential norms according to contextual demands. However, the prudential norm in no way becomes the default norm; rather, after the urgency dissipates, one ought to revert to normalcy in terms of general rule following. Furthermore, in keeping with the examination of exceptions in some countries: a soldier who kills or commits other crimes, is not tried in a civil court; he is tried in a military court, and the law that applies is different. A person might then be held by one norm when doing X in a civil context and by a different norm when doing the same in a military context.

One might describe this case as one wherein the norms of a context are suspended by entering a different context. It is also the case though that some people, for example children, are exempt from adhering to certain norms. In that case, some norms simply do not apply to them, being replaced perhaps by weaker norms.

2.4.1.3 KNA can be Overridden by Prudential Norms

During times of duress, extreme fear, urgency, or forced compulsion, the nature of assertions ought to be reviewed, especially for assertions that counter one's normal views, as the following cases illustrate. This matters in the DRR context because one might have the intuition that in DRR perspectives, prudential norms are overriding the epistemic norms and thus the epistemic norms at work are less strict/redundant. However, I would argue that in these cases, prudential norms do not override epistemic norms and the standards remain strict. I will analyse this issue further here and will return to this point for application in section 2.5 on epistemic blame.

Sometimes the context of assertions can be tampered with to suit an agenda to someone's advantage, for example, when someone tries to purposefully extract a verbal agreement from a person heavily incoherent under the influence of alcohol. Assertions made in that

context, would not necessarily hold as true and binding, and even more clearly so when the scenario might be evaluated in terms of the norms governing a legal context wherein such assertions could be rendered null and void. Consider further:

The Case of a Crazy Gunman: There is a gun placed to your head and you are instructed to assert that “xyz” or you will not live another minute. Considering that your life is much more valuable than asserting that which you either do not know, or believe, or have justification for, or could be true/false, you go ahead and assert whatever the crazy gunman demands of you. Moreover, you are blameless for asserting as you do, as the prudential norm clearly overrides the epistemic norm of assertion in such a context.

Furthermore, it is worth considering Brown’s (2010) Bald case again, in which one knows that one’s boss is bald, yet it would not be polite or prudent to point this out to him. Nothing explicitly prevents one from asserting what one knows in this case, epistemically or otherwise; however, someone sensitive to context and proper behaviour would know better than to assert something that could be deemed tasteless or offensive to an authority. Concerns like these may prevent one from asserting what is known, discouraging one from asserting in a manner unacceptable according to decorum and other prudential concerns.

However, Brown (2010) presents the case of Affair as a scenario wherein a friend fails to assert based on his possessing only knowledge of an affair that his friend’s wife is having, and not certainty thereof. Brown goes on to argue that “[i]n many senses of propriety, that one knows that p is not sufficient for the propriety of asserting p” (ibid, 550). However, I disagree with Brown’s evaluation, of knowledge not being sufficient; instead, this seems strongly and intuitively yet another type of case wherein prudential norms override epistemic norms, rather than the argument that knowledge would not be sufficient for proper assertion. Perhaps the friend did not feel that he was entitled to make such a claim, especially if he did not have any evidence or ways in which he could have provided justification for his assertion, if prompted. Moreover, it seems plausible that even if the friend did possess knowledge of the affair, or certainty thereof, he may have thought it unwise to assert what he knows to the husband, thinking that in terms of social etiquette it is unwise to meddle in the private lives of his friends.

If the husband (who may be meek) is already aware of his wife's philandering behaviour, the friend's assertion informing the husband might only create an inharmonious and uncomfortable relation between the husband and friend. Or if the husband is besotted, he may then begin to look upon his friend unfavourably, accusing him of lying. Humans are generally averse to criticism (Kelp, 2018, also alludes to this point), and this would be enough to deter the friend from asserting what he already knows, rather than his requiring any further certainty to assert.

The Train case (Williamson, 1996, 508) is worth examining in more detail, being usually cited as one of prudential norms overriding epistemic norms, which I view as erroneous, as the case seems to misuse the principle of overriding.

Train Case: Sometimes one knows that one does not know that P, but the urgency of the situation requires one to assert that P anyway. I shout, 'That is your train', knowing that I do not know that it is, because it probably is, and you have only moments to catch it. Such cases do not show that the KNA is not the norm of assertion; they merely show that the KNA can be overridden by other norms not specific to assertion. The other norms do not give one warrant to assert that P, for to have such warrant is to satisfy the rule of assertion.

Knowing that it is urgent for one to get to one's destination equates to knowing the context and the implications thereof i.e. what is at stake for the other person. Asserting as if one knows although one does not know that is the case gives the one being asserted to the impression that the asserter knows and is thus asserting in the manner that they are. Carter and Gordon (2011) suggest that the implied warrant in assertion is absent, thus violating the Gricean norm to not mislead. You may assert in this context, but you would not be allowed to convey or portray yourself as knowing, for if you did, you would be blameworthy and accountable for misleading me. According to McCammon (2014, 134) "assertions *represent* the speaker as knowing what she asserts". One ought to only represent oneself as being in knowledge if one actually does have knowledge, and make the corresponding assertion based on that knowledge. In this case you possess less than knowledge and ought to represent yourself as honestly as possible, asserting that 'I believe this could be your train', or 'I guess that might be your train' rather than 'that IS your train'. However, only if you were certain, could you assert with such a corresponding degree of certainty. Williamson

(2000, 257) holds that “asserting that P without knowing that P is doing something without having the authority to do it, like giving someone a command without having the authority to do so”. Similarly, both Lackey (2008, 2011) and Goldberg (2011) argue that: “absent any entitlement to regard the fact of S’s assurance of [p] as a reliable indication of the truth of [p], no hearer should regard S’s assurance-manifesting testimony that p as a good reason to believe that p” (Goldberg, 2015, 64). You have only seen a random train approaching the station, and upon this random piece of information, thereby formed a mere belief. This belief involves the thought that there is some chance that the train you see could be the one I need to urgently catch and should thus probably check. Your thoughts are certainly different from what you assert. DeRose (2002, 185) expresses this succinctly: “It’s often tough to properly assert. Even where you have a reasonable belief that P, it’s far from automatic that you’re in any position to flat-out assert it”.

Moreover, asserting and offering a false indication that the asserter has knowledge, whereas he may only have probable beliefs, seems no different from lottery-type propositions, wherein, based on probabilities, one may assert that your ticket has not won but the asserter may not know this, and hence it would be an improper assertion. Furthermore, the urgency of the situation does not require one to assert that P while lacking much justification. It seems implausible to simply treat urgency as the sole reason to act. Here the focus seems solely fixed on context (an urgent situation) and leaves out epistemic considerations, since urgency seems to override other considerations. I argue, to the contrary, that such urgent scenarios do not override epistemic concerns. Rather, epistemic concerns are intrinsically linked to context, especially in urgent circumstances that may warrant stricter epistemic requirements.

Imagine if the train case were a scenario, in which the asserter shouts: “That is your train!” knowing that it is urgent for me to catch my train, but he does so knowing that it is the train to the airport, and most tourists are seen catching the train from that platform. So, although the asserter does not know that it is my train, he may be seen as somewhat blameless, having had some quasi-reasonable basis from which he asserts. However, if the urgency of the situation required me to get on the right train to catch my flight and you misleadingly assert as if you possess knowledge without any knowledge or quasi-reasonable basis that the train is mine, and it happens to be the wrong train, resulting in me travelling in the

opposite direction and missing my flight, you are then epistemically blameworthy. Here it might seem that ignorance is a factor that is excusable; while this could be the case from a moral and overall perspective, I argue that from an epistemic perspective it is not excusable. While I do not exclude moral blameworthiness, my focus in the analysis remains instead on epistemic aspects of blame.

Another concern is that one ought not to confuse “the failure to satisfy a rule’s standard (something that happens with some frequency) with the failure to properly apply a rule (which is less common, though still not non-existent)” (Goldberg, 2015, 25). This type of misapplication or failing to apply rules properly is why I take issue with Williamson’s (1996) Train case and Lackey’s (2007) pregnant Hanna case.

Pregnant Hanna, who is 3 months pregnant and will not receive another pay check for at least a week, is considering spending her last £4 on lottery tickets rather than on prenatal vitamins. Surely, it is permissible and indeed proper for Lackey to flat-out assert, “You are not going to win the lottery”. According to Lackey (2007, 618): “In cases such as this, flat-out assertions involving lottery propositions, even if they are not known, invite neither resentment nor criticism from the relevant hearers, thereby showing that they are not in violation of a norm of assertion”.

I strongly disagree, as the asserters in both cases (Train and Hanna) fail to properly assert according to the norms that ought to govern their respective assertion types. Yet the formulators of these cases render them blameless, according to what the authors think would be appropriate situations of blamelessness. I disagree with Williamson (1996) and Lackey’s (2007) interpretations and use these cases as examples to illustrate just the opposite. In my view, these cases constitute gross misapplication of the blamelessness principle. The asserters fail to satisfy an appropriate norm’s standard, and this further constitutes a failure to properly apply the blamelessness principle on the part of the authors of the cases. The improper assertions made by the asserters in these cases create falsely believable impressions of themselves; “assertion generates a reason to believe, and hence can play its knowledge-spreading role, in virtue of the special nature of the act of assuring another of the truth of a proposition” (Goldberg, 2015, 62).

Furthermore, in analysing the case of exceptions to KNA and the overriding principle, there needs to be more than simple do's and do not's by way of maxims to systematise cases of possible exception:

[A] general worry with excuse maneuvers is that they form very generic ways of immunizing proposed norms. Without a principled account of when an agent is excused, every counterexample to a norm may be rebutted by upholding that the agent is excused from violating the norm. As we have seen, the proponents have yet to provide a viable principled account of excusability (Gerken, 2011, 544).

Kelp and Simion's (2017) normative framework systematises epistemic criticism, and norm-specific blameworthiness. The authors primarily classify exceptions of the blameless variety into three main categories:

1. **Overriding** – cases wherein norms are violated by higher order ones
2. **Uncontrollability** – cases wherein norms are violated due to circumstances (genuinely) out of one's control
3. **Ignorance** – cases wherein one violates norms out of ignorance.

Secondarily, an agent is blameworthy if and only if (iff) she is not 'all-things-considered blameless'. In sum, the authors propose the following:

All-Things-Considered Blamelessness

An agent is all-things-considered blameless for φ -ing iff:

(1) φ -ing is all-things-considered permissible (that is, either fully permissible or permissible by all (non-overridden) overriding norms that apply to it) or

(2) φ -ing is all-things-considered impermissible but the agent's φ -ing is blameless relative to all specific norms that apply to it.

All-Things-Considered Criticisability/Blameworthiness

An agent is blameworthy for φ -ing iff she is not all-things-considered blameless for φ -ing.

According to this view, distinguishing between blameworthiness and criticisability yields a more robust means of establishing the conditions for excuses and exceptions. However, then the consideration would be how to tell which norm type is being defended and which is overridden when there are cases of overriding of norms taking place. Lackey (2011, 277) presents the issue:

how is one to distinguish between requirements pertaining to different types of norms? [...] For now, whenever evidence is adduced that concerns the epistemic authority requisite for proper assertion, it may bear on the norm of assertion, or it

may bear on these other [...] norms. [...] It will be extremely difficult, if not impossible, to tell which is being defended.

According to Simion (2015, 8) there is a succinct response based on the goal the norm is associated with: prudential norms are associated with prudential goals, moral norms are associated with the goal of maximising moral goodness, and epistemic norms are thus geared toward attaining epistemic goals.

2.4.2. Issues Faced by Contextualists

There are some who oppose contextualist views, arguing that you cannot simultaneously have statements that are both in opposition and yet true; rather, if there is a disagreement, then that is exactly what it is. Dretske (1991, 191) argues as such:

Knowledge is relative, yes, but relative to the extra-evidential circumstances of the knower and those who, like the knower, have the same stake in what is true in the matter in question. Knowledge is context sensitive, according to this view, but it is not indexical. If two people disagree about what is known, they have a genuine disagreement. They can't both be right.

Undoubtedly one encounters scenarios where there may at first be a disagreement, but once context of knowledge is made clearer, one alternative may appear more probable than another, resolving the disagreement. For example, Rama is Chair of the Governing Body Commission (GBC). At the time of a GBC meeting, when Rama sees all GBC members are in the room, he declares, 'Everyone is present.' The members present would be led by this to believe that the entire membership of the GBC is present. Suppose someone on the GBC, call him Stickler, opposes Rama's claim saying, 'No, what you said is not true, because not everyone is here. The Pope is not here.' Stickler's comment would probably come off as unamusing at best to Rama, but it is not easy to see that Stickler is saying something false (Conee, 2005).

Further, Lewis' assertions about domains (1996, 1999) seems to provide an adequate answer to the issue with quantifiers pertaining to contexts. In the GBC case, the word 'every' does not change its meaning; rather it has different domains. When the domain is presumably commonly known, it is quite clear, although it may still be open to interpretation, as in Stickler's case. This comes across as humorous simply because it is inappropriate in the given context, but still not false. Hence, in a sense both interpretations

are correct, but one is more pertinent than the other; it is not essential for the Pope to be there.

Conee (2005, 50) argues further against the stance that contextualism takes in solving these seeming discrepancies: “Contextualism finds truth at the expense of contradiction. That has a nice constructive ring to it. But it runs a risk of interpretive failure. [...] It is tempting to think that semantic contextualism is obviously correct for all evaluative expressions”.

It is a plain fact that people, societies, countries, and global communities etc. have differing standards of evaluation (as discussed earlier in 2.3). In the previous example, two people of the same GBC had differing views, what to speak of others with genuinely varying standards of evaluation.

The Generality Objection is another objection that states that there is no good reason to suppose that there are variations in truth conditions of knowledge attributions. DeRose (2002, 189-90) considers this objection:

According to the Generality Objection, [...] knowledge attributions tend to become un-assertable as we move to contexts governed by higher epistemic standards is just one part of a very general phenomenon. In such contexts, it becomes more difficult to assert anything. [...] the knowledge account of assertion yields an answer to the Generality Objection. It does so by providing the contextualist with an alternative, and, as it turns out, superior, explanation for the harmony the Generality Objector points out [...] But the Generality Objection seems able to handle only our reluctance to claim knowledge, and seems ill suited to explain why we go so far as to deny that we know.

According to contextualists, the Generality Objection is resolved when in higher standards of knowing, like in Bank Case B, the contextualist claims that the person does not know.

However, if a person can obtain knowledge at a very low threshold, in cases like Bank Case A, where little is at stake, then the levels for strictness governing assertion seem redundant. It is not easy to see how persons can obtain knowledge even if their beliefs in the low-stakes scenario would only be accidentally correct or mistaken. This seems to trivialise the conditions required for something to count as knowledge, or at least relegate these conditions to a state of insignificance. Hawthorne (2004, 86) offers his **Fracture Argument**, explicitly against DeRose’s use of the KNA in combination with contextualism:

It is natural [...] to think that there is some deep association between facts about knowledge and facts concerning the propriety of assertion and practical reasoning.

What I want to draw attention to here is that, owing to the purported ascriber-dependence of 'know', contextualism seems to disconnect facts about knowledge from these normative facts. And this is because the relevant normative facts do not seem to be ascriber-dependent.

Hawthorne's argument is that assertion should be governed by the same kind of rule as other kinds of action; assertion is a type of action. Nevertheless, if DeRose's (2002) contextualism is true, then it might appear as if assertion is different in this way: the propriety of knowledge-self-attributions would depend on some attributor's condition, not on the condition of the person claiming knowledge. However, if that person had (reflectively) reasons to believe they know, then it might seem as if their attributions should be taken at face value. So, Hawthorne claims, the contextualist account of the norm of assertion causes a fracture between the normativity of assertion and what should be our more general account of the normativity of action.

Contextualists have addressed the Fracture Argument and these responses can be collated into roughly two types: they generally either face the challenge of explaining away the conflicting intuitions or try to argue that the contextualist account is indeed adequate. Although I note that Hawthorne's (2004) 'fracture argument' does look exactly the same as the argument that DeRose (2002) offered in support of his contextualist views, showing how the invariantist would not have access to the KNA, I do not dwell further on the back and forth details of this still ongoing debate, addressed further by Wright (2005), Brendel (2005), Baumann (2008, 2010), Sgaravatti (2013), Jäger (2012), Buford (2009), and Brueckner & Buford (2009) among others.

While I favour a contextualist view about assertion, I take issue with DeRose's (2002) version because contextualists seem ready and willing to dole out knowledge in low-stakes scenarios like in the Bank Case A, even if the person in the low-stakes scenarios seemingly does not seem to be entitled to possess knowledge. Just because one's stakes may be negligible, does not mean that one ought to be awarded knowledge as an epistemic 'freebie'. Even when stakes are low, it is still an epistemic context, governed by norms to achieve epistemic goals. The conditions required for assertions to count as knowledge are important for my analysis coupled with the need to represent oneself as honestly as

possible, as in the analysis with the Train case, to minimise issues and compromises with epistemic relationships attaining epistemic goals.

2.4.3. Whose Context and Stakes Matter?

Existing theories only deal with one party: the attributor to the assertion context in the case of contextualism, and the subject, in the case of invariantism; they are not inclusive of both hearer and speaker or attributor and subject. Why do accounts not consider what is at stake for both parties to the assertive context, simultaneously? MacFarlane's (2005, 2014) relativist account of assertion involves a third person (assessor) who assesses knowledge claims individually requiring evidence after assertions by attributor and subject are made. However, the practice of assertion does not take place after each epistemic domain has been separately analysed and evaluated; it is more dynamic and complex and the governance of such a practice needs to be more truly representative of assertion and assertoric speech acts. Especially if assertion is a speaker-oriented affair that also ought to regard the hearer's epistemic interests, as in Simion (2015), both participants are intrinsically linked in relation to a fundamental epistemic goal and/or other characteristic goals. "Many philosophers favour the simple knowledge account of assertion, which says you may assert something only if you know it. The simple account is true but importantly incomplete" (Turri, 2011, 1). However, although it might seem like the data can equally be accounted for in an invariantist framework, this view still focuses on either one of the participants in the practice of assertion, rather than considering both participants for a more complete account.

If assertion is essentially constituted of a practice involving both an asserter and a hearer, why should one single party's stakes matter more than the other's? A simple answer could be that one party's stakes could be higher than the other's. However, does that then mean that the person in the lower stakes position does not matter in the face of the other's higher stakes? Does the other cease to be part of the assertive context simply if they find themselves with nothing much to lose? What about cases in which stakes for both attributor and subject are high, or low? Are the norms governing assertion inclusive enough to accept such assertions as epistemically permissible?

If the stakes are higher for one participant than the other, as in Williamson's Train case (1996), there are sets of consequences that arise out of the assertions made that seem to affect the hearer far more than the asserter. I argued earlier while discussing the Train case that such urgent scenarios do not override epistemic concerns; rather, urgent scenarios should warrant stronger epistemic concerns, in that the asserters present their assertions as honestly as possible. Should the asserter not be in possession of knowledge, this should be acknowledged and represented as such by their actions, like assertion, or choosing not to assert a falsehood. Should an asserter not be in possession of knowledge and choose to assert regardless, if the hearer's stakes are high and directly dependant on these assertions, the asserter could be blameworthy. "The appropriateness of blaming someone also seems tied to questions about what is under their control, and what they are in a position to know, in a way that merely negatively evaluating someone does not. These differences highlight a characteristic significance that blame has" (Boult, 2021a, 2).

2.5. Epistemic Blame

Epistemic blame distinguishes itself from moral blame in that it does not depend on moral evaluations. Assigning epistemic blame is the result of a form of epistemic evaluation: "Epistemic evaluation is a familiar part of ordinary life. We routinely judge others to be irrational, or unjustified in holding certain beliefs. We regard others as doing something they shouldn't when they suspend judgement on a matter about which there is unequivocal evidence" (Boult, 2021a, 1). There are currently four main views in the literature concerning epistemic blame, which I list and give brief outlines of the main ideas:

1. **An Emotion-based View:** Nottelmann (2007), McHugh (2012) and Rettler (2018): epistemic blame manifests from reactive attitudes like indignation and resentment, directed towards a target as a result of the judgement that the target has culpably violated an epistemic norm.
2. **A Desire-based View:** Brown (2020): epistemic blame occurs when a person's desire that someone not have culpably violated an epistemic norm is frustrated.
3. **A Relationship-based View:** Boult (2021a, b, c, d): epistemic blame is constitutively connected to epistemic relationship modification.

4. **An Agency-cultivation View:** Piovarchy (2021): epistemic blame functions to discourage certain kinds of epistemic behaviours, and this in turn cultivates epistemic agency, a type of responsiveness to epistemic reasons

Current accounts of epistemic blame like those of Brown (2020), Rettler (2017), Nottelmann (2007), McHugh (2012) and others draw from influential works on moral blame and are reinforced by the popular perception that emotion-based views align closely with common-sense understandings of blame (Strawson, 1962; Wallace, 1994, 2011; Wolf, 2011; Menges, 2017). However, ‘common-sense understandings’ in moral and emotion-based frameworks would seem unable or inadequate in gauging responses to epistemic failings in broader (world-wide) moral and emotional contexts because notions of protesting wrongful or disrespectful moral conduct vary across cultures and contexts. Members of different societies, communities, and cultures⁷ have varied interests, values, motivations, aims, levels of education, backgrounds, socio-economic status, etc. and are therefore not always a homogeneous group that agrees on moral grounds.

For this reason, I focus on the relationship-based view (Boult, 2021a, b, c, d) that considers epistemic blame independent of moral constructs and emotional contexts; and I thereafter apply its perspectives to the domain of DRR knowledge relationships. According to Boult (2021d), there is a distinctively epistemic kind of blame, and the motivational component of epistemic blame comes to the fore, highlighting the intentions and expectations characteristic of ‘epistemic relationships’. Relationships are a technical term in epistemology (Scanlon, 2008; 2013; Boult, 2021a, b, c, d), and they are established by certain intentions, expectations, and attitudes concerning actions in relation to one another.

According to this framework, a judgement of blameworthiness is a judgement that someone with whom you stand in some relationship has intentions, expectations, or attitudes that in some way fall short of the normative ideal of that relationship (such a judgement need not be explicitly recognized as such by the judger). A *blame* response consists in a modification to the intentions, expectations, and attitudes you have towards that person, in a way made fitting by the judgement that they are blameworthy (Boult, 2021a, 9).

An epistemic relationship is a set of intentions, expectations and attitudes people have toward one another, which is geared towards epistemic agency. Epistemic agents have a

⁷ These terms are difficult to define in themselves as highlighted in the Introduction Chapter, section 0.3.

degree of confidence in one another in that one generally expects the assertions of others to be true, resulting in mutual epistemic trust. Epistemically trusting entails having confidence in a reliable source of information, where believing assertions is a way of arriving at a favourable ratio of true to false beliefs, knowledge, or understanding. One is thus willing to rely on another in such relationships (McCraw, 2015; Boulton, 2021a, b, c, d). Suspension of epistemic trust results when there are cases of failings of intellectual conduct giving others good reason to halt the presumption of epistemic trust about certain matters or within a domain.

If someone has done something that impairs the general epistemic relationship, they are a target of blame. “For example, epistemic blamers tend to judge that someone has been *intellectually irresponsible, or intellectually vicious, or reckless, or just plain ‘stupid’*. Those are the sorts of things I take the notion of a judgement of general epistemic relationship impairment to unify” (Boulton, 2021a, 12, emphasis in original). Naturally, some relationships are more significant than others, thus some instances of epistemic blame could be stronger or weaker, based on the significance-factor of the relationship, especially in relationships concerned with the cultivation or utilisation of epistemic agency. Perceived failures to live up to epistemic relationship ideals thus makes different types of responses appropriate.

Examples of epistemic relationships include student–teacher, academic colleagues, experts and laypersons, government information channels and the public. For the purposes of my discussion here and the context relevance to the domain of DRR, I focus on the epistemic relationship between expert and laypersons, in which part of the normative ideal would be knowledge transfer from experts to laypersons (and vice versa). Knowledge transfers can be direct or indirect through an intermediary institution or organisation, such as schools or other educational mediums like public awareness campaigns. This knowledge is meant to create awareness, understanding, and/or be actionable in order to minimise risks and avert disaster.

Regarding the intentions, expectations, and attitudes in the epistemic relationship between experts and laypersons, experts are in possession of high-level knowledge within the domain of DRR and are therefore generally accepted by laypersons as reliable sources of knowledge. There is a large degree of confidence in the assertions put forward by experts as

experts are regarded as knowledgeable, having done due diligence in the epistemic processes of gaining knowledge, in order to offer the knowledge for dissemination. Thus, the layperson expects the experts' assertions to be true, resulting in the formation of epistemic trust (Fricker, 1998; Origgi, 2004; Moran, 2005, 2018; Faulkner, 2007; McMyler, 2011). Experts are viewed as reliable sources of knowledge as relationships of trust develop over time and become more reliable as epistemic relationships continue. DeRose (2002) strongly links contextualism and the KNA as expounded upon earlier in the chapter; I similarly utilise the concept of contextual sensitivity relative to knowledge to highlight that experts should have the appropriate standards for knowledge when making assertions to laypersons.

I argue that in order for experts to assert, a norm like the **Contextualism for Expert Knowledge Assertion (CEKA)** should be followed:

CEKA: To be positioned to assert that P, experts must know that P according to the standards for knowledge at work in the context, as experts make assertions.

Essentially my account hinges on the following points:

1. Epistemic relationship impairment equates to blameworthiness.
2. According to the KNA, experts should only assert what they know.
3. If experts assert what they do not know, then they are blameworthy.
4. In high-stakes cases, assertion requires more than knowledge, perhaps certainty.
5. It is vital that experts not fall short of the normative ideal of epistemic relationships.
6. Epistemic relationship impairment by experts renders experts epistemically blameworthy.

My earlier discussion of theoretical underpinnings in section 2.3. showed how varying degrees of normative requirements apply in contexts with different stakes. This is especially important to DRR, which requires accurate asserters. From the CEKA perspective, the KNA is the default norm and the minimum requirement for assertion characterising the relationship between experts and laypersons. However, if standards for assertion require more than knowledge alone, perhaps mandating certainty according to what could be at stake, this ought to be taken into account as experts make assertions; therefore, in higher-stakes contexts the CNA becomes the norm for assertion. For ensuring reliability in function

fulfilment, it is better to have a strict norm, rather than a less strict one, especially in DRR contexts with higher-stakes. If there are high risks, experts should be as certain as possible. This addresses a concern about how to determine the amount of warrant or justification experts need to possess in order to assert. “Probabilistic evidence warrants only an assertion that something is probable” (Williamson, 1996, 500). Experts should represent themselves as honestly as possible by taking stock of the warrant they possess and how to convey this accurately. If an expert asserts without certainty (where it is required), although assertion is possible in this context, experts would not be allowed to convey or portray themselves as being certain, for if they did, experts would be blameworthy and accountable for misleading laypersons. Expert assertions **represent** the expert as being certain of what they assert.

Further, there is a degree of accountability and responsibility in the relationship between experts and laypersons, as the layperson relies on the expert in their epistemic relationship, to provide expert-level-knowledge on which the layperson may base their DRR decision-making. Lycan (2002, 408) delineates clearly: “to explain something is an epistemic act, and to have something explained to you is to learn”. Since high-stakes decision-making by laypersons hinges on the knowledge assertions of experts, it is therefore vital that experts not fall short of the normative ideal of that epistemic relationship. Experts who in some way impair the relationship can be epistemically blameworthy.

For example, a scientist might be open to a stronger epistemic blame-response (involving more emotion, or more consequential changes in one’s intentions) than a layperson for failing to conform their beliefs to the evidence, because of differences in what this says about their attitudes toward the respective parties to the epistemic relationships the scientist and layperson are in. When a scientist is lazy and **misses some important bit of evidence**, this may say something about the way they view their role in the scientific community, and perhaps the role of that community in the broader epistemic community. It may say something about them that seems **particularly epistemically bad**. So, a strong epistemic blame-response can be fitting (Boult, 2021a, 14).

For epistemic failings of the types specifically dealing with the promotion of epistemic assets like believing truly and avoidance of false beliefs, asserters like experts could be held blameworthy if the epistemic goal is not reached due to their intellectual irresponsibility (Boult, 2021a, d; Brown, 2020a, 2020b; Piovarchy, 2021; Schmidt, 2021). “Knowledge can be

adequately explicated only in relation to its sources [...] sources of knowledge are also widely considered sources of justification, and they can serve as such even if justification is not entailed by knowledge” (Audi, 2002, 71).

While I endorse Boulton’s (2021a) relationship-based view, I find that Piovarchy’s (2021) agency-cultivation view is complementary to CEKA. The agency-cultivation view can be beneficial in promoting better epistemic conduct as epistemic blame can function to discourage certain kinds of unfavourable epistemic behaviours; this is especially relevant in times of ‘fake news’ and growing distrust of experts in some domains as discussed in the Introduction Chapter. “Epistemic blame is justified because the practice of blaming agents for failing to abide by epistemic norms helps them to internalise those norms, fostering a very distinctive and valuable kind of agency” (Piovarchy, 2021, 802). This therefore assists in the cultivation of better epistemic behaviours and improved epistemic agency wherein agents are willing and open to constructive critique for more enhanced epistemic relationships that attain their epistemic goals. According to Lackey (2020), if a tenured, white, male professor hears a fellow colleague make a clearly sexist remark, the professor faces a normative pressure – an epistemic duty to object that stems from both moral and epistemic considerations. Lackey (2020, 38) argues that the “end of the duty to object can be distinctively epistemic in nature; it is a duty to promote epistemic ends like truth, understanding, and knowledge in other agents, whether they are individuals or communities”.

However, within the domain of DRR, and more broadly in DRM processes, there are several epistemic contexts involving knowledge transfer between different epistemic agents. Institutions are also epistemic agents that make assertions; thus, we can extend and apply the above account of epistemic blame CEKA to DRR and DRM institutions. This then widens the scope for inquiring further in order to understand who might be responsible within DRR knowledge and decision-making contexts and thus who might be held accountable and/or blameworthy for impairments within those epistemic relationships that fail to attain expected epistemic goals. Although decision-making could be viewed at the level of the individual, it is actually a composite of factors, embedded in and inclusive of decision-making contexts and actions at international, national and local governance levels. The next chapter specifies these levels of governance in more detail.

2.6. Conclusion

A typical philosophical mistake is to think that a single normative principle can apply in all cases, so that accounts of phenomena distort these wide principles by simplifying and narrowing too much; other fields of research (DRR) might similarly face this issue (discussed in Chapters 3 and 4). In this chapter, I have considered what epistemology has to offer in relation to its methods, validity, and scope for understanding the rationality and/or epistemic blameworthiness of persons making decisions under a variety of circumstances. Assertion is important in DRR and DRM as they are informational environments where accurate and pertinent asserters are required. I began with a discussion of arguments in favour of norms that claim to govern assertion, and this survey served as background for the following discussions.

I discussed the RTBNA, KNA, and CNA in order of increasing requirements of norm strictness, for the purpose of presenting an array of cases and examples, especially to highlight that in some cases more than knowledge is required. Even if one does not accept the CNA as the norm for assertion, this variability might nonetheless give some reasons to take a context-sensitive approach because in the view that I propose, CEKA, the norm for expert assertion is sensitive to context.

I then focused on and analysed the issues concerning knowledge attributions, concentrating particularly on contextualism about knowledge in varied context-sensitive situations. In the Bank cases, contextualists claim that the intuitive variation in assertibility is straightforwardly explained by the context sensitivity of knowledge. Due to a change in context, in the second Bank Case with higher-stakes, one fails to know the proposition, 'I know that the bank will be open', and therefore one is not in a position to assert, and cannot assert it. My argument for assertion contextualism can be summarised as follows:

1. If contextualism about knowledge ascriptions is true, and
2. If at least KNA is a constitutive norm of assertion,
3. For every assertion there is a corresponding knowledge ascription (from 2)
4. For every assertion there is a possibility for the warrant required for an appropriate assertion to vary according to the context (from 1 and 3) = assertion contextualism.

I apply the contextualist concepts of varying contexts and stakes in my account of DRR expert epistemic blameworthiness but use the CNA instead of the KNA.

Although stricter norms may seem restrictive, they do not halt the process of asserting, nor prevent one from asserting; rather, norms prevent one from asserting as if one knows, or has knowledge, when one actually does not. One may assert, even without knowledge, but one would responsibly need to disclose the fact that one's assertion is lacking in knowledge, and that it may not be proper, according to the context. If someone were to assert as if he was in possession of knowledge when he was not, then challenges like 'how do you know?' would be permissible, and the asserter criticisable if he did not know. I thereafter considered and analysed prominent issues, objections, and rebuttals, and developed a novel account of epistemic blame CEKA for DRR and suggested that epistemic blameworthiness opens avenues for discussions about accountability for DRR and where responsibility for knowledge and decision-making in DRR and DRM might lay.

Chapter 3

Rationality and Responsibility in Multilevel Disaster Risk Reduction Decision-making

Disasters kill, maim and damage. But so do the epistemic and practical dimensions of the disaster risk reduction apparatus when shielded from deep critical scrutiny.

Castree in Gaillard, 2021, xii

3.1. Introduction

Within the DRR domain, and more broadly in DRM processes, there are several epistemic contexts involving knowledge transfer between different epistemic agents. Who might be responsible for DRR within knowledge and decision-making contexts, and who is held accountable and/or blameworthy for impairments within epistemic relationships that fail to attain expected epistemic and DRR goals? Where do the responsibility and accountability for DRR lie? Are they situated solely at the level of individual decision-making, or perhaps with the national government, or international DRR organisations, or all of these? In this chapter I examine and analyse the multilevel decision-making hierarchy within DRR and DRM from the perspective of accountability. Although DRR decision-making could be examined and analysed at the level of the individual alone, I argue that individual decision-making is actually impacted by a composite of factors embedded in and inclusive of decision-making contexts and actions at international, national, and subnational governance levels.

I am particularly concerned with the responsibility and accountability of experts as agents that operate at different levels; that is, as agents involved in the processes of knowledge generation and dissemination along with international, governmental, and local organisations. In Chapter 2, I outlined the epistemic relationship between experts and laypersons and possible impairments to the epistemic relationship, which could result in epistemic blame. In this chapter I focus on experts as epistemic agents in a broader sense within the DRR context, and examine how, besides generating and disseminating knowledge, they also play a part in implementing policies.

My focus on accountability is twofold.

First, current international frameworks produced by the work of experts, like the Sendai Framework for Disaster Risk Reduction (SFDRR), assert that the government is responsible for DRR. However, case study examples (like the Marmara earthquake discussed in this chapter) show the practical dimensions of governments moving away from this role of responsibility for DRR and other private sector actors or NGOs stepping up to assist in DRR efforts (Pelling & Dill, 2010). As argued persuasively by Jessop (1994, 2000), this leads to a 'hollowing out' of the role of the government in DRR, especially governments that prominently endorse the current neo-liberal narrative of 'community resilience' which exacerbates and compounds the issue (Fairclough, 2003; Jessop, 2011; Pelling, 2011; Evans & Reid, 2013; Joseph, 2013; Chandler, 2014a, 2014b; Pugh, 2014). Communities that are already marginalised become further marginalised by the governmental endorsement of 'community resilience' as it places the responsibility and accountability for DRR with marginalised individuals and communities rather than with the government (Gaillard & Mercer, 2013; Wisner 1995; Evans & Reed, 2013; Joseph, 2013; Chandler, 2013; Pugh, 2014).

Second, DRR knowledge is produced, and disseminated to governments and DRR organisations, with the aim of being actionable and implementable, and perhaps passed on to communities and individuals for DRR decision-making. However, there are no systems of checks and balances or mechanisms in place to evaluate the effectiveness and/or safety of DRR knowledge for use; "the increasing reliance on scientists and experts does present new challenges such as the unclear responsibility of scientific advisors if policies have adverse effects" (Albris et al., 2020, 3). Moreover, there is often no accountability or responsibility for cases where supposed DRR knowledge is misapplied (Albris et al., 2020) and therefore does not achieve DRR goals.

Governance generally refers to forms of organised management of countries, societies, and individuals, some of which are engineered to minimise risk; however, risk minimisation may be differently determined. Governmentality indicates a specific rationality or mentality of government, and this concept is used to analyse narratives in DRR governance discourse. Discourse refers to specific concepts and categorisations produced, reproduced, and

transformed by practices through which physical and social realities are given meaning. Alternative and competing discourses are associated with different social groups and positions. As Pitsoe and Letseka (2013, 24) point out, for authors like Foucault: “discourse joins power and knowledge, and its power follows from our casual acceptance of the ‘reality with which we are presented’. Discourse, as a social construct, is created and perpetuated by those who have the power and means of communication.” This understanding of discourse, which joins power and knowledge, is useful in critically analysing DRR discourse by challenging DRR interpretations and underlying assumptions that are taken for granted; I unpack processes that lead to and reinforce these interpretations. Meaning making depends on what is explicitly asserted and implicitly assumed. “What is ‘said’ in a text always rests upon ‘unsaid’ assumptions” (Fairclough, 2003, 11). Social, political, and hegemonic factors are inextricably linked to any offering of DRR knowledge for societal use.

Therefore, the knowledge generating, and dissemination processes involved in DRR ought to be examined as these affect outcomes through real-world application; “at the very heart of studying the efforts to reduce disaster risks, is to understand how knowledge is feeding into policy processes” (Weichselgartner & Pigeon 2015 in Albris et al., 2020, 5). Research, communication, and use are three key integrated knowledge components with significant interrelations and differing levels of interaction in the extensive processes of DRR and by extension DRM. While the humanities can enhance the engagement with science and society to offer knowledge for use in practical contexts, this knowledge is not free from the socio-political and power constructs in which it is generated and disseminated. Further, research productivity and quality standards are measured with reference to disciplinary peer-review quality assessment processes, and the quantity and impact status of peer-reviewed publications (Buwalda et al., 2014). This system generates several biases, which I discuss in this chapter and analyse in the next.

Besides concerns with knowledge processes, one may be correspondingly concerned about the substantive assertions and assumptions of researchers within disaster studies. These clusters of substantive assertions and assumptions are referred to as paradigms.

I argue that certain implicitly assumed rationalist perspectives, from Rational Choice Theory (RCT) and Expected Utility Theory (EUT), have influenced models of decision-making within

DRR. These frameworks in practice define and legitimise a certain notion of 'ideal' rationality (Eiser et al., 2012). A key issue is the extent to which theories of rational choice presuppose the universality of Western thought in that they assume that all peoples think similarly to Westerners and are thus expected to act in the same way. As such, theories of rational choice, EUT, and heuristics fail to consider cultural variation, diverse backgrounds, and geography. Therefore, the issues faced are not only limited to situations where people may not have enough data for informed choices or may not have 'computing capacity' (capacity for processing the available data); rather the key issue that emerges from this perspective is that not all peoples and cultures think and reason in exactly the same manner (Gaillard, 2019, 2020, 2021).

The major assertion of the more dominant hazard paradigm is that disasters are the results of extreme and rare natural events, and that due to an insufficiency in the risk perceptions of affected people, they fail to 'adjust' to these events (Gaillard & Mercer, 2013; Mercer et al., 2009; Mercer, 2012; Baumann, 2020; Wisner, 1995; Chmutina et al., 2021; Gaillard, 2021). The vulnerability paradigm, in keeping with the 'critical political ecology tradition' of geography, asserts otherwise. Its major assertion is that disasters first and foremost affect those who are marginalised within their everyday living contexts. Such marginalisation entails a major lack of resources, inadequate access to limited resources when available, and a lack of access to the means and forms of protection; all of these are readily available to others with more power (Wisner 1995; Wisner et al., 2012b; Gaillard & Mercer, 2013; Mercer, 2010, 2012; Baumann, 2020; Kelman, 2016; Chmutina et al., 2021; Gaillard, 2021). While in sections 3.2-3.4 of this chapter I focus on the vulnerability paradigm's criticisms of the hazard-centric approach, in the next chapter I critically evaluate both approaches to DRR and find that there are issues with both.

The current working definitions of 'disaster' and related terminology within DRR are predominantly Western constructs (Bankoff & Hilhorst, 2009; Pelling & Dill, 2010; Gaillard, 2019, 2021). Thus, the current epistemology of DRR is problematic when applied to contexts other than the West. Contextualism is a concept I discussed in detail in Chapter 2 and will now apply in the following chapters. The processes of DRR knowledge generation and dissemination also assist in perpetuating some of the hazard paradigm's core and most

problematic tenets (Blaut, 1993) and are unable to account for other epistemologies of disaster and risk. One may then critically question the role of knowledge in DRR.

In this chapter, I first examine rationality, decision-making theories, and heuristics to argue that certain implicitly assumed rationalist perspectives have influenced DRR decision-making. I then argue in section 3.3 that international frameworks like the SFDRR are assistive but limited because they are tough to implement at national and subnational or local levels. As argued for in the literature, neo-liberal approaches to government lead to a hollowing out of the role of the government and communities left to fend for themselves, often under the guise of striving to make communities more resilient through self-reliance. Further, although vulnerabilities are somewhat acknowledged, frameworks like the SFDRR are still hazard-centric and technocratic in approach (Osorio-Piñeros, 2020).

In section 3.4, I examine DRR governance and offer a limited analysis of DRR governance and neo-liberal governmentality. In section 3.5, I consider vulnerability paradigm perspectives that attempt to include local voices, cultures, and contexts. Technocratic and hazard-centric approaches remain predominant despite more than 40 years of research and guidance from researchers and practitioners who have developed frameworks and tools from the vulnerability paradigm's perspective (Wisner, et al., 1976; Waddell, 1977; Hewitt, 1983, 1995, 2007; Wisner 1995; Bankoff & Hilhorst, 2009; Mercer et al., 2009; Mercer, 2012; Gaillard & Mercer, 2013; Weichselgartner & Kelman, 2015; Donovan, 2017; Baumann, 2020; Chmutina et al., 2021; Gaillard, 2021, 2022). This chapter does not attempt to provide an exhaustive review of all methods and tools. Instead, I review a few approaches to illustrate how they are manifest within DRR.

Furthermore, since there is no consensus within the domain of DRR concerning who is responsible and accountable for DRR (Albris et al., 2020), accountability remains vague and hampers efforts for hybrid forms of knowledge and implementation that remain theoretical rather than applied. If accountability remains vague and the responsible agents remain unidentified, it will be difficult to actuate any meaningful changes for DRR. I am concerned with the responsibility and accountability of epistemic agents, specifically experts, to promote more responsible epistemic agency and to ascertain where future research and hybrid forms of DRR knowledge should be properly directed for use. Vagueness concerning

accountability currently results in DRR research efforts and much science remaining superfluous rather than impactful (Datta et al., 2016). To summarise, in this chapter, I survey prominent approaches to DRR, and critically analyse them in chapter 4.

3.2. Rationality, Decision-Making Theories, and Heuristics

An examination of standard decision models and rational theories is required to ascertain their influence and usefulness or shortcomings in addressing hazard and risk contexts. Rationality and the ability to ponder and reflect are often cited as the defining characteristic of human beings: “Rationality fixed human distinctiveness, the Greeks held. ‘Man is a rational animal’. The capacity to be rational demarcates humans from other animals and thus defines them” (Nozick, 1993, xi-xii). Rationalist philosophers like Descartes, Leibniz, and Spinoza championed reason as the chief source of knowledge. From a Western philosophical perspective, the ability to use logic and deductive methods for reasoning was argued to be an innate characteristic from which to draw innate human ideas. In its simplest form, rationality encompasses evaluative thinking oriented toward a goal, and that expresses a high degree of consistency, “the kind of rationality which one displays when one believes propositions that are strongly supported by one’s evidence and refrains from believing propositions that are improbable given one’s evidence” (Kelly, 2003, 612).

Such a definition may be deemed unfit for every day, practical life rationality for a multitude of reasons, including, for example, instances wherein one acts on low levels of direct evidence, or none, because the consequences of doing so are negligible. Such cases of low-stakes scenarios were cited and argued for in Chapter 2, section 2.3.

Fogelin (2003) points out that people face threats of illusion, doubt, and inconsistency. These attributes affect people’s normal rational lives and systems of belief. People may discover that, under close scrutiny, many currently relied-upon belief systems are actually inconsistent in that they yield conflicting and contradictory results: “Inconsistency concerns the fact that many of the belief systems on which we uncritically rely in everyday life harbour hidden tensions and conflicts that reveal themselves when subjected to close scrutiny” (Kelly, 2004, 751).

Fogelin's triad of threats (illusion, doubt, and inconsistency) would not satisfy the criteria required for epistemically rational beliefs. These threats do not minimise the need for cognition, thinking, and human reason, but rather highlight instances wherein such faculties may not essentially need to be employed in the strictness demanded of epistemic contexts. Some authors (like Stanley, 2008) argue that all contexts are epistemic, and thus rational beings are expected to be rational in the strictest sense all the time (Stanley, 2008, as discussed in Chapter 2, argues for the Certainty Norm of Assertion). Similar arguments can be found in neoclassical economic thought, attempting to predict the behavioural patterns and choices of consumers or 'ideal' decision-makers. Standard decision models have emerged therefrom, but such models have their own shortcomings. For example, there are now several economic crashes' worth of data available that put paid to the idea of 'ideal' economic actors.

There is another issue with the strict notion of idealised rationality: it expects one's beliefs to be supported by evidence, devoid of room for discussions concerning high-stakes contexts where rationality and rational decision-making may be required with little or no evidence at hand – or more specifically, evidence relevant for distinguishing between (or preferring) different possible courses of action. One such situation concerns rational decision-makers operating under conditions of great uncertainty, computational limitation and temporal pressures while facing natural hazards. In many instances, under such circumstances, decision-makers lack a wide variety of choices and types of evidence to support the choices that are made (Datta et al., 2016). One may argue that these circumstances are possible but unlikely and are in no way the norm; however, this presupposes a 'developed', progressive situation as in countries within the Organisation for Economic Co-operation and Development (OECD), which excludes a majority of the world population⁸. The issue is not whether there is evidence for people in non-OECD countries to base their actions on, but rather that there are fewer opportunities to access and make use of the available evidence. Nevertheless, an examination of standard decision models and rational theories is required to ascertain their influence and usefulness or shortcomings in

⁸ For scale, the population of OECD countries is 1,370,858,750 (World Bank, 2020), which accounts for only 17.6% of the world population (7,794,798,739 in 2020).

addressing hazard and risk contexts. I commence with RCT, followed by EUT, and thereafter heuristics.

3.2.1 Rational Choice Theory

RCT occupies a central role in economic analysis and functions as a framework for understanding and modelling economic behavioural patterns. In principle, while it assumes that agents have preferences, it is not concerned with what these preferences are. The underlying assumption is that from the choices at hand, individuals always make rational, sagacious decisions, thus deriving the highest benefit in their best self-interest (Veblen, 1898; Simon, 1986).

Sociological versions of RCT focus on systems and how they function, irrespective of the individuals' choices, decisions, or rationality. The aim is to show how reasonable or rational actions can combine to produce social outcomes, and "the essential requirement is that the explanatory focus be on the system as a unit, not on the individuals or any other components which make it up" (Coleman, 1992, xi-xxi, 7). Nevertheless, RCT in sociology, just as in the economic variation, requires that the costs and benefits of all possible courses of action be specified and the 'optimal' action taken that maximises the differences between benefits and costs.

Thus, the differentiating element of RCT is the 'optimization' of one's choices that leads ultimately to the best estimated result (Simon, 1986; Eiser et al., 2012). "Theory specifies that in acting rationally, an actor is engaging in some kind of optimization" (Coleman, 1992, xi) that can be expressed, for example, as a maximisation of utility, minimisation of cost, or choice of best route. RCT "compares actions according to their expected outcomes for the actor and postulates that the actor will choose the action with the best outcome" (Coleman, 1992, xi).

The philosophical approach to RCT begins from the individual psychological perspective and incorporates, where possible, different social aspects. First and foremost, RCT is treated as a normative theory in philosophy (Steele & Orri, 2020), which is a theory of how people ought to make decisions, while also accounting for the fact that individuals often make decisions under conditions of uncertainty. Schulz (2011, 1273) offers a good summation:

In general, there are three major interpretations of RCT (Hausman 1995; Bermudez 2009): normative ones (where the theory is seen to express necessary conditions concerning how people ought to choose), predictive ones (where the theory is seen to provide an instrumentally useful set of claims for the prediction of the actions of individuals or groups), and descriptive ones (where the theory is seen to describe the psychological processes that are actually going on when people make decisions).

However, these summarised views take into account individual decisions that usually concern the individual (self-interest) without considering others in broader familial, social or community contexts while in the process of decision-making. Within DRR contexts, individual DRR decisions are not made in a vacuum, but are affected by international, national, and local governance contexts. Historically, the foundation of the model of a 'rational self-regarding actor' is credited to Adam Smith (1776/2015) who claimed that self-interested competition guides an 'invisible hand' within a free market economy. Models like Smith's have similarly failed to allow for individual decision-making that accounts for and factors in the consideration of others. However, as Simon (1986, 223) sharply says:

Economics without psychological and sociological research to determine the givens of the decision-making situation, the focus of attention, the problem representation, and the processes used to identify alternatives, estimate consequences, and choose among possibilities—such economics is a one-bladed scissors.

Some recent authors have tried extending RCT to address some of the issues it faces. In *Rational Choice Theory and Interest in the "Fortune of Others"*, Paternoster et al. (2017) suggest an overall expansion of the conceptual boundaries of RCT to make provision for (and thus include) more than one's own self-interest. Their team tested participants in scenarios that dealt with self-interested intentions and their intentions with concerns for others. Paternoster et al. (2017) argue that 'other-regarding preferences' have important implications for understanding the behaviour and rationality behind decision-making. There is a need to recognise that an agent's concerns are heterogeneous, with part of that heterogeneity including 'other regarding preferences'.

Furthermore, rationality does not correspond entirely and only to a narrow definition of self-interest. Thus, Paternoster et al. (2017), and Agnew (2014) and Opp (2019) jointly appeal for further theorising and research into the role of social concerns for developing a revolutionised and sophisticated understanding of RCT. However, the appropriateness of these approaches has been questioned, for example by Manzo (2013), who raises the point

that alternative approaches such as heuristic-based ones exist (a discussion on heuristics follows in section 3.2.3).

3.2.2. Expected Utility Theory

While accounting for the fact that individuals often make decisions in uncertain conditions, under such circumstances it is assumed that people rationally choose the result with the highest expected utility, and this is known as EUT. It might appear that EUT can avoid some of the criticisms levelled at RCT. EUT is often used as a descriptive theory of how people 'do' make decisions, or as a prescriptive theory of how people 'should' make decisions (Briggs, 2017). Although the theory does sometimes correctly predict people's choices and can thus function and be used as a descriptive theory, it does not explicitly account for psychological mechanisms. Hence, EUT and RCT may lead to faulty predictions about people's choices in real-life choice situations (Briggs, 2017). There is much evidence that individually and collectively, people often do not act according to EUT. According to Baillon et al. (2016, 100), "previous research has found that groups violate EU[T] as often as individuals do (Bone et al. 1999; Bateman and Munro 2005; Rockenbach et al. 2007)".

In particular, the 'Allais Paradox' (1953) has repeatedly elicited responses inconsistent with EUT. Through a series of contradictions, the paradox shows that EUT lacks accuracy in describing human choice behaviour, as it especially does not account for individuals' high level of risk aversion. Allais' prescient realisation that people's decisions violated the rational assumptions of economics, and EUT in particular, was revolutionary. Rather than making decisions that could possibly be predicted through the use of a few mathematical equations, individuals instead acted with immense and somewhat frustrating inconsistency (Lehrer, 2010).

These concerns informed the work of Tversky and Kahneman (1974) who explored why people did not respond to probabilities in a linear manner. Certainty is an extremely attractive factor in decision-making, and Kahneman and Tversky (1974) attempted to understand this psychology. Economists had assumed that individual decisions were made by taking into account all of our wealth, as being rational obliges factoring in all relevant information. However, Tversky and Kahneman (1974) realised that individuals thought about alternative outcomes in terms of gains or losses rather than their absolute states of wealth. It has been

acknowledged (Tversky and Kahneman, 1974; Simon, 1982, 1990) that individuals do not think or make decisions based upon a complete set of information. Some of this work has been summarised in Kahneman (2011). The framing of questions in terms of gains and losses led to the realisation that people were averse to losses. This and the Allais paradox led to radical revisions in studying human nature, positing that individuals are not as rational as previously assumed, and seem motivated by inarticulate feelings and pre-programmed instincts (Lehrer, 2010). Such pre-programmed instincts include heuristics wherein one, either consciously or unconsciously, makes decisions based on incomplete knowledge.

3.2.3. Heuristics

Heuristics are defined as unconscious by-processes, or intuitive short-cuts: a rough-and-ready procedure without an exhaustive comparison of all available options, and hence without any guarantee of obtaining correct and/or optimal results (Colman, 2008). Some of the earliest computational models of heuristics were initially proposed by Luce (1956), Simon (1957), and Tversky (1972). Economist and decision theorist Simon (1957) first suggested that decision-makers with bounded rationality use heuristic procedures when thorough examination of all available options is infeasible. The concept of a decision-maker who adapts to their situation was advocated by Payne et al. (1993).

The most prominent reasons that humans rely on heuristics are (Marewski & Gigerenzer, 2012, 85):

- **Effort Reduction:** people utilise heuristics as a type of cognitive laziness. Heuristics reduce the mental effort required to make choices and decisions.
- **Attribute Substitution:** people substitute simpler but related questions in place of more complex and difficult questions (Kahneman & Frederick, 2004).
- **Fast and Frugal:** heuristics are used because they are fast and do not require a great deal of cognitive capacity.

Gigerenzer and Gaissmaier (2011) define heuristics as a strategy that ignores parts of information, with the objective of making decisions more quickly, frugally, and accurately than complex methods. Heuristics do not try to optimise (i.e., find the best solution), but rather satisfice (i.e., find a good-enough solution). Calculating the maximum of a function is a form of optimising; choosing the first option that exceeds an aspiration level is a form of satisficing (Gigerenzer et al., 2008).

An important point about the usability of heuristics is that they are simplified to generalise:

If a different heuristic were required for every slightly different decision-making environment, [...] **we would not be able to generalize** to previously unencountered environments. Fast and frugal heuristics avoid this trap by their very simplicity, which allows them to be robust in the face of environmental change and enables them to **generalize** well to new situations (Gigerenzer et al., 2008, 18).

According to Gigerenzer et al. (2008) the simplicity of heuristics contributes to their potential for universal generalisation. However, this can lead to issues when considering applicability in a given context. The concept of generalisation for universal applicability, its implications, and associated issues will be discussed in this chapter, in the SFDRR analysis section that follows, and critically analysed in Chapters 4 and 5.

Bishop (2000) and Bishop and Trout (2005) argue that people are more likely to make correct judgements if they use heuristics and therefore should use them even in high-stakes situations. However, this underplays the issues of possible cognitive biases and is a gross under-consideration of the impacts from margins of error in high-stakes situations. “Heuristics are helpful in many situations, but they can also lead to cognitive biases” (Tversky & Kahneman, 1974, 1130-31). Within the bounded rationality paradigm, human beings try to make rational decisions, but cognitive limitations inhibit us from being fully rational. While human bounded rationality rationalises the use of fast and frugal methods, there are limitations to them: “Many of us rely on our intuitions far more than we should. And when we do try to think systematically, the way we enter data into such formal decision-making processes is often biased” (Bazerman, 2018, 545). Bazerman (2018) observes that human judgement tends to deviate from rationality based on biases, intuitions, and inclinations. Some of these biases come about through the propensity to short-circuit a decision-making process by heavily simplifying the thought processes involved in rational decision-making. Simplifying heuristic strategies may assist in coping with some complexities surrounding decision-making but remain nevertheless subject to systematic and predictable biases:

Time and cost constraints limit the quantity and quality of the information that is available to us. Moreover, we only retain a relatively small amount of information in our usable memory. And limitations on intelligence and perceptions constrain the ability of even very bright decision makers to accurately make the best choice based on the information that is available (Bazerman, 2018, 545).

This is in line with current observations within the DRR domain. “Habits of mind become biases that interact with people’s social motives and the world around them to determine the decisions they make. This also affects the decisions made individually and collectively about how to cope with disasters [...and] how these cognitive biases can result in suboptimal decision-making around disasters” (UNDRR, 2022, 93).

Kahneman’s *Thinking, Fast and Slow* (2011) outlines the logic behind a dual system of thinking. Two of the fundamental classes of different thinking are: fast, automatic, and unconscious (System 1), and slow, effortful, and conscious (System 2). In general, a completely thorough process like System 2 is not required for every decision. Thinking at the level of System 1 is adequate in many situations; while doing chores, for example, it might prove cumbersome and impractical to logically reason through every choice we make.

Because System 1 operates automatically and cannot be turned off at will, errors of intuitive thought are often difficult to prevent. Biases cannot always be avoided, because System 2 may have no clue to the error. Even when cues to likely errors are available, errors can be prevented only by the enhanced monitoring and effortful activity of System 2. As a way to live your life, however, continuous vigilance is not necessarily good, and it is certainly impractical. Constantly questioning our own thinking would be impossibly tedious, and System 2 is much too slow and inefficient to serve as a substitute for System 1 in making routine decisions. The best we can do is a compromise: **learn to recognize situations in which mistakes are likely and try harder to avoid significant mistakes when the stakes are high** (Kahneman, 2011, 28).

It is preferable that the logic and rigour of System 2 ought to influence and shape the most vital and significantly weighty decisions when stakes are high. This thinking corresponds to my views on contextualism about knowledge discussed in Chapter 2, where the intuitive variation in assertibility is explained by the context sensitivity of knowledge. In higher-stakes scenarios where one must make significantly weighty decisions, effortful and conscious System 2 thought processes are required. In lower-stakes scenarios System 1 thought processes might be suitable:

Jumping to conclusions is efficient if the conclusions are likely to be correct and the costs of an occasional mistake acceptable, and if the jump saves much time and effort. Jumping to conclusions is risky when the situation is unfamiliar, the stakes are high, and there is no time to collect more information. These are the circumstances in which intuitive errors are probable, which may be prevented by a deliberate intervention of System 2 (Kahneman, 2011, 79).

Here is a sketch of an argument for this view when applied to multilevel higher-stakes DRR contexts:

1. System 1 thinking can be right by chance even if the margin of error is high,
2. System 1 thinking does not minimise margins of error (from 1),
3. High-stake-scenarios ought not rely on mechanisms that tolerate high margins of error,
4. High-stakes-scenarios ought not to rely on System 1 thinking (from 2 and 3)

The stakes of concern apply not only to decision-makers, but more so to people affected by those decisions. Therefore, this pertains to both individual and collective decision-making, pointing out a common feature of connectedness in the context of DRR, without collapsing their distinctions. Section 3.3 contains further discussion regarding collective decision-making via governance frameworks, and Chapter 4 discusses individual decision-making via protective action measures.

One might infer that in DRR decision-making, at multiple levels, urgency should be the foremost concern that overrides System 2 processes and epistemic concerns. However, I argued in Chapter 2 that in DRR contexts characterised by duress and urgency, epistemic standards remain strict and warrant more than knowledge, i.e., certainty. While there may seem to be a contradiction because urgency warrants fast action, making a fast decision that is erroneous or mistaken in enormously high-stakes DRR contexts can be fatal. Therefore, high-stakes scenarios do not tolerate high margins of error; these margins would in effect be potential casualties.

My focus on epistemic certainty can be used to improve and enhance DRR knowledge that proactively goes through a series of tests, checks, and balances and can thereafter be implemented for faster action. While simplification to heuristic form can take place at later stages, bypassing the rigorous System 2 processes with urgency being a quasi-justification for unconscious System 1 processes in DRR knowledge generating and disseminating processes is not recommended. This is in line with what Kahneman asserts about high-stakes scenarios:

Correcting your intuitive predictions is a task for System 2. Significant effort is required to find the relevant reference category, estimate the baseline prediction, and evaluate

the quality of the evidence. The effort is justified only when the stakes are high and when you are **particularly keen not to make mistakes** (Kahneman, 2011, 192).

DRR contexts are examples of cases where stakes are high, and the responsible agents are not keen on making mistakes. Distilling from rigorous processes to the eventual form of heuristics for use in high-stakes DRR contexts could be encouraged after testing for potential implementability, along with associated factors embedded in the broader decision-making processes.

The key to reducing the effects of bias and improving our decisions is to transition from trusting our intuitive System 1 thinking toward engaging more in deliberative System 2 thought. Unfortunately, the busier and more rushed people are, the more they have on their minds, the more likely they are to rely on System 1 thinking (Chugh, 2004). The frantic pace of professional life suggests that executives often rely on System 1 thinking (Bazerman, 2018, 552).

The use of heuristics is acceptable if they can minimise the margin of error, and offer epistemic certainty. In cases where the use of heuristics minimises margins of error, the subjects are trained specifically to make use of them in ways that minimise error. However, that training requires some method that involves System 2 to assess the accuracy of the heuristics.

Here, I look at the domain-specific application of heuristics, rather than their general applicability. I do not attempt to provide an exhaustive overview of the applications of heuristics in all possible domains, but instead illustrate how they could and do materialise within DRR. While it has been argued that heuristics can be useful in applied fields, this has not been researched extensively, and certainly not in the case of DRR. As Banks et al. (2020) point out, there are several concerns about how best to practically apply heuristics.

Furthermore, there are significant limitations concerning the generalisability of the use of heuristics:

A limitation of the fast and frugal heuristic studied here, and of many fast and frugal heuristics in applied domains, is the simple nature of the decision outcome. The heuristic quickly leads to a decision to attack, defend, withdraw, and so on but then further decisions are required following from this. Having decided to attack, is the attack on the left flank or the right flank? **Many applied decisions have this complexity.** For example, a medical decision to prescribe a drug or not is often not taken in isolation, but as part of an overall careplan with several interacting treatments. The heuristic also was developed around specific decision scenarios, but **it would not be useful in every situation.** More heuristics would need to be

developed to cover more situations and further research is required to specify how more complex multifaceted decisions unfold from simple heuristics (Banks et al., 2020, 707).

Banks et al. (2020) also observe that while heuristics may be highly accurate, in those cases they might not necessarily be fast. In fact, it is not clear that heuristic-based models that tried to handle all the complexity involved would be any less complex than System 2 mechanisms. Moreover, heuristics are only one part of the complex decision-making process, as further decisions are required along with the consideration of associated factors, which are all embedded in broader decision-making processes. “When System 1 runs into difficulty, it calls on System 2 to support more detailed and specific processing that may solve the problem of the moment” (Kahneman, 2011, 24).

Gigerenzer (2008) attempts to address the issue of context with the concept of ‘ecological rationality’, which considers some constructs of the environment for decision-making. While environment features in some definition(s) of ‘ecological rationality’, there is no consistent or singular clear definition in the generalised sense that was earlier endorsed:

“[...] ecological rationality, [that is,] how we are able to **achieve intelligence in the world** by using simple heuristics in appropriate contexts” (Gigerenzer, 2008, 3).

“The study of ecological rationality analyzes which heuristics **match** with which environmental structures” (Gigerenzer, 2008, 25).

“The study of ecological rationality is about **finding out which pairs of mental and environmental structures** go together” (Gigerenzer, 2008, 15).

“We use the term ecological rationality both for a **general vision of rationality and a specific research program**. As a general vision, it provides an alternative to views of rationality that focus on internal consistency, coherence, or logic and leave out the external environment. **Ecological rationality is about the success of cognitive strategies in the world**, as measured by currencies such as the accuracy, frugality, or speed of decisions” (Gigerenzer, 2008, 14).

Here is a tension in Gigerenzer’s (2008, 18) claims, as he suggests, heuristics “**generalize**”, while simultaneously claiming heuristics have a contextual application (i.e. are ecologically rational). Generalisation for the suitability of every environment cannot simultaneously have a contextual application. This would be the equivalent of proposing ‘p but not p’. To use a turn of phrase from Gaillard (2022, 14), this is an “epistemological non-sense”.

Moreover, it is unclear whether the generalising approach of Gigerenzer (2008) can account

for cultural diversity, social variation, and political dimensions of concern within DRR contexts. Case studies from the *Global Assessment Report* (UNDRR, 2022) reveal significant systemic biases and large margins for error in high-stakes scenarios and show how risks are amplified by particular socio-political and cultural factors. At the very least, advocates for heuristic-based DRR approaches should pay attention to these factors.

Independently of the issue of whether the approach could be extended to handle these dimensions, it is clear that Gigerenzer's own formulations do not account for them. This impacts the way in which users of the approach may develop heuristics for different scenarios. By focusing on an underspecified notion of environment, social, cultural and political factors could perhaps be taken as part of that 'environment box'. However, this is not suggested by the approach itself, and it is not clear how this could be implemented. Furthermore, there is good reason to doubt that the use of heuristics is epistemically responsible in high-stakes DRR scenarios. For these reasons, deliberate System 2 thought is preferable for decision-making processes in high-stakes disaster contexts.

3.2.4. Summary

Thus far, I have examined RCT, EUT, and heuristics to ascertain how they influence and bear on DRR decision-making processes. Within economics, a closer look at the nature of decision-making reveals the assumption that economic agents are all rational (Kahneman, 2011). As shown above, much research in psychology and economics has radically posited instead that individuals are not as rational as often assumed.

Decision-making theories do not always precisely model the psychological mechanisms of decision-making processes and do not place much emphasis on understanding behavioural patterns unless they are an anomaly. In evaluating the feasibility and applicability of these theories for DRR decision-making, if DRR experts assume that all people act in set ways, since that assumption is simply false, DRR efforts will not achieve their goals. Tversky and Kahneman (1974) inquired why people did not respond to probabilities in an expected manner, as evidenced by the Allais paradox. This is a particularly key point because in the field of DRR hazard analysis is very commonly concerned with the probabilities of certain events occurring. People may assess the probability of an uncertain event based on beliefs, usually expressed as 'I think that...', 'chances are...', 'it is unlikely that...', etc., but what

determines such beliefs? Reliance on a limited number of heuristic principles, such as those mentioned above in Banks et al. (2020), reduces the complex tasks of assessing probabilities and predicting values to simpler judgemental operations. There are a variety of ways in which people could, and do, respond to probabilities and related factors. These large numbers of possibilities could be reduced by specifically recommending employing deterministic actions like 'do this', which simplify the process. DRR messaging that aims to eliminate probabilities in favour of contextualised deterministic actions is a central theme for discussion in this thesis.

In the examination of standard decision models and rational theories I find shortcomings in addressing hazard and risk contexts, particularly when attempting to apply generalised heuristics with high margins of error to high-stakes contexts; by using deliberate System 2 thinking and processes for testing, the margins of error could be reduced. After testing, DRR knowledge could be distilled and simplified into heuristics once the margin for error has been reduced. In order to effectively apply DRR knowledge in the form of heuristics, decision-making contexts should include considerations of diverse backgrounds and geography including cultural diversity, social variation, and political dimensions. However, current formulations, like Gigerenzer's (2008) 'ecological rationality' do not directly account for these factors in decision-making environments. Instead, generalisation is the favoured approach to have a single heuristic that can be very widely or universally applied. However, applied case studies show how more than a single heuristic is often required, and further System 2 processes are needed for functioning beyond the single-generalised-heuristic usage in decision-making contexts.

Generalisation for universal applicability across different social and geographical contexts is not the best option for DRR efforts that require context-sensitive application. For this reason, the SFDRR, which is intended to be widely or universally applicable (Osorio-Piñeros, 2020; Gaillard, 2021), is worth reviewing in terms of its epistemic framings and narratives, what the framework says about socio-political and cultural contextual factors, and how those actually apply to the SFDRR.

3.3. The Sendai Framework for Disaster Risk Reduction (SFDRR)

The SFDRR 2015-2030 is an international policy adopted by 187 member states of the United Nations General Assembly (UNGA, 2015). The SFDRR is the successor instrument to the Hyogo Framework for Action (HFA) 2005-2015, created to give further impetus to global DRR work (UNGA, 2015). Since the SFDRR is a successor instrument, I focus on it rather than its predecessors. The SFDRR has:

[...] the reduction of disaster risk as an expected outcome, a goal focused on preventing new risk, reducing existing risk and strengthening resilience, as well as a set of guiding principles, including primary responsibility of states to prevent and reduce disaster risk, all-of-society and all-of-State institutions engagement (Wahlström in Foreword to SFDRR, UNGA, 2015, 4).

The SFDRR, with its emphasis on disaster risk governance, acknowledges and highlights inequalities and injustice as root causes of human vulnerability to hazards and disasters, and it offers guiding principles and priorities for action at global, national, regional, and local levels. The SFDRR also highlights the role of public and private stakeholders in DRR efforts, encouraging international cooperation and global partnership, providing policy and technical guidance for developing national DRR policies and practices (UNGA, 2015). The SFDRR emphasises the role of science and technology in DRR and the importance of scientifically produced knowledge, outlining a series of mutually reinforcing steps to invest and engage the public in DRR education and awareness. The SFDRR acknowledges that governments share in accountability and responsibility with other stakeholders, although it still asserts that the overall accountability for DRR lies with the government:

While States have the overall responsibility for reducing disaster risk, it is a shared responsibility between Governments and relevant stakeholders. In particular, non-State stakeholders play an important role as enablers in providing support to States, in accordance with national policies, laws and regulations, in the implementation of the present Framework at local, national, regional and global levels. Their commitment, goodwill, knowledge, experience and resources will be required (UNGA, 2015, 20).

Some of the strengths of the SFDRR (Oxley, 2015), which has a 15-year time frame within which to achieve its sustainable goals, include a focus on both risk creation and reduction by attempting to include people in marginalised and vulnerable situations. It recognises smaller-scale, recurrent, and slow-onset disasters that affect and impact the daily lives of people who live with hazards, rather than solely placing focus on large 'disaster events',

which may not occur frequently (UNGA, 2015). Smaller-scale events receive less media attention and thus receive minimal government and/or external assistance. The recognition of slow-onset disasters also serves to broaden the SFDRR's scope for its classifications to allow for both natural and man-made hazards. Moreover, the varying capacities of countries to plan for and respond to disasters is acknowledged, and the SFDRR calls for a greater recognition that assistance should be proportionate to different country capacities, especially those with higher levels of risk and vulnerability.

Further, it recognises the growing role of the private sector within DRR and in the different facets of DRM and thus emphasises the need for enhanced multi-stakeholder engagement. This also includes the involvement of civil society, science and academia, and media, with particular focus on certain areas:

[...] in pursuance of the expected outcome and goal, there is a need for focused action within and across sectors by States at local, national, regional and global levels in the following four priority areas:

Priority 1: Understanding disaster risk.

Priority 2: Strengthening disaster risk governance to manage disaster risk.

Priority 3: Investing in disaster risk reduction for resilience.

Priority 4: Enhancing disaster preparedness for effective response and to "Build Back Better" in recovery, rehabilitation and reconstruction.

In their approach to disaster risk reduction, States, regional and international organizations and other relevant stakeholders should take into consideration the key activities listed under each of these four priorities and should implement them, as appropriate, taking into consideration respective capacities and capabilities, in line with national laws and regulations (UNGA, 2015, 11).

An emphasis on governance comes to the fore in the second priority where it is cited as the single most important factor in DRR, specifically for the purposes of implementation through various channels. DRR compliance and enforcement at different levels are sometimes weak and compounded by implementation issues (UNDRR, 2020), which represents governance deficiencies rather than technical or knowledge deficiencies (Ambraseys, 2010; Ambraseys & Bilham, 2011; Castree, 2005, 2014; Trumble, 2018). This will be detailed further in section 3.4 on governments, DRR governance and governmentality.

The SFDRR recommends extensive multi-stakeholder consultations and strives for increased international cooperation. It asserts that it is more cost effective to adopt approaches that protect and enhance lives, livelihoods, and assets and build resilience to disturbances rather than taking a purely reactionary approach (UNGA, 2015).

The SFDRR also has integrated and coordinated follow-up processes that attempt to measure the progress toward achieving outcomes of substantial reductions in disaster risk and loss of lives, livelihoods, health, and assets (economic, physical, social, cultural and environmental) of persons, businesses, communities and countries. The SFDRR (UNGA, 2015) measures progress by quantifying a country's socioeconomic progress and prosperity along with its responsible use of resources and human security among related factors. This forms part of a composite sustainability index and uses a set of scorecards to compare the performance of different countries.

3.3.1. SFDRR Critique and Analysis

In this section I outline critiques from the literature. I focus in particular on issues surrounding the fundamental assumptions that underpin the SFDRR's rationalist, top-down approach to disaster risk. I examine how the shortcomings of rational decision-making reviewed in the previous section are manifest in this framework, and why this matters for individual decision-making in the face of hazards. The SFDRR: (1) lacks clear definitions, (2) is based on a rationalist concept of disaster risk, (3) is technocratic and top-down, (4) lacks detail around implementation, and (5) prioritises development as economic growth, over socio-political issues, which disregards available evidence.

While the SFDRR's priority for action is in understanding disaster risk, it does not define the concept; it mentions that this phenomenon should be understood "in all its dimensions of vulnerability, capacity, exposure of persons and assets, hazard characteristics and the environment" (UNGA, 2015, 7). However, not having a distinct and agreed-upon definition makes for vague understanding and application of the framework and its intended objectives.

Therefore, communication of scientific discourse to the policy domain is also made problematic. "Even within scientific disciplines, there is a significant difference in the

understanding of disaster and risk terminology (Kelman 2018), which makes it difficult to communicate scientific discourse to the policy world” (Albris et al., 2020, 6).

In the previous section, I examined decision-making theories like RCT, EUT and heuristics because the rationalist approaches encountered within DRR, and DRM decision-making processes seemed to be influenced by economics (rather than philosophy or sociology).

Epistemologically speaking, the SFDRR holds a rationalist understanding of disaster risk, whose origin is in the modernisation theory of development⁹. The undesired outcome of the technocratic understanding of disaster risk is because this approach is not able to trace the grounds of this phenomenon which are the **human decisions represented in the social, economic and political structures of society** which cause poverty, a vulnerability to disaster risk (Osorio-Piñeros, 2020, 319).

Osorio-Piñeros (2020) and Gaillard (2021), among others, have further argued that frameworks like SFDRR hold dominant rationalist understandings and conceptualisations of disaster risk, steeped in dominant Western narratives.

Methods to uncover and assess disaster risk have been epistemologically aligned with the Western heritage of the Enlightenment, **successively fostering econometric and reductionist approaches, anthropological and particularistic techniques, and pluralistic and participatory initiatives** [...] Europe’s colonial and imperialist legacy has led such understandings of disaster to dominate and inform **an overall monolithic approach to disaster** in spite of the seemingly significant, but ultimately marginal, nuances that the different discourses have forged. As a result, it is no surprise that policies and actions geared to reduce disaster risk and alleviate suffering in the time of, or following, what we call disaster have drawn on a *dispositif* that **sustains governmentality as the art of government of the West** (Gaillard, 2021, 193).

These rationalist approaches tend to find and hold their legitimisation in the rigid definitions of rationality to which others are expected to conform. As Western knowledge (knowledge conforming to Western conceptions of rationality) is assumed to be superior (Gaillard, 2019, 2021, 2022), the further assumption then follows that it must be universally applicable. RCT, EUT and heuristics inherit sets of particular meanings, concepts, and assumptions from the Western conception of rationality just sketched. These particular meanings, concepts and assumptions may prove troublesome as they may or may not make sense outside of the

⁹ See Reyes (2001) for further explanation(s) of the modernisation theory of development. “Modernization is a europeanization or americanization process; in the modernization literature, there is an attitude of complacency toward Western Europe and the United States. These nations are viewed as having unmatched economic prosperity and democratic stability” (Reyes, 2001, 110).

West. By suggesting that these concepts are universally applicable, dominant powers normalise these assumptions and dominant views. Therefore, the domain of DRR does not currently account for other non-Western epistemologies and ontologies of disaster and risk, and people in non-Western countries can be sweepingly classed as being irrational (going against reason) or arational (outside the domain of reason) because their thinking and behaviour does not conform to dominant notions.

Although the SFDRR narrative speaks in favour of the people-centred perspective, where people rather than hazards are the focus, it does not align with the people-centred approach. People-centred approaches prioritise people from the start of DRR processes, and consider four main elements: a) a background of risk knowledge: what is known about the risk, how it develops and what can be done to mitigate it; b) a monitoring and warning system (technical); c) a way to disseminate and communicate knowledge and warnings when needed; and d) response systems to enact actions on the basis of that knowledge (Basher, 2006, 2174). Knowledge about risk in people-centred approaches is transformed into usable formats, often distinct to specific social contexts. However, technically minded developers of DRR tools consider how to get warnings to local people as a ‘last mile’ problem, at the end of DRR processes (Thomalla et al., 2009), which is the route the SFDRR takes. For people-centred approaches, this is much more pressing, and is instead a ‘first mile’ problem (Stanciugelu et al., 2017; Gaillard & Kelman, 2018).

[Disaster knowledge] has been a largely technocratic and top-down approach handled by scientists and filtered by governmental and non-governmental agencies and officials [Wisner, Gaillard & Kelman, 2012b]. Especially since the 2004 Indian Ocean tsunami, the main challenge has been improving the ‘last mile’ of the chain of actions designed to reach people on the ground [Thomalla et al., 2009]. Even so, **there is still an assumption that the signal has to come from the top-level experts down to the (apparently ignorant) people affected** (Gaillard & Kelman, 2018).

Proponents of the people-centred approach have insisted that communication issues surround the whole development of DRR tools. People-centred approaches examine not only disaster- or hazard-related issues, but issues like marginalisation and vulnerability that pre-exist the phase of disasters and that are further exacerbated by disasters. Wisner et al. (2014) and Wisner et al. (2012b), among others, give context to many root-cause issues like marginalisation and vulnerabilities that are deeper than the surface issues experienced

when a disaster occurs. While root-cause issues and the unequal status quo are acknowledged, the SFDRR's guiding principles do little to assist in solving them.

Despite the international scope of the SFDRR, efforts toward achieving DRR have not seriously challenged currently prevailing development models of the international system, which are essentially capitalist, extractivist, and oppressive (Marchezini & Wisner, 2017; Anderson & Elkaim, 2018). These development models are the foremost obstacles to effective DRR, as they are the origin of such risks (Osorio-Piñeros, 2020; Wisner, 2020; Aronsson-Storrier, 2020; Baumann, 2020; Chmutina et al., 2021; Gaillard, 2021). The SFDRR further avoids topics of vested economic interests that directly affect and influence the political economy of development, which can advance or constrain DRR efforts:

During the first five years of the SFDRR, the pressure on governments to allow large scale investment in hydropower, mining, large scale agribusiness, new technology cities, and luxury housing development **has increased**. Pressure on indigenous forest dwellers in Brazil's Amazon has increased as has internal displacement of populations (Marchezini & Wisner, 2017; Anderson & Elkaim, 2018). This is a test of governance. **Few governments reject a megaproject on the basis of its possible displacement of people, destruction of livelihoods and the biosphere** (Wisner, 2020, 242).

Although scientific experts and academics are increasingly prevalent in DRR, the role and efforts of local people within DRR power-sharing structures is still diminished. "Project-ism' is still the dominant mode of top-down DRR and plans, protocols and 'log frame' choreography, still blunt attempts to mesh with people's skill and local knowledge to produce flexible, localized assistance" (Wisner, 2020, 242). Integration for long-term, sustainable implementation is essential to building relationships of trust and thereby fostering a spirit of cooperation for mutual benefit. Participation of different age groups in DRR processes allows for involvement and nurtures a sense of shared responsibility.

An additional challenge to implementing the SFDRR is **mistrust and alienation**. Stratification and increased polarity between the rich and poor breeds mistrust and noncooperation among the residents of self-built, low-income settlements, especially youth (Rocca, 2019). **Given the SFDRR's commitment to youth participation in DRR, such mistrust and alienation is a serious obstacle to implementation** (Wisner, 2020, 243).

Although the SFDRR identifies a range of risk drivers and compounding factors, it does not explain how such challenges will be addressed through implementation. Here a concern

could be raised that perhaps a framework like the SFDRR does not need to address implementation issues directly. However, in order to reach the aims and goals that the SFDRR sets out, it has to be implemented. Implementation could be an issue because of the very nature of the SFDRR, which is broad and generalised. In order to address implementation, a context-sensitive approach would be required. The recommendation for context-sensitive application, which varies from place to place, should be encoded into a framework itself, and in this case, in the SFDRR. Frameworks should begin with a people-centred approach that takes into account context-sensitive factors.

The framework avoids politically sensitive matters like unequal power distribution and relationships. Oxley (2015) argues that the SFDRR has an incomplete analysis of previous issues encountered and underutilises lessons and findings from prior frameworks. Wisner (2020, 239) argues “the overall conclusion is that both the HFA and the SFDRR fail to deal with root causes of disaster”. This should be seen in a wider context of depoliticisation of research and the way that research is implemented by governments (Chmutina et al., 2021). The SFDRR is produced by experts who take part in the depoliticisation of knowledge, but who are nonetheless situated in political contexts. This highlights general issues about the role of politics in DRR. Research from different disciplines has been criticised for failing to include a political lens in disaster studies, DRR, disaster impact and response (Trumble, 2018; Olson, 2000). The political lens is often removed for strategic reasons in order to focus on economic, (sometimes social) and physical impacts of disasters (Trumble, 2019; Olson, 2000). Political impacts are often hidden, coded, or distorted also by media coverage, especially with state-controlled media. Political impacts can thus also be swiftly suppressed by those in power who have the means.

However, the **assumption that domestic political authorities can achieve DRR** is problematic in a number of ways. The first problematic assumption is that the government of a state has control over its territory and population [...]. Second, [...] there is an assumption that governments have control over the ways in which disaster risk within their territory is affected by the global economic system (Aronsson-Storrier, 2020, 233).

Political power can be used for priorities opposed to DRR goals. Pelling & Dill (2010, 21) use case study examples, like the 1999 Marmara earthquake, Turkey, to show how decision-making in DRR is affected by politics, arguing that (human) “geographers have long asserted

a politics of disaster”. In this case study, the government had not offered any assistance and thus felt threatened and undermined by the successful efforts of NGOs and other local organisations actively assisting in DRR efforts. Moreover, because the media’s broadcasting of DRR successes highlighted the government’s lack of response to the disaster, the government decided to freeze the bank accounts of involved NGOs. “Inadequate state response was compounded by the growing realisation that the state **failed to implement the regulation of building standards pre-disaster**. Erosion of trust in the state opened a policy and political gap, provoking increased attention on underlying inequalities and inefficiencies in governance” (Pelling & Dill, 2010, 32). In another case study example of the 2008 Sichuan earthquake, the Chinese government made concerted efforts to control criticism and to reshape the disaster into a vehicle for nationalist sentiment. These examples demonstrate how the fear of political change can lead to a suppression of rights and a reinforcement of the status quo (Pelling & Dill, 2010). Thus, returning to my critique of the SFDRR, the assumption of the SFDRR that domestic political authorities can be overarchingly relied upon to achieve DRR is flawed. “If the SFDRR is truly committed to mobilising the knowledge and skill of local people, how will it deal with governments if and when they lock out NGOs and other civil society organisations such as faith groups from the decision-making loop?” (Wisner, 2020, 244). This is an enquiry that requires a resolution for effective DRR.

A number of authors have argued that the SFDRR still prioritises economic growth over social and political goals (Osorio-Piñeros, 2020; Oxley, 2015; Aronsson-Storrier (2020); Wisner 2020; Zaidi & Fordham, 2021; Kelman, 2018; Chmutina et al., 2021; Gaillard, 2021). Despite the discourse of vulnerability and injustices, the SFDRR’s measurement of progress towards DRR focuses on disaster events and threats, almost completely ignoring the abundance of data concerning development variables beyond economic ones (Chmutina et al., 2021). The SFDRR acknowledges fundamental causes of vulnerability: weak governments, a prioritisation of profits at all costs, and development that remains uninformed of inherent risks. Nevertheless, the problems mentioned strongly relate to the ideology and development model of neo-liberalism, which is the basis for creation of disaster risk going beyond DRR attempts. Neo-liberalism politically facilitates the restructuring and re-scaling of social relations according to unrestrained global capitalism. Therefore, particularly for this reason, “measuring DRR without considering indicators that

point to the creation of risks will keep us in a vicious circle that can only get worse” (ibid). Chmutina et al. (2021) argue that disaster risk measurement can be significantly improved by integrating development data; they suggest that these be incorporated into future iterations of global DRR action frameworks.

The SFDRR acknowledges that governments share in accountability and responsibility with other stakeholders but still asserts that the overall accountability for DRR lies with the government rather than a shared accountability with stakeholders. DRR accountability, and its associated power structures, remain rigidly controlled top-down by the national government, by donor countries, or international NGOs (Potetee & Ribot, 2011; Gibson, 2019; Wisner, 2020) rather than a sharing of power with other stakeholders like academics or local people. As Pelling and Dill (2009, 25) elaborate, “these new actors need to be included in accounts of maintenance and change in the social contract which puts stress on pre-existing state-based legal structures for accountability”.

3.4. DRR Governance, Governments, and Governmentality

In this section I examine DRR governance and offer a limited analysis of DRR governance and governmentality. I further analyse how governments work together with other domestic political authorities and should proportionately share the responsibility and accountability for DRR. If governments have the overall responsibility for DRR but share aspects of that responsibility with other actors, this warrants looking at some other actors. National and local actors like militaries and non-governmental organisations play a vital part in DRR and the disaster relief process. While community-based organisations are often underrepresented in national and municipal structures, their involvement as partners is crucial to assisting in DRR, immediate relief efforts, as well as long-term recovery (Wisner, 1995; Wisner et al., 2012b; Gaillard & Mercer, 2013; Mercer et al., 2009; Mercer, 2012; Baumann, 2020; Chmutina et al., 2021; Gaillard et al., 2019a, 2019b). In my overall argument, I focus on (scientific) experts and their relationship with laypeople often through the medium of governments and other agencies. Intermediate actors play a role as structures in the knowledge transferring relationships between experts, governments, and laypeople, which are evolving; however, the narrative of overall governmental responsibility for DRR does not seem to proportionately evolve to include other agents and intermediaries.

Militaries operate at the level of the government and enact the government's policies. Militaries are vital to DRM and disaster relief operations, as they assist in various aspects like transportation, communication, food, and water aid, as well as medical assistance (UN-OCHA, 2016). **“While the primary responsibility for disaster response lies with civilian agencies,** only the military has the manpower, equipment and training necessary to offer the relief surge required during immediate disaster response” (Cook et al., 2018, 538). However, some concerns have been expressed regarding the use of military assistance for humanitarian purposes, as the extension of military engagement beyond their established directives for activities, such as emergency relief and counterinsurgency, often blurs lines between military and humanitarian action (Anderson, 1994; Canyon et al., 2020). **“Military assistance is progressing beyond traditional methods** to place a higher value on issues relating to civil cooperation, restoring public health infrastructure, protection, and human rights, all of which are **ensuring a permanent diplomatic role for this soft power approach”** (Canyon et al., 2020, 92).

The main UN agencies with disaster relief directives aim to facilitate the humanitarian efforts of the UN system and take responsibility for gathering and mobilising humanitarian actors for an effective and coherent response to emergencies to be conducted in a coordinated, principled, and effective manner. Prior work is usually done to facilitate sustainable solutions, and promote preparedness and prevention where possible (UNDRR, 2022). UN agencies are generally geared to assist at initial stages of disaster management, when teams are usually deployed upon the request of governments, which they assist. The UNDRR oversees the implementation of the SFDRR.

The Red Cross and Red Crescent Movement (RCRC) and its affiliated components function alongside the UN agencies for disaster response. The RCRC are usually the first points of contact for governments that request relief assistance, and are expected to be impartial, independent, and neutral as an organisation.

NGOs are generally divided into two categories: national and community-based, and international NGOs. While national and community-based NGOs may work independently, they nevertheless support the disaster response activities of governments, UN agencies and

international NGOs. “They generally have strong community-based networks critical to reaching disaster affected communities” (Cook et al., 2018, 539).

Private sector companies have become increasingly more involved in disaster response by, among other functions, acting as donors and sometimes direct service providers.

Collaboration with aid agencies, especially within the logistics sphere, has assisted in improving processes and the effectiveness thereof, which has now enabled actors to deliver larger quantities and volumes of aid by working with logistics firms such as DHL and UPS. “Of late the private sector has contributed more extensive support [...including] provision of training and operational management schemes and the transfer and application of technologies. These humanitarian actors were actively involved in responding to the Nepal earthquake” (Cook et al., 2018, 539).

Local-level individual actors, especially because of their close proximity and understanding of local contexts, can offer their experienced assistance for effective disaster response.

Locals are always the first to respond to disasters, and engagement with them to harness their capacities and abilities may lead to improvements in response strategy and overall efficiency.

Local communities have strong relationships, important norms, and effective leaders [...]. International organizations continue to highlight that a people-centered approach is essential in providing humanitarian assistance to all those affected. A people-centered approach recognizes that a person’s gender, age, and other diverse **characteristics have a significant impact on how they experience emergencies and access assistance** (Cook et al., 2018, 539).

While the above-mentioned actors may assist with DRR efforts, if overall responsibility for DRR still lies solely with the government, would the government remain accountable, and perhaps criticisable and thus blameworthy for misunderstandings of local contexts and resultant mishaps accrued during DRR efforts? Given that governments do work together with other international and domestic political authorities, as shown above (and discussed in Chapters 5, 6 and 7), should they proportionately share the responsibility and accountability for DRR with these agents?

3.4.1 Critique and Analysis of DRR Governance, Governments, and Governmentality

Although governmental responsibilities seem axiomatic and are meant to protect vulnerable citizens during disasters, merely having laws that define roles and responsibilities is insufficient for non-binding DRR obligations to be carried out in practical terms for beneficial results (Pelling & Dill, 2010; Aronsson-Storrier, 2020; Gaillard, 2021). The proper procedure to ensure enactment of these responsibilities is lacking, and thus accountability is also difficult to assess and assign.

Struggles for hegemony ensue, in an attempt to give a universal status to particular discourses, representations, ideologies, and communication technologies (Gaillard, 2021; 2022). Government ideology (beliefs and/or principles that serve governmental interests; a conceptual scheme with practical application) can be associated with discourses (as defined in this chapter introduction), which can contribute to establishing, maintaining, and sometimes changing social relations of power. Governments implicitly assume and almost universally agree on a neo-liberal governmentality inclination (the argument can be made even for the case of China, see Duckett, 2020), that they encode in explicit intergovernmental agreements: “Neo-liberalism is a political project for facilitating the restructuring and re-scaling of social relations in accordance with the demands of an unrestrained global capitalism” (Fairclough, 2003, 4). While defenders of neo-liberalism might view it as the best way to rapidly transform social systems, it has led to reductions in social welfare, and an increasing division between rich and poor (Marchezini & Wisner, 2017; Anderson & Elkaim, 2018; Wisner, 2020). Adoption of neo-liberal governmentality by governments has resulted in increasing economic insecurity and an intensification in the exploitation of labour (cf. Shakya, 2018, who discusses the impact of neoliberalism in Nepal; a discussion that I will return to in Chapter 7). “The unrestrained emphasis on growth also poses major threats to the environment [... and has] produced a new imperialism, where international financial agencies under the tutelage of the USA and its rich allies indiscriminately impose restructuring on less fortunate countries, sometimes with disastrous consequences” (Fairclough, 2003, 5).

Within DRR, Cook et al. (2018) believe that because of the vital role that national governments play in disaster relief, a substantial challenge to countries most vulnerable to

disasters arises. “A national government plays a critical role in disaster relief, yet their capacity in disaster response remains varied across the Asia-Pacific. This poses significant challenges to countries most exposed to disasters” (Cook et al., 2018, 538). Governments often fall short in fulfilling their responsibilities towards those they govern, and case study examples from disaster governance are cited below in section 3.4.2. to show this as a practical reality. “National political systems do not operate in isolation from international pressures. The potential for international aid to be used by national elites to limit political unrest and so contain change was observed” (Pelling & Dill, 2010, 25). This is also illustrated by the difference in the ways in which governments are willing to ask for assistance and to receive it, a case where both capacities and exercise of political will are at play:

[...] oftentimes governments do not call for external assistance but will take it when offered by friendly countries and allies. This is an important if subtle difference in how to approach countries affected [...]. Foreign governments’ relief assistance is essential especially when the affected country has a limited capacity and resources to respond to and manage disasters. Nevertheless, international aid depends on the consent of the National government of the affected country (Cook et al., 2018, 538).

It seems natural, justifiable, and well intentioned for an authority, such as the government, to declare a disaster of crisis status and to invite help as soon as humanly possible. However, for political, strategic, or other reasons not discussed or disclosed, governments may choose not to declare disasters in a timely fashion, causing delays that can result in an increase in the loss of lives.

3.4.2. Further Marginalisation of Marginalised Groups by Governments

There are other ways in which the government can further marginalise particular groups. Trumble (2018) and Pelling and Dill (2009) describe case study examples where local political elites use their positions to capture funding meant for DRR.

First, in the case of flooding in Guyana (Pelling, 1998), local political elites were well placed to present themselves as ‘local voices’ to capture externally allocated funds for local-level risk reduction. This only served to further strengthen the already existing status quo, as funds meant for local people never reached them.

Second, local-level organising is sometimes perceived as a threat to the pre-existing, established status quo. In Turkey (Jalali, 2002) when NGOs seemingly threatened the

government, local bank accounts were frozen to recover government power (legislative, economic tools to achieve political goals). These goals, rather than mitigating disaster risks for local people, exacerbated their marginalisation and increased their risks.

Cohen and Werker see **local targeting as a way of circumventing the state rather than thickening governance**. This raises significant concerns over sovereignty and the **accountability of international actors to the state**, a particular concern during the first phases of relief and reconstruction when normal levels of scrutiny on humanitarians as well as the state are often relaxed. This work also plays down the influence of internal distortions in the polity including corruption, clientelism and party patronage (Pelling & Dill, 2010, 25).

Third, disasters demonstrate or bring to light a manifest failure for renegotiating the values of the various structures of society. Thus, governments cannot be counted on to prioritise their citizens' security. Some governments make some attempt at DRR efforts in order to show and maintain their own legitimacy. However, most lack the motivation to go further than minimal levels (Trumble, 2018). This is a power struggle perpetuating a vicious cycle of vulnerability, especially in countries where civil society is split along ethnic and social lines. Inadequate government response compounds these issues and leads to an erosion of trust in the government by vulnerable groups of people and international organisations (Trumble, 2018).

[...] dominant or state actors can also **use disasters to further marginalise groups**. One interpretation of aid blocking by the Myanmar state following Hurricane Nargis (2008) was to weaken resistance and force ethnic Karen rice farmers from the fertile land of the Irrawaddy delta – described by one commentator as 'laissez faire ethnic cleansing' (Klein, 2008 in Pelling & Dill, 2010, 25).

Weak disaster risk governance arguably leads to many more deaths than do geohazards and disaster events (Ambraseys, 2010; Ambraseys & Bilham, 2011; Castree, 2005, 2014; Trumble, 2018; UNDRR, 2020). Wisner et al. (2004, 3-6) approach DRM by highlighting issues of violent conflict, illnesses, and hunger that they evaluate to claim more lives than natural hazards:

Occasionally earthquakes have killed hundreds of thousands, and very occasionally floods, famines or epidemics have taken millions of lives at a time. But to focus on these (in the understandably humanitarian way [...]) is to ignore the millions who are not killed in such events, but who nevertheless face grave risks [...] Disasters are a complex mix of natural hazards and human action [...] crucially, humans are not equally able to access the resources and opportunities; nor are they equally exposed to the hazards.

DRM is inextricably connected with people's vulnerabilities created through their 'normal' and sometimes inherently dangerous states of existence, where there are added complications in the event of hazards, as vulnerabilities trigger disaster. In this understanding of risk, the approach to hazards is not detached from the social frameworks that influence how hazards affect people; rather the social, political, and economic environments are considered and show disaster perception within wider configurations of society, which differs from conventional hazard-only focused views of disaster. As Wisner et al. (2004, 4) point out, analysing disasters "in this way may provide a much more fruitful way of building policies that can help to reduce disasters and mitigate hazards, while at the same time improving living standards and opportunities more generally".

Hazards affect people differently with different intensities; some are more prone to loss, suffering and damage than others (White et al., 2001). It is imperative to identify different levels of vulnerabilities for different groups determined by social systems and power, rather than by natural forces alone (Cutter, 1996). Weak disaster risk governance thus leads to more fatalities than disasters and remains unaccounted for in technocratic and hazard-centred approaches to DRR. Other perspectives have tried to include disaster risk governance among other factors for more inclusive approaches to DRR.

3.4.3. Summary

DRR has often been approached from a rationalist, technocratic perspective, which is exemplified by the SFDRR (3.3.) but not limited to that framework. I have reviewed what those rational approaches entail and why they could be problematic for DRR. Thus far, some of the issues identified at both the international and governmental levels are that traditional models of decision-making tend to be technocratic and top-down, based on a rationalist concept of disaster risk, which generalises rather than considers context-sensitivity, prioritises 'development' as economic growth, and in many cases depends on concepts that lack clear definitions, and therefore lack detail around implementation. Another class of issues has to do with the place of politics in DRR, which was examined in section 3.4. Perhaps these issues could be addressed by more inclusive, participatory, or wider conceptions of the links between DRR actors, which I attempt to offer in Chapter 7 by applying standpoint theory to the domain of DRR. To that end, it will be worth looking at

alternative approaches that intend to be more inclusive frameworks from which to examine these issues.

3.5. Vulnerability Paradigm Perspectives that Attempt to Include Local Voices, Cultures, and Contexts

In this section I present and analyse perspectives from the literature that highlight current gaps in DRR in 3.5.1, and issues of geopower in 3.5.2. I also present perspectives and proposed frameworks like assemblage theory, which are suggested as more inclusive alternatives to the hazard paradigm's approach. Although I do not endorse these approaches (I critique them in Chapter 4), they serve the purpose of highlighting further issues within DRR and DRM when attempting to address socio-political components.

Some social and cultural factors are usually difficult to conceive of and conceptualise from the perspective of someone who may work merely within the contexts and characteristic confines of labs and offices. Expansion of work, as Gigerenzer et al. (2008, 6) identify, would become necessary, and if it included contextual factors like socio-political components the task would become unfeasibly large. "The moment one moves beyond simple constrained settings [...] that psychologists and computer scientists study to real-world situations that people actually live through, the time, [expanded] knowledge, and computation that probabilistic models demand grow unfeasibly large". This is so because socio-political and cultural factors influence DRR knowledge and decision-making processes at every stage of DRR knowledge production and are particularly crucial in the dissemination stages.

Arguably, if such factors so acutely affect the process of DRR knowledge production and dissemination, they ought to be considered from the very outset. However, there are no formal regulations in place governing the production of DRR knowledge that would require such broader socio-political and cultural inclusivity.

There are some improvements in governance of ethical considerations of research and development, such as ethical requirements imposed by funders. Participatory Action Research (PAR) is one such area of scholarship that encourages considering the ethical, social, political, and cultural dimensions to research, knowledge development and usage. Yet implementation of PAR is not always suitably applied in research contexts as often as it could be (Gaillard, 2021, 2022). Neither are PAR methods developed explicitly with the

participants' benefit and sustained well-being at the core; rather research outcomes are often the sole focus and priority. This has prompted some proponents of the vulnerability paradigm to draw up a disaster research manifesto (Gaillard & Peek, 2019) attempting to offer ethical and empathic considerations for experts intending to conduct research in the immediate aftermath of disasters.

However, current DRR approaches to knowledge generation, dissemination, and implementation still rigidly stick to 'top-down' production methods (Wisner, 1995; Bankoff & Hilhorst, 2009; Mercer et al., 2009, Mercer, 2012; Gaillard & Mercer, 2013; Weichselgartner & Kelman, 2015; Donovan, 2017; Baumann, 2020; Chmutina et al., 2021; Gaillard, 2021, 2022), with many case studies that can be cited of unfortunate attempts to offer knowledge that have had the opposite effect when socio-political and cultural factors and other perspectives have been ignored (discussed in empirical chapters 5 and 6).

DRR knowledge production that includes scientific, social, and cultural knowledge remains challenging, particularly in operationalisation at the science-policy-practice interface (Gaillard & Mercer, 2013; Weichselgartner & Pigeon, 2015). Weichselgartner & Pigeon (2015, 115), among others, suggest that the next steps in DRR require "a shift in focus from the production of risk information per se towards co-produced risk knowledge that is understandable and actionable by different kinds of users".

Risk perception is influenced by social interactions through which we form the beliefs that play a large role in the meaning-making process and in interpreting information about ourselves and the world around us. Preparedness beliefs align with what people believe preparedness means, how personal understandings of disaster impact and affect one and how one might deal with disasters (Becker et al., 2013). When risk perception is low due to optimistic bias, where people believe that an event is unlikely to occur or the resulting impacts will not actually affect them, then people are not as inclined to prepare for disasters (Becker et al., 2013). Optimistic bias affects people's beliefs in that they hope disasters will not happen and are thus unlikely to prepare. Beliefs such as helplessness due to a lack of control also influence people's thinking and can also often lead to non-preparedness. When individuals feel that there is nothing that they can do about natural hazards, they locate the locus of control externally in relation to themselves. "A belief that they had no control over

what nature can do was reflected by some in saying that events such as earthquakes were an 'Act of God', 'We are in the lap of the gods', are at the whim of 'mother nature' or that 'We are at the mercy' of hazard events" (Becker et al., 2013, 1714-15). According to Becker et al. (2013, 1718), "[m]ost interviewees did actually think that it was important to undertake a degree of preparedness, but this belief did not necessarily lead directly to adjustment adoption because of interaction with other beliefs or contextual factors".

DRR advice, instructions and guidance have varying degrees of impact on the listeners and end-users, affecting what information they gather, retain, and choose to act on (Albarracín et al., 2011). Context-sensitive delivery mechanisms are thus vital for proper dissemination of DRR knowledge. The current DRR narrative, a predominantly Western construct, cannot account for different understandings of risk; there are fundamentally different interpretations, evaluations, interests and values between scientists, policymakers, experts, and laypersons. I further extend this analysis in Chapter 7 to show how different epistemologies and ontologies of risk exist, although these are seldom heard of, researched, or incorporated into current DRR literature and practice.

Collaborative arrangements between scientific and policy domains can sometimes take the form of 'boundary organisations' with the aim of facilitating the joint construction of knowledge to enrich policy and other decision-making by understanding and managing this intersection or boundaries between domains. While there are certain demonstrable challenges and potential tensions in attempting any type of cross-domain working, the outcomes usually outweigh the difficulties encountered, especially after issues are identified and suitably addressed (as with Project AF8 in Orchiston et al., 2018).

3.5.1. Epistemological, Institutional, and Strategic Gaps in Disaster Risk Reduction

Practitioners in the field, NGOs, and experienced others working on the ground with communities have been advocating for people directly affected by disasters to have a more substantial involvement within the DRR processes of policy development and actions implementation. While this push for a community-based DRR has gained some attention over the last few decades, Gaillard & Mercer (2013, 93) reinforce the words of Long and Long (1992) by reiterating that the field of DRR is "**a battlefield of knowledge and action**".

Often, during the clashes between knowledge and action factors, the outcomes derived are of poor quality, resulting in intangible reduction of risks. Unfortunately, the most vulnerable people, who are thus impacted directly by these outcomes, endure the greatest losses. “The escalating occurrence of disasters also reflects an inability to bridge the gap between local and scientific knowledge, and bottom-up and top-down actions in DRR” (Gaillard & Mercer, 2013, 94). This extant prominent gap hampers attempts at achieving DRR.

[The inability to bridge the gap] is clearly evident in the dominant top-down, **homogenizing DRR strategies utilizing global scientific knowledge on hazards and vulnerability, on the one hand, and the context-specific nature of local knowledge and community-based actions on the other hand** (Wisner et al., 2012). Such a gap in the scale of actions and knowledge is considered a major obstacle for reducing disaster risk in a sustainable manner and on a large scale (Wisner, 1995 in Gaillard & Mercer, 2013, 94).

In the table below, Albris et al. (2020) outline three types of gaps, namely epistemological, strategic, and institutional, which appear in the contexts of knowledge transfer, disaster expertise, and risk awareness. Briefly, these challenges for the DRR science–policy interface are as follows. Albris et al. (2020) identify an epistemological gap between scientists and policymakers who do not share the same views on the types of knowledge they promote as valuable. This extends and evolves further into a strategic gap if there is a lack of communication and cooperation between scientists and policymakers. The institutional gap consists of different organisational barriers that function like invisible red tape, preventing closer, deeper, and improved engagement and integration; “[T]he turn to [DRR] warrants an increased focus on vulnerability and on resilience, but it is less clear what forms of expertise are demanded of professionals in public institutions to lift the challenge of reducing risks” (Albris et al., 2020, 10).

Table 3.1. An analysis of the 3 issues with respect to the science-policy interface for DRR (Albris et al., 2020, 7).

	Epistemological Gap	Institutional Gap	Strategic Gap
Knowledge transfer	The transfer of knowledge is a messy process, as science must rest on a basis of uncertainty, making it hard to provide clear-cut policy recommendations	Institutional structures that can facilitate transfer of knowledge from science to policy, and vice versa, are often nonexistent or ineffective	Due to lack of common strategic visions, knowledge transfer tends to take place within sectors rather than across them, and in an ad hoc rather than systematised manner
Disaster expertise	Disaster experts are needed to act as mediators of science for policy in both policy and academic domains	There is a lack of platform and arenas in which discussions and exchange of best practices can occur between scientists, practitioners, and policymakers	While international frameworks focus on capacity building, risk education, and cross-sectoral training, there is a lack of efforts to invest long term at the national and local levels
Risk awareness	The need for specialised terminology underpinning scientific inquiry hinders communication with the policy domain and the public	Scientists are but one group in a multitude of different stakeholders that compete for funding and the attention of policymakers	A lack of communication and identification of needs between the scientific domain and the general public

Another way to analyse the institutional gap is to assess it in terms of its direct and indirect consequences. The governmental focus on international-level institutions and treaties, along with the growing emphasis placed on local-level community-based actions, creates institutional lacunas, which tends to hollow out the role of the government and national-level involvement from the DRR landscape. This can be seen often, as governments mobilise the narrative of ‘community resilience’ as a means to forgo their overall responsibility for DRR, transferring this to the communities themselves (Pelling, 2011; Brassett et al., 2013; Bulley, 2013; Evans & Reid, 2013; Joseph, 2013; Chandler, 2013, 2014a, 2014b; Pugh, 2014). There is a need to be cautious when utilising the concept of resilience. “The power of resilience to suppress deeper changes in the institutions and values that shape development and risk management is reinforced by its attractiveness as a solution [...] for donors and government precisely because it does not challenge the wider status quo” (Pelling, 2011, 51). Bulley (2013, 271-2) questions why poverty and inequality are entirely absent from the community resilience agenda and offers an explanation: “Because this would require local and central government spending and policies targeting ‘equity in hazard vulnerability, focusing on poorer areas’ of the community”. Since this is not the focus, in an ironic twist,

the governance of community through resilience “ends up necessitating the disastrous circumstances it ostensibly secures against”.

A promotion of the discourse of (community) resilience is often used as a form of neo-liberal governmentality (Evans & Reid, 2013; Joseph, 2013; Chandler, 2014a, 2014b); and has thus become an “increasingly dominant mode of Western intervention in the global South” (Pugh, 2014, 314). Chandler (2013) asserts that resilience discourse facilitates the evasion of Western responsibility for the outcomes of Western interventions, which problematise local practices and understandings as productive of risks and a hindrance to progress. Brassett et al. (2013) concur, highlighting that resilience shifts responsibilities of risk management to the individual.

Note how the new form of words used [...] is ‘community resilience’ as well as **‘responsibility’ in the broader domain of disaster management**. The danger is that local participation becomes a low-cost way for the state, and the elites it represents, to off-load the duty of care and cost of social protection onto risk bearers themselves. So, while these phrases sound innocent enough, their misuse can produce either co-optation, or an excuse for benign neglect by the state, or both. ‘Community participation’ is subject to the same distortion and misuse (Wisner, 2020, 244).

Communities on their own cannot ensure DRR over long and sustained periods. They require assistance from national and local government in order to become enabled in a more enduring manner. “Indeed, the accessibility of necessary resources to those most vulnerable is often dependent on actors and forces which lie outside a community” (Gaillard & Mercer, 2013, 97). Communities require assistance in a sustained manner, with a longer-term focus, rather than a sole reliance on disaster aid after a major disaster event, which also may not reach some of the most affected.

Recommendations for bridging knowledge-action and governmental gaps are offered by Gaillard & Mercer (2013), among others, by way of reconciling the roles of different knowledge forms, and the involvement of a large array of stakeholders who utilise both top-down and bottom-up initiatives. Moreover, initiatives involving stakeholders at different levels require a broader outlook of the various processes within DRR, which include knowledge and decision-making at different levels, influenced by numerous factors and relational constructs.

3.5.2. Geopower and Assemblage Theory

Donovan (2017) examines broad ideas related to risk, knowledge, and power, offering a framework for future DRR research based on assemblage theory. She asserts that an assemblage is a multi-scalar entity, composed of separate but linked components. Although these components are heterogeneous, they may also be part of other assemblages, which makes component interactions difficult to quantify or assess while incorporating complexity and non-linearity. Assemblage theory uses these concepts to explain different phenomena. In particular, assemblage theory emphasises the relational construct of identity, the way in which something's identity is constructed in relation to something else. The constructed identity of DRR is intrinsically related to the terminology used within its own domain. From the perspective of assemblage theory, the identity of DRR is thus related to the dominant usage of terms like 'uncertainty', 'risk', 'hazard' and 'resilience' as discussed in the Introduction Chapter. Furthermore, within DRR, there is no universally agreed-upon definition of terms, and even the concept of disaster is contested (see Kelman, 2020, and Aronsson-Storrier & Dahlberg, 2022), nor is there a clear definition of different types of knowledges (Mercer & Gaillard, 2013; Kelman, 2018). The production of knowledge and its implantation through implementation measures and broader processes is inherently political. Expertise itself is context-dependent, being a product of social constructs, and influenced by political and historical factors (Trumble, 2018). Knowledge and its implementation cannot be taken at face value when one begins to explore how expertise demonstrates, exerts, and influences power relations.

Two aspects in particular, related to offering expert advice from a DRR perspective, have received sparse attention and examination, and Donovan (2017, 45) has highlighted them as pertinent issues: "the latent, multiscale power dynamics that exist behind the language of DRR (e.g., Pelling and Dill, 2010; Bankoff and Hilhorst, 2009), and the problem of different epistemologies underlying scientific advisory practice (e.g., Donovan and Oppenheimer, 2015)." However, the study of power relations and 'power-laden assertions' within DRR literature concerning knowledge offered through scientific advisory bodies is seldom scrutinised; "there is less work on the power relationships involved in the provision of physical scientific advice" (Donovan, 2017, 46) both generally and in DRR specifically.

Knowledge topologies refer to the way in which constituent parts of knowledge are interrelated or arranged. While there are some knowledge topologies within DRR that are considered and presented as scientific rather than political, science is not entirely independent from the social constructs within which it is developed, thereby rendering it political in composition. Both science and social constructs of knowledge may produce and be products of one another; “science and social order are coproduced (Jasanoff, 2004) and science cannot be separated from its social context” (Donovan, 2017, 46).

DRR discourses contain several assumptions, among which, for example, are assumptions concerning the desirability of certain aspects of social being. “There are ideological undertones to the language of DRR that can be carried into different contexts in different ways by people in positions of power” (Donovan, 2017, 46) – this is what happens in the case of the use of ‘community resilience’, as discussed above. These latent undertones and assumptions are applied to DRR contexts either consciously or unconsciously; nevertheless, their presence and involvement in the processes of knowledge production and decision-making is impactful.

[DRR] can be limited by the **implicit assumptions behind its terms** (Bankoff and Hilhorst, 2009; Grove, 2010, 2013, 2014a; Grove and Pugh, 2015; Oliver-Smith, 2015). This may partly be because of **a relative lack of cultural studies of disasters (e.g. noted by Krüger et al., 2015; Oliver-Smith, 2015; Hewitt, 2015)** that involve analysis of diversity that is **lost at the international level of management** (see also Gaillard & Mercer, 2013) but that is important in the assembling of a disaster (Donovan, 2017, 59).

Donovan proposes assemblage theory as a possible framework to address issues of power, knowledge, and risk within DRR. While a lack of knowledge in DRR contexts is challenging, “the placing of knowledge is also non-trivial – the translation of knowledge across boundaries may be closely tied with the topologies of power and geopolitical representations” (Donovan, 2017, 48). Donovan refers here to the ways in which power and geopolitical representations are arranged as part of a system. The human-led process within the sciences and DRR requires closer examination, as it forms an integral component of the larger DRR assemblage. Six interlocking dimensions are proposed to illustrate the human and natural flows of power and knowledge that Donovan refers to as geopolitics.

[Donovan] uses the concept of ‘geopolitics’ (Grosz, 2008; Yusoff et al., 2012) to unpack the connections between different aspects of DRR. Geopolitics allows the

agency in disasters – and in DRR – to be complex and to include earth system forces as well as human and human-natural interactions. In a disaster, a hybrid of earth system forces and human factors is drawn together. The relationships between landscapes, governments, institutions, knowledges and population groups are transformed (Donovan, 2017, 59).

These complex interlinked relational dynamics are pointed out in an attempt to describe a socio-spatial phenomenon through the use of assemblage theory for the purpose of practical application. These six interlocking dimensions (Donovan, 2017, 53-58) are:

1. Governance and governmentality in disasters
2. Expert advice, power and uncertainty
3. Vulnerability and imbalances of wealth, resources and scale
4. Values, ideologies and social empowerment
5. Disasters and geopolitical risk
6. Hazard and risk assessment under uncertainty

This framework proposes a focus on the relationships between the above-mentioned components of disasters, rather than an emphasis on the search for a singular root cause of disasters. Donovan (2017) recommends that research programmes incorporate the full range of sciences (social, political, physical and medical) in collaboration with each other. While recognising and utilising the diverse epistemological approaches of each science, there ought to be a further recognition of the differing dynamics of power and knowledge that permeate the DRR assemblage, outlined in the six points above.

3.6. Conclusion

In this chapter I examined a few approaches to knowledge processes, paradigms, substantive assertions, and assumptions of researchers to illustrate how they are manifest within DRR and disaster studies. I have examined RCT, EUT, and heuristics because they influence and bear on DRR decision-making processes. A closer look at the nature of decision-making reveals the assumption that agents are all rational; however, individuals are not as rational as often assumed. Hence, in DRR decision-making, if experts assume that all people act in set ways, since that assumption is simply false, multilevel DRR efforts will not achieve their goals.

In the examination of standard decision models and rational theories, I found shortcomings in addressing hazard and risk contexts, particularly when attempting to apply generalised heuristics with high margins of error to high-stakes contexts; by using deliberate System 2 thinking and processes for testing, the margins of error could be reduced. After testing, DRR knowledge could be distilled and simplified into heuristics once the margin for error has been reduced. In order to effectively apply DRR knowledge in the form of heuristics, decision-making contexts should include considerations of diverse backgrounds and geography including cultural diversity, social variation, and political dimensions. However, current formulations, like Gigerenzer's (2008) 'ecological rationality', do not directly account for these factors in decision-making environments. Instead, generalisation is the favoured approach in order to have a single heuristic that can be very widely or universally applied. However, applied case studies show how more than a single heuristic is often required, and further System 2 processes are needed for functioning beyond the single-generalised-heuristic usage in decision-making contexts. Generalisation for universal applicability is not the best option for DRR efforts that require context-sensitive application.

The task of research programmes incorporating a fuller range of sciences and knowledge types requires an innovative synthesis wherein varied dimensions of hazards issues can be integrated in an internally consistent way with broader environment and 'development' goals (White et al., 2001). Weichselgartner and Kelman (2015) emphasise structural and socio-political processes while acknowledging societal differences that need to be acted upon, and they also emphasise the need for greater reflexivity in research. These authors, and others discussed in the chapter, like Gaillard (2021), also strongly recommend co-designing knowledge. While I endorse the concepts of co-design, co-production and hybrid forms of knowledge (I will return to this point in Chapters 7 and 8), I do not endorse some of the current methodologies and frameworks that claim to be inclusive but do not meaningfully include or value other forms and sources of knowledge from different epistemologies of risk; I will critique this in Chapter 4.

Chapter 4

A Critical Analysis of Generalisation for Universal Applicability within DRR and for PAMs

4.1. Introduction

Despite more than 40 years of research and guidance from researchers and practitioners who have developed frameworks and tools from the vulnerability paradigm's perspective (Wisner, et al., 1976; Waddell, 1977; Hewitt, 1983; Wisner, 1995; Bankoff & Hilhorst, 2009; Mercer et al., 2009; Mercer, 2012; Gaillard & Mercer, 2013; Weichselgartner & Kelman, 2015; Donovan, 2017; Baumann, 2020; Chmutina et al., 2021; Gaillard, 2019, 2021, 2022), current approaches to landslide risk reduction still follow technocratic and hazard-centric approaches of acknowledgement of vulnerability, while omitting integration and socio-political 'development' data, or co-production/hybrid forms of knowledge. Hazard-centric research (which asserts that disasters are the results of extreme, rare natural events, and that due to insufficiency in risk perceptions of affected people, they fail to 'adjust' to these events) emphasises social culpability or blame rather than the environment within which decisions are taken, or the reasons due to underlying causes. "[R]esearch which focuses almost exclusively on the disaster end of the spectrum tends to **increase emphases on the search for both social culpability or blame**; description of the physical risks involved; and the **emergency and short-term** humanitarian response" (White et al., 2001, 85).

Instead of allocating blame to marginalised people because of their apparent insufficiency in risk perceptions, vulnerability paradigm perspectives have attempted (some accounts of this are detailed in Chapter 3) to understand the underlying issues and combine forms of knowledge to collectively achieve DRR. Vulnerability perspectives attempt to shift the focus to people marginalised within daily contexts. However, researchers and practitioners from within the vulnerability paradigm are reflexively and critically assessing whether the paradigm is achieving its goals (Qasmiyeh, 2015, 2018; Fiddian-Qasmiyeh, 2019; Gaillard, 2021).

In this chapter, I first analyse hazard-centric and vulnerability paradigm perspectives and find that both use generalisation for universal applicability of concepts, methodologies, and

a dominant Western construction of DRR epistemology. Second, I extend the analysis of generalisation for universal applicability further to Protective Action Measures (PAMs) used within DRR as a type of heuristic or simplified rule, signalling appropriate actions to take during events like earthquakes. However, I argue that generalisation for universal applicability, especially with regard to PAMs, is antithetical to the awareness of disasters as social constructs. The generation and dissemination of DRR knowledge, which includes PAMs, requires a context-sensitive and specific approach as societies world-wide are not homogeneous, and thus dominant generalised DRR concepts, methodologies, and epistemologies are problematic. Therefore, the practical applicability of PAMs in DRR contexts requires a critical analysis. I then give a synthesis.

4.2. Analysis of Shared Issues in Hazard and Vulnerability Paradigm Perspectives

Vulnerability proponents claim that disasters are social constructs; however, they also (just as the technocratic proponents do) resort to concepts, methodologies, and epistemologies that are taken as universal (as initially set out in Chapter 3). Concepts like ‘disaster’, ‘vulnerability’, ‘resilience’ and ‘risk’ are used and applied in world-wide contexts, assuming they assist in understanding or knowing how varied cultures and societies make sense of ‘natural hazards’. This is antithetical to perspectives of disasters as social constructs. Gaillard (2021) argues that part of the universalising issue stems from concepts like ‘disaster’ being a Western invention; this is the common Western heritage of both paradigms.

Is there such a thing as a disaster? The answer is inherently subjective and contextual and it will be up to whoever dares to take our agenda forward to try to answer the question in their own unique context. Our contention, though, is that there may be no easy answer for the very reason that disaster, like any other concept in the Western world view, is an invention (Gaillard, 2021, 194).

The Western technocratic paradigm endorses power asymmetrically by endorsing the knowledge generation and dissemination processes, which sustain rather than challenge Western hegemony. The vulnerability paradigm endorses the very same processes, which are problematic. “Without critical reflection of such legacy, we risk creating knowledge that has no substance in the real world” (Yadhav et al., 2022, 177). Universality was not the intended goal of the vulnerability paradigm, which began with the idea of moving away

from Western scholarship, and in particular the technocratic paradigm, rather than replicating the same issues.

We were encouraged, therefore, to embark on an epistemological journey [...]. We were meant to challenge the hegemonic rules and values of Western science that were underpinning the whole transfer of knowledge and technology associated with the then dominant strategies to reduce the risk of disaster; strategies embedded within the broader neo-colonial relationships imposed by Western governments on the rest of the world (Comité d'Information Sahel, 1975; Copans, 1975; Said, 1978, in Gaillard, 2021, 44-45).

To re-align with some of the original goals, changes are required in current processes of knowledge generation, dissemination, and implementation. Without this re-alignment both the vulnerability and technocratic perspectives fail to adequately address disasters as social constructs. Therefore, both paradigm perspectives currently reinforce predominant Western notions, which take different forms that I will examine here.

The translation of scientifically produced knowledge into practicable action by policymakers and end-users is troublesome. Sometimes the knowledge produced is used to inform scientific or governmental policies, or in some rare instances, actually offered, albeit in its original specialist, academic language, for others to make sense of and possibly use through novel open-access publishing and the like.

In disaster situations, the dilemmas inherent in the relationship between science and policy seem to be intensified. Disasters accelerate the policy domain's need for speed, which is contrasted by the science domain's need for time, reflection, and thoroughness. While policy changes, informed by scientific insights, might come about in the wake of disasters and emergencies, research suggests that this is not necessarily always the case (Birkland, 2006, in Albris, 2020, 5).

Academic culture and processes, especially the 'publish or perish' model of academic life is dispersed world-wide (Altbach, 2013). Emphasis is placed on having English publications in endorsed journals; "it is possible that the most concerted motivation of academic publishing, although certainly not the most idealistic one, is for personnel (sic) reasons: to gain a post, a promotion, or job security by demonstrating to colleagues that one is a prolific scholar" (Alexander et al., 2021, 9).

In the Western research model, to consider other forms of knowledge as real, worthy of being heard and appreciated, the requirement is usually that it needs to come from another similarly qualified expert in the field, through peer-reviewed publications (Alexander et al.,

2021). Otherwise, the source of that knowledge becomes questionable, often disregarded, and is unable to be academically referenced according to the current system of knowledge production (Wisner, 1995; Gaillard & Mercer, 2013; Albris, 2020; Gaillard, 2019, 2021).

Research productivity and quality standards are measured with reference to disciplinary peer-review quality assessment processes, and the quantity and impact status of peer-reviewed publications (Buwalda et al., 2014). In order for the transfer of knowledge to be functional, a normative system of standardised DRR terms, policies, and actions is required.

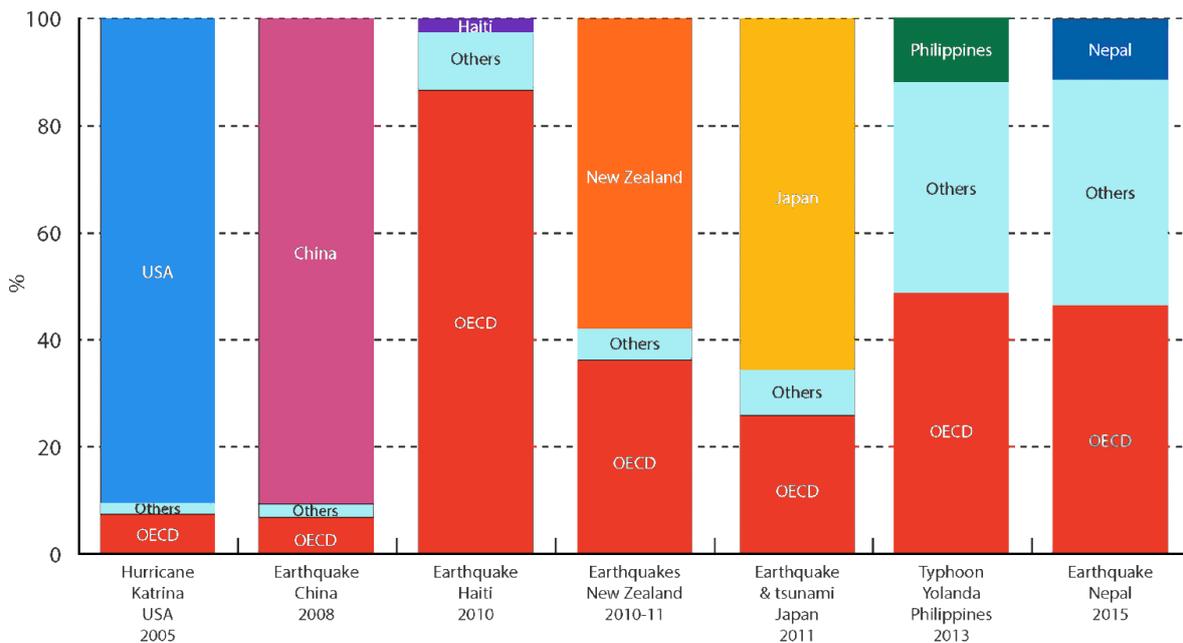
The underlying issue is how to deal with uncertainty:

The problem of terminology merely reflects one aspect of a much deeper problem: uncertainty. As science and research runs on intellectual contestation and critique, and thus contingent and **uncertain knowledge**, it is often difficult to provide clear-cut conclusions to decision makers and policymakers in the transfer of knowledge from one domain to another (Albris, 2020, 7).

The issues of terminology go beyond definitional inquiries requiring reflexive understanding of knowledge and power structures within DRR; “the hegemony of Western knowledge in disaster studies supports normative and standardised DRR policies and actions, which in many instances fail to consider the diverse realities of very different local contexts around the world” (Gaillard, 2022, 2). The current working definitions of disaster and DRR are a predominantly Western construct (Bankoff & Hilhorst, 2009; Pelling & Dill, 2010; Kelman, 2018; Gaillard, 2019, 2021, 2022) to such a large extent that when disasters in non-OECD countries occur, it is chiefly OECD scholars that research, write, and publish about non-OECD countries’ disasters, rather than local scholars from within non-OECD countries.

This clearly reflects the compounded Western hegemony in disaster studies.

Figure 4.1. Unequal distribution of authorship (based on affiliation of lead authors) for the seven disasters that stirred the greatest interest between 2005 and 2015. Reproduced from Gaillard (2019, S10; colour added) using data from Scopus.



Likewise, Petley (2012) and Froude and Petley (2018) have documented the mismatch between where landslide studies have been focused and the nationalities of the study authors. “The spatial distribution of landslides is heterogeneous, with Asia representing the dominant geographical area” (Froude & Petley, 2018, 2161). Although Asia experiences the highest number of events, 75% of landslides, Asian researchers are not the dominant academic authors.

However, research from the perspective of the vulnerability paradigm was meant to enable local scholars to lead research within their own countries (Lewis, 1979), or research driven by local people through genuine participatory research outside the academic environment (Wisner et al., 1977; Gaillard, 2019). I endorse this initiative of enabling local scholars to lead research within their own countries in order to produce context-sensitive knowledge, which I include in my own proposal in Chapter 7.

Local researchers were meant to study disasters on their own terms using indigenous perspectives and concepts. Consequently, research was to be moved away from the silo of Western science and academic institutions, whose role, beyond their surrounding localities, was supposed to shift from drivers to supporters. We were all to acknowledge that local researchers and people affected by disasters are as good and capable as Western scientists, and that their views

could underpin indigenous and context-specific initiatives to reduce the risk of disaster and support their demand for action by the state (Gaillard, 2019, 59).

Nevertheless, Western domination persists and perpetuates in the generation and dissemination of *acceptable* knowledge that has to be in the English language (Contesi & Terrone, 2018; Schwitzgebel et al., 2018; Pérez, 2018; Pronskikh, 2018; Schliesser, 2018; Glock, 2018; Chiesa & Galeotti, 2018; Khan et al., 2022). This disadvantage has not yet been sufficiently addressed, although some recent initiatives like the *Barcelona Principles for a Globally Inclusive Philosophy* acknowledge the issue (Contesi et al., 2021). “The use of the English language similarly prolongs the hegemony of the West” (Gaillard, 2021, xvi). Anglophone traditions of international academic publishing marginalise scholars whose native language is not English (Canagarajah, 2002a, 2002b; Alexander et al., 2021; Khan et al., 2022). Alexander et al. (2021) identify three major challenges.

First, in engineering, medical, and social sciences, articles are “expected to follow standardised formats structured around an introduction, a review of the literature, description of methods, presentation of findings, discussion, and conclusions” (Alexander et al., 2021, 12). Some journals explicitly mandate that manuscript submissions conform to this format. This excludes other traditions of academic writing and explains why many social scientists, adept in structuring their articles very differently, struggle to gain acceptance in Anglophone journals (Canagarajah, 2002a).

Second, non-Anglophone scholars must filter their original ideas through English translation which entails losing the essence of arguments for fitting into Anglophone concepts and frameworks (Cf. Gaillard, 2021). Non-Anglophone scholars often have to use alien concepts and terminology to potentially increase citation of their work (Alexander et al., 2021).

Third, non-native English scholars must often rely on very expensive services of translators and editors, associated with commercial publishers. Such costs are unsustainable for researchers based in less affluent countries. Further, publishing, although more flexible, is not free of charge, and newer models of open access are required (Schiltz, 2018; Alexander et al., 2021).

Furthermore, non-native speakers of English are often at the mercy of native English-speaking peer reviewers, who are often harsh in their treatment of errors of grammar, syntax, and usage. Such reviewers may **discredit a manuscript on**

linguistic grounds rather than on its scholarly contribution to knowledge

(Alexander et al., 2021, 12).

Non-Anglophone researchers, such as Khan et al. (2022, 184) in *Epistemological freedom: activating co-learning and co-production to decolonise knowledge production*, express their experiences of the lack of pluralism and inclusion in DRR epistemology, which limits pursuits in obtaining the whole truth:

We have struggled with presenting empirical work in forms that western academia will accept, all the while knowing that there is **so much knowledge that is not accepted or valued** because the format was not the conventionally accepted form, the English utilised was not perfect or the key concepts utilised are not in vogue.

However, many researchers who have a perfect command of the English language are still heavily underrepresented, as evidenced by Figure 4.1, based on their non-Western geographic positioning. Philosopher Ingrid Robeyns (2022) has appropriately recognised and described the long-standing issue, characterising it further as *geo-academic inequalities*. Robeyns (2022) argues that if your mother tongue is Hindi, but you moved to a UK/US elite institute, you can become part of the academic centre; however, if you were raised in India in English, but stay in India and cannot make frequent visits to the UK/US, then having English as a native language does not help much or matter, as the chances are very high that UK/US political philosophers will not know your work. Robeyns (2022, online) makes a recent observation that exemplifies such geo-academic inequalities:

I discovered that the *Oxford Handbook of Political Philosophy* has 23 chapters (the introduction included), of which 20 have been written by political philosophers based in the USA, 2 by political philosophers then based in the UK who have in the meantime moved to the USA, and 1 chapter by a duo of political philosophers based in Oxford. And while this is a pretty striking case, in many if not most handbooks authors from the USA and the UK are numerically dominating.

In *A Geopolitics of Academic Writing* (2002a, 3), Canagarajah critiques the disparity in knowledge gained through data gathering in local contexts, which pales in significance alongside interpretations produced far away (typically in alien institutional or laboratory settings) by foreign teams. “This displays a common Western assumption that though the Third World may have the data, it takes Western academics to theorise about it.” Western academics are likewise the main producers of disaster research, as evidenced by Figure 4.1; therefore, similar issues are encountered. Knowledge produced from data collection by local

academics in 'developing' contexts is not accorded the same significance as Western interpretations of data (rather than primary data) by foreign academics.

Furthermore, English language use has notable impacts for DRR as the international media is biased towards reporting and research in English (UNDP, 2007). This can be exemplified by the number of fatalities the media requires for non-English speaking contexts to become newsworthy and reported as a disaster, as compared to English-speaking mainly Western contexts, which do not require as many fatalities to be labelled a disaster (Ritchie & Roser, 2014).

For every person killed in a volcano disaster, 40,000 people must die in a drought to reach the same probability of media coverage. Similarly, it requires forty times as many killed in an African disaster to achieve the same expected media coverage as for a disaster in Eastern Europe of similar type and magnitude (Eisensee & Strömberg, 2007, 694-695).

Eisensee and Strömberg (2007) studied the influence of mass media and its effects on disaster relief decision-making for the US. The authors found that if disasters occur at a time when other newsworthy events are happening, disaster reporting is crowded out and this affects disaster relief. Their study looked at approximately 5000 disasters between 1968 and 2002. "To have the same chance of receiving relief, the disaster occurring during the highest *news pressure* must have six times as many casualties as the disaster occurring when *news pressure* is at its lowest, all else equal" (Eisensee & Strömberg, 2007, 22-23, emphasis in original).

Few scholars have documented the role of media in driving the allocation of foreign assistance to 'developing' countries. Van Belle et al. (2004) studied patterns of aid allocation in donor agencies and found that disaster aid has tended to follow patterns of reporting in major Western newspapers. The authors found that on average, one article in a Western newspaper correlated with an additional US\$77,000 in aid to a recipient nation.

One might argue that perhaps the media does not matter for DRR because if laypeople were to earnestly search for the facts another medium would be preferable. However, McClure et al. (2015, 16) found the opposite to be true: "the media shape people's mental models of disasters". Studies like Bell (1994) found that the media were the sole source of information on climate change for people in Aotearoa. "For most citizens, knowledge about science

comes largely through mass media, not through scientific publications or direct involvement in science” (Durfee & Corbett, 2004, 130).

Thus, the process of DRR knowledge generation and dissemination (including media) currently assists in perpetuating some of the hazard paradigm’s core and most problematic tenets (Blaut, 1993). The vulnerability paradigm faces similar criticism as it likewise perpetuates, rather than challenges, the issues discussed above. Mainstream DRR research has not moved from the silo of Western science and academic institutions, which remains embedded within broader neo-colonial relationships imposed by Western governments onto ‘developing’ contexts. The sole epistemic focus of DRR remains squarely in Western scholarship without any challenge to hegemonic rules in the knowledge generating and disseminating processes. Western science underpins the whole transfer of knowledge and technology and thus remains the dominant and default strategy for DRR. While a degree of acknowledgement is sometimes made of local researchers and people affected by disasters being as capable as Western scientists, their views are still stifled based on geo-academic inequalities perpetuated by dominant DRR narratives. This is the current epistemic framing within which expert-generated PAMs are developed.

4.3. Protective Action Measures and Campaigns

PAMs are used for DRR as a type of heuristic or simplified rule that signals appropriate action that should be taken during events like earthquakes. ‘Duck, cover and hold’ (DCH) is an example of an earthquake PAM that is widely recommended, universally accepted, and adopted as the best guidance to follow in the case of an earthquake. As argued above and in the previous chapter, generalisation for universal applicability (the assumption that rules can be applied universally across different contexts) could be problematic; therefore, the practical dimensions of this DRR heuristic require deep critical scrutiny on a context-by-context basis. Since I am interested in the contexts of Nepal and Aotearoa (New Zealand), which both endorse DCH, I examine the mechanisms in place (if any) that act as a set of checks and balances to gauge the usefulness, relevance, practicality and/or effectiveness of the PAM. Currently, although it is endorsed in Nepal, there is no literature available measuring or analysing the (un)suitability of DCH; therefore I commence with the available literature in the Aotearoa context.

Large-scale public earthquake drills are one example of a type of PAM to educate the public on appropriate action to take during earthquakes. The largest drill, the International ShakeOut Day, was originally held in Southern California in 2008 and has become an annual event, where businesses, public organisations, schools, NGOs, and the public are invited to participate in regional drills by following instructions like ‘Drop, Cover and Hold’ (Shakeout.org).

Subsequently, a similar event, Whakahaumarū Aotearoa, was organised in 2012 and 2015 (every 3 years¹⁰). McBride et al. (2019) specifically examine and define results of observational studies carried out after Aotearoa’s drills, and consciously shift their examination’s focus and research, exploring a range of barriers to drill performance by using qualitative analysis and specified questioning. Their article specifically examines whether people took the prevalently accepted recommendation to DCH. In their view, “protective action campaigns have merits in that they provide people with actions they can do to increase their chances of survival in a major earthquake or other threat” (McBride et al., 2019, 7).

McBride et al. see the value of PAMs through the idea of ‘positive outcome expectancy’, whereby the belief in an increase in survival chances as a result of specific actions means that people are “more likely to undertake [such] action” (2019, 7). In the case of Aotearoa’s 2012 drill, which resembled the original in California, organisational partnerships consisted of major public service organisations that formed a committee coordinated by the Ministry of Civil Defence & Emergency Management (MCDEM), The Ministry of Health, Transportation, Education, Defence, Internal Affairs, Police, and Fire Services. The ShakeOut drill’s messages were extremely consistent in Aotearoa, across regional and local councils. “The consistency of messages is a key ingredient of successful communication of public education information” (McBride et al., 2019, 4).

In Aotearoa the drills attempt to aid in the development of procedural knowledge, required in performing DCH. Procedural knowledge here refers to knowledge that underlies the physical performance of actions rather than a conceptual form of knowledge. “For the

¹⁰ Thereafter, in 2018, there was a concerted effort to have annual national ShakeOut Drills and practise tsunami hīkoi (evacuation walks) for coastal areas; see <https://getready.govt.nz/involved/shakeout/>

ShakeOut drills, participants are encouraged to ‘drop’, and then find ‘cover’, (e.g., specifically under strong tables/desks) and ‘hold’ onto the furniture” (McBride et al., 2019, 1). The ShakeOut’s focus is on protective action; there may be elements of preparedness messaging (a focus of prior campaigns), but it aims to train people to take specific PAMs, like performing DCH during earthquake drills, to prepare for what to do in real earthquakes (McBride et al., 2019). Other campaigns were held in addition to the ShakeOut in 2012. ‘Get Ready, Get Thru’, another effort the MCDEM managed in 2006, similarly aligned with the ShakeOut’s key messages. The Get Ready, Get Thru campaign was social marketing-based and focused on television commercials, in addition to a website, brochures and emergency planning support for households. Other preparedness campaigns included the ‘Happens.nz’ website (which now redirects to getready.govt.nz), guiding households with suggestions like food, water, and emergency supplies storage.

The ShakeOut drill encourages wide participation of community groups, governmental agencies, and businesses. Participants are asked to sign up online and are informed of an appointed time to DCH, while ceasing other activities. Although drills have large groups of registered participants, it is worth noting that registration does not imply participation to the fullest intended extent, as there are some barriers to drill performance for certain groups of people.

Some regional and local councils considered much caution in holding the drills, particularly for the Waitaha (Canterbury) region, which was highly impacted by the earthquakes and where their devastating effects were still vivid in the minds of local people. The caution stemmed from the trauma experienced and possible triggers that could be set off during a life-like stimulation that so closely resembles the real-life earthquake scenario (interviews, 2019).

Crucially, however, our analysis found that across all participants, regardless of having participated in the drill or not, people were more likely to report the correct action to take in an earthquake when the hypothetical scenario was based inside (51.6% correct), than when it was based outside (14.1%). This difference points to a **potential education gap in the knowledge** of those surveyed [...]. These results highlight the important role of ShakeOut in teaching about earthquake response **behaviour in varied contexts** (i.e., walking outside or driving). (Vinnell et al., 2020, 6).

The development of the 2015 ShakeOut was markedly more 'social' than 2012, using social media platforms like Twitter and Facebook, and media influencers. Aotearoa-based celebrities were highlighted as participants in a YouTube video campaign, including Sir Peter Jackson (director of *The Lord of the Rings* Trilogy, filmed in Aotearoa); videos also aired on national television as commercials. By publicity standards a highly marketed event, it nevertheless drew similar numbers of participants as in 2012, when a single YouTube video was created, in which Dr Kelvin Berryman, a renowned local geologist, explained why Aotearoa is 'so shaky' (McBride et al., 2019).

Why is it that more social media marketing did not convince more people of the importance of participation in drills? Tools like social media channels are only a part of the risk communication process.

The notion of risk communication as a process is too often overshadowed by a singular focus on products such as apps, maps, graphs, games, posters and posts on social media. These can be important tools, but they should have a clear purpose, rooted in a wider strategy that nurtures inclusive, informed and ongoing conversations that support decision-making over time (UNDRR, 2022, 126).

Definitions calling for a more inclusive and interactive risk communication process between individuals, groups, and institutions were published 30 years ago (US National Research Council, 1989). However, most risk communication initiatives currently remain top-down and poorly evaluated (UNDRR, 2022).

Prior to the popularisation of the DCH advice, people were advised to get into a doorway/under a door frame (USGS, 2019). "For example, official advice to stand in doorways has historically been given in NZ, while other countries with less stringent or less earthquake-focused building codes do encourage immediate exit of buildings" (Vinnell et al., 2021, 6). In unreinforced masonry structures and adobe homes, the door frame was sometimes the only thing left standing in the aftermath of an earthquake. This was based largely on old photographs of doorways still standing in otherwise collapsed buildings (Andrews, 2018). Therefore, it was thought that safety could be found by standing in doorways. However, in modern homes doorways are not stronger than the rest of the house and usually have doors that swing and can cause injuries. Thus, since about 2009, this is no longer recommended, being outdated and offering insufficient protection (USGS, 2009). However, the Waikirikiri (Darfield) Earthquake happened at 4:00 am and most injuries were

caused by people getting out of bed and moving to doorways/frames (Johnston et al., 2014). Moreover, Subedi et al., 2020 and Subedi & Hetényi (2021, 11) still recommend this for the context of Nepal: “if one is on a higher floor, it is better to hide under a strong table or doorframe”. Without research and testing in local contexts it remains unclear if such advice is suitable for effective DRR in Nepal.

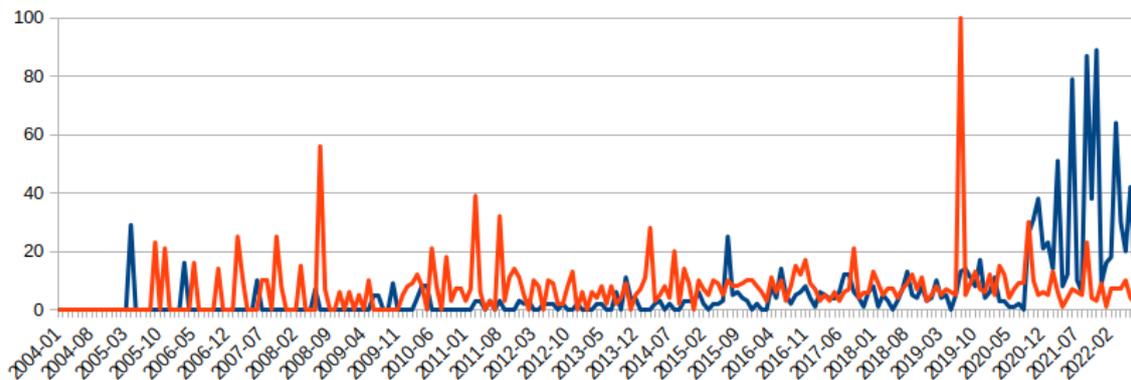
In a study conducted by Whitney et al. (2004) in Southern California, a context with modern homes, most respondents were still under the strong impression that door frames could offer protection. This indicates that protective action messaging was not yet sufficiently communicated or updated, especially on the (un)safety of doorways to the public until about 5 years later. According to Horspool et al’s (2020), analysis of the 2016 Kaikōura earthquake in Aotearoa, those injured by taking cover in a doorway/frame amounted to 10%.

My Google Trends comparison between the queries ‘duck cover and hold earthquake’ and ‘doorway earthquake’¹¹ (Figure 4.2) shows concerning results. World-wide,¹² English speakers with internet access were still seemingly under the impression that doorways could offer protection, based on their search history. It appears that on average, interest in both queries has been roughly comparable until as recently as 2020, when the DCH query then overtakes the doorway query. This suggests that people were (or could still be) under the impression that standing in a doorway might be an effective earthquake PAM, despite the emphasis put on campaigns advising the use of DCH.

¹¹<https://trends.google.com/trends/explore?date=all&q=duck%20cover%20and%20hold%20earthquake,earthquake%20%20doorway>

¹² There are limitations to using Google Trends. Searches for region-specific information resulted in the response that there is not enough data at hand.

Figure 4.2. Google Trends results for ‘duck cover and hold earthquake’ (blue) and ‘doorway earthquake (red)’. Accessed 4/7/2022, data ranges from 1/1/2004 to 4/7/2022. The y-axis represents relative interest in percentage.



The most popular instance for the search ‘doorway earthquake’ in July 2019 correlates to two earthquake events: the Ridgecrest sequence, Southern California, US, and Batanes sequence, Itbayat, Philippines. Since drills recommending DCH have been held in Southern California since 2008, it is noteworthy that more than a decade later in 2019, people in California were still searching ‘earthquake doorway’ in such a large percentage. This correlates with the findings of Adams et al. (2017) and Kano et al. (2009) where both surveys found that people in California remained misinformed, believing that the doorway is the safest place inside buildings. Adams et al. (2017, 1) assert that despite many years of educational campaigns people have not “completely processed what actions are most important to take during an earthquake”. The reason for this according to Kano et al. (2009, 17) is that “numerous, uncoordinated programs makes it difficult for the public to identify clear and consistent messages on which they can act”.

DCH, which is the almost universal advice given by experts currently, was not as popular historically, nor was it considered something to do in every environment or context to ensure safety (interviews, 2019; McBride et al., 2019). Internationally, DCH messaging was only increasingly used after the first Great California ShakeOut in 2008.

From 2001 to 2008 in Aotearoa, DCH was not mentioned, let alone highly recommended in published literature or pamphlets of recommended activity and preparedness messaging (interviews, 2019; McBride et al., 2019). Only after 2008 did DCH gain popularity and become a widely suggested earthquake PAM in Aotearoa. People did not perform the DCH PAM in 2010 and 2011 earthquakes in Aotearoa because it had not yet been popularised,

which “aligns with the findings that people in Christchurch who were recorded on closed circuit television (CCTV) footage during the 2010 Darfield and 2011 Christchurch earthquakes did not undertake the DCH action. This suggests DCH information had not been made widely available” (McBride et al., 2019, 4). Current campaigns, like the MCDEM’s Happens NZ, have now incorporated DCH. This campaign addresses people’s ‘optimism bias’ – i.e., when people comprehend and expect that a large-scale disaster could affect them but also believe that they will have no issues, and would survive the event, even in cases where no precautions or prior preparatory actions were taken (interviews, 2019; McBride et al., 2019). I will expand on this further in Chapter 6.

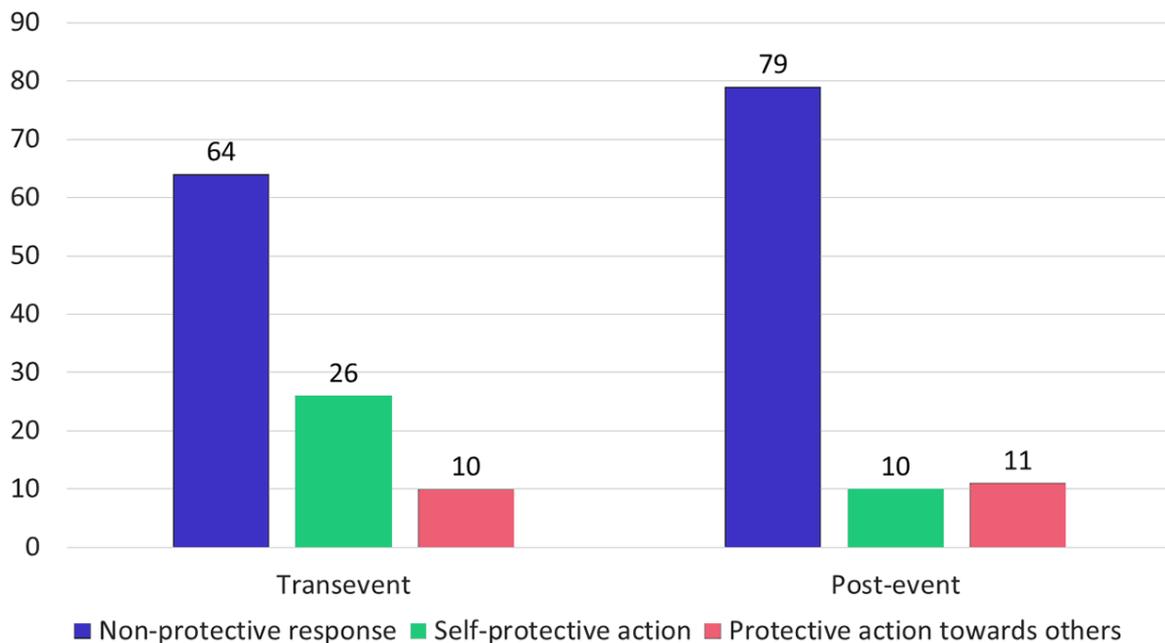
Further research in Aotearoa has evaluated the usefulness of DCH after its promotion through the Shakeout campaigns and examined whether or not its actual performance might be achievable. A series of tests prove that situations during the course of an earthquake may inhibit the performance of DCH. Lambie et al. (2017) found that few people took PAMs. In particular, only 1.3% dropped, and 26% held on to something, which is similar to the findings of Lindell et al. (2016), where only 7.2% took cover during the Christchurch earthquake. “Full actions may not be entirely achievable, depending on the peak ground acceleration (PGA) after the earthquake and shaking intensity felt during an earthquake and further found that it was difficult for people to stand or to move in .5g or greater shaking” (McBride et al., 2019, 4).

Research is needed to establish how long it actually takes to get into the DCH position and to determine whether actions can be completed in a high PGA earthquake with prolonged shaking. Porter and Jones (2018) found that in their sample (size: 525) composed of a diverse group of people (in terms of gender, race, and ages) most took between 5 and 15 seconds from start to finish to DCH entirely. This study was conducted on participants in a non-shaking environment where DCH was practised in response to a fictional earthquake early warning message.

During earthquakes, there is little or no evidence that demonstrates that people hold the DCH position for the entirety of the shaking. Lambie et al. (2016) found that in the Darfield and Christchurch earthquakes, most people did not start in the DCH position, and if they did, they did not stay for all of the shaking (McBride et al., 2019, 6).

Moreover, behavioural studies from surveys and analysis of closed-circuit TV footage in Aotearoa revealed that during earthquakes, the most common action was freezing, and less than 20% of people used the recommended DCH in the 2016 earthquake, while no one performed DCH in the footage from the Christchurch earthquake (Horspool et al., 2020; Vinnell et al., 2022).

Figure 4.3. Transevent (during) and post-event behaviours during earthquakes in Aotearoa, evaluated and analysed by Vinnell et al. (2022, 1647; colour added). Y-axis shows percentage.



In addition to this, not everyone felt catered for in the 2012 and 2015 ShakeOut; this is highlighted as a problem for drill participation (interviews, 2019). Tipler et al. (2016) suggest that future messaging should include needs-specific training encouraging people with disability and fragilities to learn, practise, and use a tailor-made PAM. If tailored messages with instructive pictograms were provided, a greater number of people with disabilities may participate. Currently, on the official website of the ShakeOut there is no specific advice and instructions offered that cater for people with disabilities who would like to participate in the drills, although the Get Ready website does offer advice on preparation for earthquakes for people with disabilities. The Royal Aotearoa Foundation of the Blind has a guide for people with sight impairment (made available through the Get Ready website).

One of the most common reasons for not using DCH is prioritising other actions. Vinnell et al. (2021, 6) report on some actions that were likely “intended to protect the individual

including going outside, standing in doorways, or following building procedures. Some of these actions are likely influenced by conflicting messaging". Vinnell et al. (2020) recommend that future drills should address the issues and gaps currently observed in public knowledge and action.

In the current epistemic framing, in which expert-generated PAMs are developed, PAMs are used for DRR as a type of heuristic or simplified rule signalling appropriate action to take during events like earthquakes. DCH is widely recommended, universally accepted, and adopted as the best guidance to follow in the case of an earthquake. Generalisation for universal applicability can be problematic; therefore, the practical dimensions of this DRR heuristic require further research and understanding of impacts on a context-by-context basis. In the Aotearoa context, which endorses DCH, DCH messaging only became popular after 2008. Before the shift to DCH messaging, taking 'shelter in doorways' was popular, although this is no longer recommended. Nevertheless, this advice is still offered as a PAM in the context of Nepal, and English speakers worldwide seem to still have the impression that doorways may offer protection during an earthquake event. This means that beyond the testing for suitability that is required for PAMs in different contexts, protective action messaging requires further research and understanding to improve and achieve effective DRR communication.

4.4. Critical Analysis of Landslide PAMs

Research investigating the vulnerability of people to landslides is rare (Glade, 2003; Lin et al., 2017; Massey et al., 2019) yet protective actions during landslide events are a critical component of landslide risk reduction (Davis et al., 2020; WGS, 2017; WGS & DOGAMI, 2015, Pollock & Wartman, 2020). As pointed out in the Introduction, in this thesis I focus on published research on PAMs for co-seismic landslides.

While earthquake PAMs are widely known, in a systematic review of recent work on DRR PAMs in general and in Nepal more specifically, only two published papers that address PAMs for co-seismic landslides were found: Milledge et al. (2019), which is generalised (for wide applicability) but implied for possible use in mountainous Nepali areas, and Pollock & Wartman (2020), which is generalised for use. Furthermore, these papers do not refer to previous work on providing guidelines for PAMs, nor does Pollock & Wartman (2020) refer

to Milledge et al. (2019). The total pool of papers I can draw on is thus limited to these two papers.

This initial step of deconstruction from within and through text is therefore necessarily to be completed, challenged and expanded by perspectives from the non-Western world [...] to question and challenge the hegemonic rolling-out of both Western discourse on disaster and the imperialist dispositif of DRR in places where they do not make sense (Gaillard, 2021, xvi).

I will critically examine and analyse these recent publications as examples of universal and technocratic discourses in prescribing landslide PAMs to highlight the impacts they have.

4.4.1. Pollock & Wartman (2020)

Pollock & Wartman (2020), in *Human Vulnerability to Landslides*, develop a data-driven tool for use in landslide risk assessments to estimate an individual's probability of death based on landslide intensity. They also suggest some practical actions to reduce personal risk. The authors use statistics from sets of public records of individuals who have experienced landslides. While not conducting their own fieldwork, the fatality data set used was constructed by the authors by recording basic information about landslides, structures, and individuals. Their data set included "334 exposed individuals in 95 impacted buildings and 38 unique landslide events between 1881 and 2019" (Pollock & Wartman, 2020, 4), a duration of 138 years.

The authors aim to hazard-centrally quantify 'human vulnerability' for use in landslide risk assessment and analysis. "The natural sciences focus on **physical vulnerability**, which quantitatively describes the degree or probability of tangible damage, injuries, or deaths on a scale from zero (none) to one (complete). Physical vulnerability is a fundamental component of risk analysis" (Pollock & Wartman, 2020, 1). The authors present a human vulnerability curve, which links individual probability of death to landslide inundation depths. According to Pollock & Wartman (2020), there is no correlation between the probability of death and landslide inundation depth within the 0.9-5.9 m range, which leads them to infer that human behaviour must be the controlling factor on survival. Since human behaviour affects vulnerability at inundation depths of 0.9-5.9 metres, the authors suggest a set of PAMs to reduce personal risk.

The PAMs in Pollock & Wartman (2020) for minimising vulnerability (according to their definition) involve three distinct categories of actions: that people have performed before, during, and in the immediate aftermath of landslide events. Further they detail two key actions that put individuals at greater risk during landslides. Pollock & Wartman (2020, 10) suggest that specific actions (listed below) may be worth communicating to at-risk populations through educational programmes, since they identify that these actions positively correlate with survival:

Before a landslide event:

1. Be informed about potential hazards and talk to people who have experienced them
2. Move areas of high occupancy, such as bedrooms, upstairs, or to the downhill side of a home

During a landslide event:

3. Escape vertically
4. Identify and relocate to interior, unfurnished areas
5. Open downhill doors and windows

If caught in landslide debris:

6. Continue to make noise and motion

Conversely, we also identified key actions which put individuals at greater risk:

1. Opening a door out of curiosity
2. Sheltering behind or beside large furniture

Although Pollock & Wartman (2020) recently noticed an emphasis placed on ‘vulnerability’ as a primary driver of disasters, rather than hazards, their approach and particularly their interpretation of vulnerability still lies squarely in the technical DRR corpus. According to Pollock & Wartman (2020, 1) vulnerability “is the potential to *suffer harm from a human perspective*” (emphasis in original). The emphasis on vulnerability as a primary driver of disasters has not surfaced recently but has largely been the focus of the proponents of the vulnerability paradigm for over 40 years already. The authors’ definition of vulnerability differs from the definitions and meanings conveyed by the vulnerability paradigm perspectives, as it only considers physical harm, such as blunt-force trauma. Nevertheless,

Pollock & Wartman's (2020, 1) use of "a recent emphasis on vulnerability as a primary driver of disasters" requires some epistemic unpacking. If one uses the definition that the authors provide, this would then read: 'the potential to suffer harm from a human perspective' (as taken from the definition quoted above) is a primary driver for disasters. However, I am not convinced that this is what the authors are trying to convey, since that implies that physical harm, such as blunt-force trauma, is a primary driver for disasters. This definition then simply collapses to standard technocratic definitions without reflecting their purported emphasis on vulnerability. The authors' definition of vulnerability would require adjustments to encapsulate why the authors think vulnerability is a primary driver for disasters. "If we choose not to uncritically accept disasters as natural or technological, then we need to promote new analytical frames" (Knowles, 2014, 773).

Moreover, the authors use 'economic development' as an indicator of vulnerability, which is a crude measure. An economically 'developed' nation can have some residents that fare poorly economically, while some residents of 'developing' nations can be astronomically wealthy. Therefore, it is a possibility that wealthy persons in 'developing' nations may be significantly better off than poverty-stricken persons in 'developed' nations. Therefore, economic 'development' would not be the best indicator of vulnerability.

Pollock & Wartman (2020) incorporate actions from people's past experiences to offer evidence-based advice. Nevertheless, the authors recognise that their data set is not representative of other geographic areas, apart from 12 countries (most of their data comes from the USA). "Due to the specific inclusion criteria, the data set is not representative of global landslide-human interactions and is subject to reporting bias based on the existence of English language media accounts and academic studies" (Pollock & Wartman, 2020, 5). They also acknowledge shortcomings with using an English language only search and therefore receiving the results of intense US research, which results in reporting biases. "Reporting bias is especially pronounced when considering countries by the United Nations threshold of economic development" (Pollock & Wartman, 2020, 5).

The authors' awareness of languages other than English is good; however, they do not take action to ensure that they are not part of the problem. Thus, this acknowledgement communicates the current status quo of the media bias towards English language reporting

and English language research, which in turn now informs their data. This is a reinforcement of the current status quo and has impacts for landslide DRR and particularly research for developing PAMs.

These biases have some significant consequences in terms of the applicability of the results of the study in the construction of their PAMs. A title like *Human Vulnerability to Landslides* has the connotations of being a very broadly applicable paper. This sets the reader up for very different expectations if it was not intended to be generally or universally applicable. Perhaps the title could instead reflect the narrowly applicable range of specific subjects and geography for a more accurate reflection of the data used. This is at least one step that the authors could take to more accurately portray the limits they have chosen via specific inclusion criteria due to English language searches and research. As the majority of data is from the US, this could then be explicitly stated.

In addition to the very broad title, the authors seem to see their findings as general patterns, which they do not specifically recommend for any region or geography. This is made more explicit in the conclusion where the authors assume that preconditions for actions they propose are 'readily accessible'. These are examples of generalisations.

At intermediate inundation depths, human behavior is the most significant factor in landslide mortality. Hazard preparation, situational awareness, and informed protective action such as moving to a higher floor or a prepared refuge space are potent and readily accessible means of lowering personal landslide risk (Pollock & Wartman, 2020, 13).

The exclusion of extreme cases of complete mortality or complete survivability leads to a narrower view of what actions are possible or feasible, but also to discounting cases where human action is not sufficient for survivability. By the exclusion of extreme cases of complete mortality or survivability, the range of applicability is limited to landslide events only wherein survivability is possible. Therefore, there seems to be some circularity in the argument, as the specified range of medium-sized events is chosen for 'survivability' and the authors recommend actions because they 'positively correlate with survival'. How can one ascertain if it is precisely due to behaviour alone that participants survived?

While Pollock & Wartman (2020) argue that this bias in their model is not statistically significant, it is important for the issue at hand, of how to devise actionable guidelines.

News reports that include inundation depth are infrequent unless the event is particularly noteworthy, such as cases of partial burial or dramatic rescues, or contains other human-interest elements. Thus, we anticipate the **underrepresentation** of extreme low- and high-intensity events associated with total survival and total mortality, respectively. We do not believe the reporting bias systematically affects the results other than understating the fit of statistically derived vulnerability curves at the extremes (Pollock & Wartman, 2020, 3).

Another problem with the argument that human behaviour is the primary factor in landslide mortality, which at best can be argued for medium-sized events, is that this argument remains vague without offering the reader any context-sensitive information about the people that comprise the data sets. In locations that are prone to the extreme cases of almost complete mortality, these guidelines might be superfluous, because human behaviour would not be the factor that individual survivability is dependent on. Instead, in those cases (or all cases) systematic preparedness, governance, and infrastructure—a form of intervention highly anchored within the vulnerability paradigm—would be more important factors. In such cases, factors for minimising risk prior to landslide events might require much more focus in order to lessen the chances of fatality during events.

Pollock & Wartman (2020) recognise that subjective expert knowledge and judgement without considering the role of human behaviour is not an effective approach to estimating human vulnerability to landslides. However, human behaviour alone cannot be relied on to minimise landslide risk, especially when there are generalisations about human behaviour drawn from data that has been selected in ways that introduce biases. This has repercussions on the kind of advice the research provides; in particular, whether this advice can be generalised or used in specific circumstances. It is worth noting that Pollock & Wartman's (2020) practical actions to reduce risk are offered categorically, without taking into consideration the circumstances where people are in a position to use them. For example, to 'Escape vertically' is not given conditionally: the advice is not of the form, 'if X, escape vertically'. It is a categorical statement of what one should do during a disaster event. Therefore, this advice cannot be followed in every circumstance during a landslide event.

Education and awareness campaigns are useful tools for risk reduction strategies, which work well when rigorously tested for context-specific locations, with participants, and when

researchers might be able to observe and possibly inquire about the behaviour of participants to better understand their DRR decision-making processes. This was discussed in detail in Chapter 3, regarding System 1 and 2 approaches for higher-stakes scenarios. Moreover, rigorous testing provides opportunities to understand and observe how PAMs and DRR messaging are practically applied, and if there are cases of misapplication, or any other issues with communication or implementation. Testing could take the form of 'drill-like' scenarios with participants. Pollock & Wartman (2020, 13) acknowledge the need for hazard awareness to have clearer communication and cite a case study which produced the opposite result of the intended DRR messaging.

... public outreach and advisories must be **unambiguous** for their intended audience. In the days leading up to the 2018 Montecito debris flow disaster, **different risk perceptions** between **scientists**, **emergency managers**, and the **public** led to a **false sense of security** among residents of a designated 'voluntary evacuation zone' (Hayden, 2018a). During the debris flow event, an **ambiguous** emergency SMS message instructing residents to '**go to high ground**' led some individuals to **evacuate their homes only to be swept away** (Hayden, 2018b)

While Pollock & Wartman (2020) recognise the scope for errors and issues in the processes of DRR knowledge production, dissemination, and implementation, they do not subject their PAMs to any form of testing, like a drill sequence, or any other form/means of practical testing. The major implications of not testing PAMs are twofold: first, it remains vague and unclear whether the recommended PAMs can be practically applied in context-sensitive higher-stakes scenarios. In the case above, the ambiguous emergency message is a type of PAM, in the form of a simple instructing heuristic. However, because of the prior miscommunication and resulting ambiguity, the heuristic, even though simple, fast and frugal, had the opposite effect to the intended outcome (i.e., increased risks of fatalities).

Second, if PAMs are applied in particular contexts and they yield the unintended opposite result, like the case study above did, who should be held accountable for this? Are the duties of the government in terms of the overall accountability and responsibility for DRR, as outlined in the SFDRR for example, still applicable? If misconceptions arise between scientists, emergency managers (who could be employed by governments or NGOs) and the public, it is unclear who is accountable and responsible for the impacts and outcomes. However, if experts and scientists generate and disseminate DRR knowledge without it being rigorously tested, and this leads to the opposite outcome of fatality rather than risk

reduction, then at the very least this is a case of irresponsible epistemic agency that could be epistemically criticisable and blameworthy as set out in Chapter 2.

Moreover, it is problematic to assume that because a certain group of people from a limited data pool behaved in a certain manner in the past (starting from 1881) that people across different locations might conform to a universal, uniform, and unified behavioural pattern. Human behaviour should be studied for developing context-specific PAMs and testing the application of those PAMs in that specific context. Caution should be exercised in applying knowledge developed for a particular context for broader application without considering diverse factors such as culture, socio-political, and economic factors, and the resulting impacts of applying non-contextually developed knowledge.

4.4.2. Milledge et al. (2018, 2019)

I focus particularly on Milledge et al. (2018, 2019), who specifically deal with co-seismic (and rainfall-induced) landslide guidance for mountainous regions in Nepal, and fundamentally because my thesis aims to offer an open space to consider what an inclusive and context-sensitive approach for future research in mountainous Nepali communities should include. See Figures 4.4 and 4.5, which show the typical conditions for the areas where these rules might be applied. I therefore analyse and critique the discourse and underlying assumptions inherent in this attempt to offer data-based rule knowledge. Milledge et al. (2018) is a policy briefing based on the work of their (2019) paper, and the briefing offers simple guidelines that are PAMs. The explicit goal of the (2019, 837) paper was to: “develop simple rules to minimise exposure to co-seismic landslide hazard that are understandable, communicable and memorable, and that require no prior knowledge, skills or equipment to apply”.

The three simple guidelines (Milledge et al., 2018, 4-5) to minimise exposure to earthquake-triggered landslides are:

Guideline 1: Minimise the angle from your current location to the skyline

Guideline 2: Avoid steep (>15°) channels with many steep hillsides (>35°) upstream

Guideline 3: Minimise the local slope, but not at the expense of increasing skyline angle (guideline 1) or exposure to steep channels (guideline 2)

Figure 4.4. A settlement on the way to Listi, showing angles from horizontal line to skyline, typical for most settlements in the central mountains (Photo credit: author, 2017).



Figure 4.5. Listi village, located along steep hillsides with high slope angles (Photo credit: author, 2017).



According to Milledge et al. (2019, 837), landslide risk is “primarily mitigated by reducing exposure”, a hazard-centric focus of a technical paper for landslide risk reduction experts. However, Milledge et al. (2019, 839) claim that they “have begun to explore ways of expressing these rules in a format that is more accessible to a general audience”, which is however similarly generated, sans the detailed methods and results, and similarly disseminated through research channels (they are only available from the website of the project). Omission of technical data does not make the technical origin or dissemination of knowledge for use any less technical; rather this remains an “attempt to extract a more general set of rules from landslide data sets across multiple earthquakes” (Milledge et al., 2019, 839). The attempt to offer a ‘more accessible’ format might perhaps be more academic ‘reader-friendly’ but does not actually address accessibility or the related concerns of a broader general audience. Moreover, the considerations of who the ‘general audience’ is could lead to one thinking that it is laypersons who the authors describe, but in the policy briefing (2018) Milledge et al. clarify that the general audience refers instead to local governments, NGOs, etc.

No further clarification in terms of definitions is offered for the concepts of ‘hazard’, ‘risk’, ‘exposure’ and other terms which are used without discussion of their parameters. This is problematic because in DRR there is no universally agreed upon definition of terms (Kelman,

2020, Aronsson-Storrier & Dahlberg, 2022), and without clarification, Milledge et al. (2018, 2019) could be read as endorsing a universal understanding of these terms.

Moreover, current working definitions of 'disaster' and related terminology within DRR are predominantly Western constructs (Bankoff & Hilhorst, 2009; Pelling & Dill, 2010; Gaillard, 2019, 2022). Thus, the current epistemology of DRR is problematic when applied to contexts other than the West, which in this case would be applied to Nepal. Therefore, communication of scientific discourse to the policy domain is also made problematic. "Even within scientific disciplines, there is a significant difference in the understanding of disaster and risk terminology (Kelman, 2018), which makes it difficult to communicate scientific discourse to the policy world" (Albris et al., 2020, 6).

Milledge et al. (2018, 2) target this guidance at "those supporting householder and community decision-making in preparing for large earthquakes, choosing locations for houses or key infrastructure, and dealing with potential future landslide impacts (e.g., local government and NGOs)" for the purpose of reducing landslide risk in mountainous regions. This assumes that local government and NGOs should and will perhaps take on the responsibility of disseminating this knowledge to local laypersons. However, governments often fall short in fulfilling their responsibilities towards those they govern, and case study examples from disaster governance were cited earlier in Chapter 3 illustrating this. The assumption that domestic political authorities can achieve DRR is problematic. Presenting scientific advice to a dissemination channel that is in need of repair cannot enable effective DRR. Nevertheless, if I consider Milledge et al. (2018, 2019) more charitably and suppose this channel of knowledge dissemination works well, and these DRR guidelines were offered to laypersons for implementation in local contexts like the Sindhupalchok District in Nepal, several concerns still arise.

First, Milledge et al. (2018, 2019) hold prevailing rationalist understandings and conceptualisations of disaster risk that are steeped in dominant Western narratives. Implicitly assumed perspectives have been accepted without critical evaluation, reflexivity, or acknowledgement and understanding that 'people' are not a homogeneous group. This rationalist approach finds and holds legitimisation in the rigid definitions of rationality that people in 'developing' countries are expected to conform to. Whether they meet those

standards or not, they nonetheless constitute a majority of the population, and furthermore, even within 'developed' countries, there are groups that 'fall short' of those rationalistic standards. This universal approach persists even though the majority of people do not reside in 'developed' countries, and thus do not form part of the 'developing'-universalist DRR context. As Western knowledge is assumed to be superior (Gaillard, 2021, 2022), the further assumption then follows that it must be universally applicable. Laypersons are expected to behave as closely as possible in line with rigid definitions of rationality, to avert the possibilities of being or becoming irrational (going against reason) or arational (outside the domain of reason). Within the Western approach, almost universal applicability is the only manner in which such technocratic measures/ideas can be put forward and published because considering context sensitivity can hold experts accountable for checking even basic socio-political development data and understanding whether such technical fixes might be applicable in different country contexts, or different contexts and environments within the same country.

"Research has shown that these types of simple rules are already to some extent implicitly coded into the decisions that people make (e.g., Gigerenzer, 2008), reflecting tacit knowledge of hazard" (Milledge et al., 2019, 838). As discussed in Chapter 3, heuristics may assist with some forms of decision-making in some contexts but remain subject to our systematic and predictable biases (Bazerman, 2018), which Milledge et al. (2019) do not discuss or critically analyse. There is a distinct absence of engagement with critics of Gigerenzer's (2008) perspectives and no attempt to address or resolve any issues that may arise with endorsing these perspectives in a universal manner across other domains. Rather, there is a top-down endorsement of a particular discourse, that should then be 'rationally' accepted as an expert assertion that holds true in all DRR contexts because 'research' (primarily a Western construct) has to some extent shown its implicit coding. There are significant paradoxes linked to decision-making, which can sometimes lead to severe and systematic errors as judgements are based on data of limited validity, and there are issues with the use of heuristics (Tversky & Kahneman, 1974; Kahneman, 2011) within DRR, as discussed in Chapter 3. Moreover, erroneous use of heuristics in high-stakes DRR contexts can have fatal results. I will expand on this with case study examples in the empirical chapters.

Second, Milledge et al. (2019) is an illustrative example within DRR of OECD scholars who research, write, and publish about DRR in non-OECD countries, reflecting and reinforcing Western hegemony in disaster studies (consider again Figure 4.1). There are no contributing authors from non-OECD countries in Milledge et al. (2019), and authors from the USA and the UK are numerically dominant; out of seven authors, five are from the UK and two are from the US. This is in keeping with the characterisation of current geo-academic inequalities discussed earlier in this chapter. “The production of the text puts the focus on producer, authors, speakers, writers; the reception of the text puts the focus on interpretation, interpreters, readers, listeners [...] we must take account of the institutional position, interests, values” (Fairclough, 2003, 10).

Milledge et al.’s (2018) policy brief does include four persons from NSET Nepal in the list of authors and attempts to present the rules in a format that is more accessible to a general audience. However, I argue that it again chiefly remains an “attempt to extract a more general set of rules from landslide data sets across multiple earthquakes” (Milledge et al., 2019, 839). The authors do not outline or indicate the contributions of the Nepali authors at any stage of the generation, dissemination, or implementation of the briefing, or mention any specific input or insight. This sort of inclusion may at worst be seen as a merely tokenistic gesture because adding or removing the Nepali authors seems to make no difference to the epistemic content of the briefing; there is no indication of what has been contributed by the addition of four persons from NSET Nepal. Without Milledge et al. (2018) offering any indication of substantial and authentic involvement of others, the policy brief can remain a distilling of the technocratic tools developed and presented in the 2019 paper. While this may or not be the case regarding work presented in Milledge et al. (2018, 2019), the texts themselves do not offer any evidence for this to not be a relevant concern.

[T]okenism is a role partnership composed of Token and Sponsor, which together embody and enforce the limitations on participation by members of the underrepresented group in the dominant group. The Token does not become assimilated into the dominant group but [...] is a member of an underrepresented group, who is operating on the turf of the dominant group, under license from it. The institution of tokenism has advantages both for the dominant group and for the individual who is chosen to serve as Token. These advantages obtain, however, only when the defining constraints are respected: the flow of outsiders into the dominant group must be restricted numerically, and they must not change the system they enter (Laws, 1975, 51-52).

Attempts to include personnel in an authentically transdisciplinary manner need to move beyond tokenistic involvement, in which they may have no real voice or power, or perceptible engagement in shaping DRR processes and outcomes, and perhaps be translated into local languages rather than English. Researchers from local contexts should be able to bring in the type of knowledge that is needed, which might be specific, distinctive, and reflect their background. This proposal will be discussed further in Chapter 7. “Often missing in science stories are the contexts (social, economic, political, and historical), as well as information about how science and the scientific process are conducted” (Corbett & Durfee, 2004, 130).

Milledge et al.’s (2018, 2019) approach to DRR knowledge generation and implementation thus still sticks rigidly to the ‘top-down’ production methods discussed earlier, wherein probabilistically based risk analysis by experts is applied in a universal manner, without considering context-sensitivity, or assessing its usefulness for the intended end-users, laypersons. This homogenising DRR strategy utilising global scientific knowledge on landslide hazards has been created by experts for use by mountainous communities based on the tool’s use of probability analysis relative to one’s proximity to nearby mountain slopes (2018, 5). This gap in the scale of knowledge and actions is considered by a number of scholars to be a major obstacle for sustainably reducing disaster risk (Wisner, 1995; Gaillard & Mercer, 2013).

Third, although Milledge et al. (2018, 3) assert the three PAMs are “designed to be understandable, communicable, and memorable; to require no prior knowledge, skills”, there is still an implicit requirement and presupposition that a layperson understand the concepts of an angle, and/or measurement of angles based on hand gesture of distance from horizontal line to skyline. Consider Figures 4.4 and 4.5, which show steep hillslopes as a normal part of the settlements. In mountainous contexts like Sindhupalchok, education in hill tribes/ethnic clans often comes largely from other children (Burbank, 1995), so those presuppositions are unlikely. “Nearly a third of respondents (28.2 %) have never been to school” (Van der Geest & Schindler, 2016, 2348). Moreover, post-disaster disruption to normal education routines stretches over months, and children suffer most from landslide impacts (Van der Geest & Schindler, 2016).

Expected levels of literacy, infrastructure, and access to technology by Western standards, as experienced in OECD countries, cannot be assumed and held true for every place and population (see Figure 4.6). Nevertheless, guidelines developed by Milledge et al. (2018) and tools developed by Pollock & Wartman (2020) inherently assume accessibility to these developments, as well as the ability to read, comprehend, and universally apply the knowledge or implement guidelines, and particularly in Milledge et al. (2018), to be able-bodied. People with disability are routinely excluded from DRR measures that able-bodied people design and disseminate (Alexander, 2012; Kelman, 2015; Gartrell et al., 2020; Ton et al., 2020), as discussed in section 4.3. Since disasters tend to increase the levels of discrimination people with disability face, it would be helpful if they were included in the PAM development processes.

Figure 4.6. A sample of Secondary School (grade 12) examination results, indicating that few students passed (Photo credit: author, 2017).

The figure consists of two photographs of examination result sheets. The left photograph shows a 'MARKS LISTER OF GRADE XII FIRST TERM EXAM 2017' from a Higher Secondary School. It is a table with columns for Roll No., Name of the Student, and marks in various subjects (English, Nepali, Mathematics, Science, Social Studies, Physical Education, Music, Art, and Computer). The final column indicates the student's status as 'PASS' or 'FAIL'. The right photograph shows a similar result sheet from G.P.O. Box 8975 EPC 1171, Nepal, with a similar layout of student names, marks, and pass/fail status.

Fourth, this DRR knowledge seems to target individual decision-making without considering the embedded nature of decision-making within international and national constructs. Milledge et al. (2018, 3) claim that the guidelines are not a replacement for local and other forms of knowledge about landslide hazard and should be used in combination with these. This raises the question of why Milledge et al. (2018), although aware of other forms of knowledge, did not attempt to combine or co-design and produce knowledge where

available, as no evidence signalling the contrary is given. Hybrid approaches to knowledge production and implementation have been advised as a sustainable alternative to rigid ‘top-down’ methods, and guidelines may have a better chance of integration and implementation when local academics and laypersons can be involved in the processes. The technocratic understanding of disaster risk is unable to trace the grounds of human decisions represented in the socio-political and economic structures of society, which cause poverty, vulnerability, and further exposure.

Fifth, Milledge et al. (2018, 838) assert that data-based rule knowledge is “commonly in demand not only from technical users but also from laypeople”. There is no indication of which sector of laypeople have made this demand. This assertion is problematic because members of society are not always a homogeneous group when one considers varied interests, values, motivations, aims, levels of education, backgrounds, socio-political, economic status, etc. The level of exposure to hazards and vulnerabilities faced and the ability to recover from disasters would thus also differ, and therefore perhaps laypeople’s demands also differ. In principle, in order to provide relevant outcomes, end-users ought to be engaged in the decision-making process wherever possible at various stages, including research direction (Beaven et al., 2017). This concern highlights and reinforces the value in employing reflexivity, which involves reflecting on the manner in which research is carried out and understanding how the process of conducting research shapes its outcomes. “The under-consideration of reflexivity on assumptions and values – as well the social norms and practices that sustain them – has been highlighted as a key problem” (Popa et al., 2015, 46).

The narrative that more scientific knowledge and technology are always required and assistive is inherently inconsistent with the existing evidence because numerous case study examples demonstrate contexts wherein adequate levels of scientific knowledge are available, but DRR is not achieved (see Chapter 6). Data-based rule knowledge is based on probabilities that may or may not reach the desired DRR outcomes in specific contexts; “technologies of risk management rarely succeed in pre-empting catastrophe. Aradau & van Munster (2007, 108) conclude ‘their failure is, however, part of governmentality, the very motor of the continuous requirement for new technologies and more knowledge’” (Oels, 2013, 20). Moreover, non-scientific approaches may complement and sometimes replace scientific knowledge (Aradau & van Munster, 2011).

The assumption that required DRR knowledge must come from top-level experts down to the affected, apparently ignorant people is flawed (Gaillard & Kelman, 2018). There are contexts with plenty of knowledge, but that does not automatically equate to use: “enough knowledge existed then and exists now. The problem is putting it to work” (Wisner, 2020, 244). Issues with knowledge generation and dissemination are sometimes manifest in the lack of implementation. According to White et al. (2001, 81), there are four possible explanations for situations in which more is lost while more is known: knowledge

- (1) continues to be flawed by areas of ignorance;
- (2) is available but not used effectively;
- (3) is used effectively but takes a long time to have effect; and
- (4) is used effectively in some respects but is overwhelmed by increases in vulnerability and in population, wealth, and poverty.

Milledge et al. (2018, 2019) completely ignore and exclude knowledge of socio-political and economic development variables; a mere acknowledgement of the existence of vulnerabilities and socio-political issues is inadequate. Using White et al.’s (2001) classification, the problem here is of the second type: there is knowledge available, but it is not used effectively. Therefore, the narrative that more scientific knowledge is in demand and should thus be generated in a technocratic manner does not mean that these DRR efforts would be effective.

A potential response to the critiques of Milledge et al. (2018, 2019) set out above can be formulated along the lines of: the authors are technical experts, who are simply doing their technical aspects of research. The rest of the requirements for inclusion of diverse forms of knowledge/co-production, or hybrid forms, inclusion of development considerations and data etc. can be addressed by experts from other areas of specialisation at other stages of research.

In response to the potential rebuttal, I would say the following:

If Milledge et al.’s (2018, 2019) goal is the development of PAMs specifically for co-seismic (and rainfall-induced) landslide guidance to be used in mountainous regions of Nepal, this research should be actionable. However, Milledge et al. (2018, 2019) do not get to the point where this knowledge is testable, actionable, and achieving DRR. In addition to this the

guidelines are not available in local language or dialects and accessible to people living in mountainous Nepali areas. It is worth also considering whether people value such guidelines and are they prepared to implement or incorporate aspects of it. A potentially related worry is that local people—those who are intended to follow the guidance—do not feature anywhere in the research scope.

Regarding the epistemic intentions, expectations, and attitudes in the epistemic relationship between experts and laypersons (as set out in Chapter 2), if Milledge et al. (2018) are unable to account for testing their guidelines in practical contexts before offering this knowledge as expert-level assertions to laypersons in mountainous communities, then there may be a breakdown of trust and an epistemic relationship impairment. Critically analysing the current epistemic framings within DRR, which sometimes warrants holding experts and scientists epistemically criticisable and blameworthy, can serve the purpose of assisting in the process of creating and supporting more epistemically responsible agents that DRR contexts require.

Moreover, there are still consequences and impacts from the knowledge that DRR experts offer for use even if experts are unwilling to acknowledge them. Milledge et al. (2019) and Pollock & Wartman (2020) seem to acknowledge that PAMs may need to be tailored to make them implementable and usable, but they do not take steps toward achieving this. DRR knowledge that is proactively put through a series of tests, checks, and balances can thereafter be implemented for faster action as simplified, heuristic-like PAMs, rather than bypassing the rigorous groundwork required. Context-sensitive research and knowledge production does not need to be solely attempted or carried out by foreign experts; rather, local experts should be enabled to lead these initiatives with the support of other agents (this is discussed further in Chapter 7). Neither do I expect that technical experts undertake social science, but instead allow local social scientists to assist with the research of those aspects. This is not a panacea, but it is an attempt to foster more inclusive, context-sensitive knowledge generation, dissemination, and use. I re-assert that it is epistemically irresponsible, criticisable, and blameworthy for any expert or institution to publish and disseminate DRR knowledge that has not been tested in ‘drill-like’ scenarios with participants, because of the potential impacts and consequences in high-stakes DRR contexts. If the aspects of the scenario might be too difficult to replicate closely, and actions

too complicated to perform in 'drill scenarios', then they are probably too difficult to perform in actual disaster contexts. If within DRR, PAMs can no longer be said to be about reducing risks, then what is their purpose?

4.4.3 Synthesis

Milledge et al. (2019) and Pollock & Wartman (2020) acknowledge some of the impact of vulnerabilities and exposure, as well as the existence of socio-political issues; however, their approaches still remain hazard-centric as per the hazard paradigm. These technocratic, hazard-centric approaches fail to adequately address the vulnerabilities they acknowledge. Critically, they do not integrate other forms of knowledge (other than the Western corpus) or any of the available data on integrated social, political, and economic factors available within the Western corpus. Thus, the manoeuvre of an acknowledging nod to socio-political issues, exposure, and vulnerabilities without any further related action can at best be described as technocratic with perfunctory manners.

Milledge et al. (2019) and Pollock & Wartman (2020) currently assist in perpetuating some of the hazard paradigm's core and most problematic tenets, reinforcing Western science's hegemonic rules and values. Western conceptions of disaster and DRR still channel a universality approach even though most people in the world do not live in Western countries, and thus do not form part of the Western-universalist DRR context. "Thus, in no way were Western concepts meant to be rolled out in all sorts of settings and locations as the panacea to comprehend and address the root causes of people's hardship" (Richards, 1975).

My critiques of Milledge et al. (2019) and Pollock & Wartman (2020) are not entirely novel, but develop the critiques of philosophers and geographers (outlined in my earlier analysis, and in Chapter 3), applying them to PAMs. My critical evaluation serves the purpose of showing how the currently predominant systems of DRR knowledge production, dissemination, and implementation require an overhaul, rather than the idea of processes and terminology being entirely cast aside. Instead of introducing new terms and concepts, I make use of existing terminology and language to show the inherent issues and underlying assumptions and to highlight the need for transformation in order to be effective in achieving DRR goals.

Case study examples exemplify the great divide that exists between theory and practice; in the chapters that follow, I focus and expand on this idea. There is a gulf of difference between accepting and allowing for DRR measures on paper in terms of contracts, policies, rules of law, guidance, or simple rules that are developed and disseminated, but that are almost never assessed in practical terms of actually achieving their purported goals where theory ought to meet practice. Usually, there are no mechanisms in place to act as a set of checks and balances to weigh and gauge the actual usefulness, relevance, or practicality of DRR measures. By virtue of DRR policies, rules of law, guidance, and other measures being drafted by experts (mainly OECD-based, as per Figure 4.1), they are accepted as reasonable, 'workable' and useful in a universal manner, without the assessment phase to verify the practical usefulness aspect on a contextually sensitive basis.

Moreover, the biases that arise from the use of English as a predominant language for DRR knowledge generation, dissemination, and implementation have impacts and consequences for DRR. Gaillard (2022) acknowledges and addresses the issue of hegemonic English usage by using quotes in original languages in an attempt to preserve the nuances and meanings that are obscured or smothered by translation into English. In Chapter 7, I thus offer texts, words, and concepts in their original languages, simultaneously giving English translations for purposes of coherence and readability of the thesis.

There is no clear-cut process for attempts to produce hybrid or co-produced forms of knowledge, but there is an abundance of guidance, suggested frameworks, and theories from the vulnerability paradigm perspective. However, both paradigm perspectives use universal concepts, methodologies, and epistemologies. Concepts like 'disaster', 'vulnerability', 'resilience' and 'risk' are still used and applied in world-wide contexts, assuming they assist in understanding how diverse cultures and societies make sense of 'natural hazards'. Experts who would like to be more responsible epistemic agents are required to take up the task of breaking away from traditional constructs and challenging hegemonic rules and values underpinning the whole transfer of knowledge and technology associated with dominant DRR strategies that may not achieve DRR goals.

There are examples and case studies (in the next section and Chapter 5) in which experts produce hybrid/co-produced forms of knowledge specific to 'developing' regions; for the

case of Nepal, perhaps the development of an open space to consider what an inclusive and context-sensitive approach for future context-specific research may assist. In Chapter 7, I offer ontologically diverse perspectives that are seldom heard, discussed, or published in traditional academic channels, taking up the task of breaking away from traditional constructs and challenging the hegemonic rules and values underpinning the generation and transfer of knowledge within dominant DRR strategies.

4.5. Possible Challenges to Co-production of Knowledge

I have argued in favour of co-production of knowledge for DRR, and in this section I assess some challenges.

Hilhorst (2004) raises a concern about different local knowledge types, from different domains. Caution is expressed about having utilitarian or instrumental approaches that visualise local knowledge as a barrel that can be tapped for DRM. The second concern stems from the assumption that local knowledge can overcome the separation of nature and culture and thus 'decolonise' researchers' minds. The third concern stresses local knowledge as a source of political-economic empowerment of local people with an agenda based on self-reliance. However, these three lines of thought assume that local knowledge represents a 'homogeneous community stock' that accumulates. Hilhorst (2004) views this assumption as problematic, and I agree that local people and knowledges are not homogeneous. I have discussed generalisation at length in Chapters 3 and 4, and will return to non-homogenising views in Chapters 5 and 7. Hilhorst is concerned that local people can hold very different and even conflicting perspectives. However, because the same can be said for people anywhere, this might not be a critique for using local knowledge but rather a highlighting that this issue can be present there too.

Oliver et al. (2019) criticise co-production on the basis of a cost-benefit analysis of co-produced research projects in the health sector. Oliver et al. (2019, 3) contend that "co-productive research can cause conflict, consume resources, and lead to misunderstandings" (similar concerns have been raised by Flinders et al., 2016). A first response to this concern is that any research can have misunderstandings, consume resources, and cause conflicts; this may be the case for any tasks involving people who hold different views as individuals.

The concern here may be, however, that co-production is more likely to have ill effects than the alternatives. Nevertheless, Oliver et al. (2019) have not shown that this is the case, or that it should be expected for co-production to fare worse than alternatives in these respects. As the authors themselves admit: “We recognise the transformative potential of co-produced research, and also feel that calls to do impactful research are unlikely to go away. If done well, coproduced research processes can – indeed must – manage and alleviate these tensions” (Oliver et al., 2019, 6). As the authors assert, it is a good idea to have a cautious approach to co-production; but proponents of co-production would not have asserted otherwise.

Moreover, there are case study examples of the successes of co-production and hybrid working within the health sector that can be cited, such as the SEARCH Project (CHIP Upenn, 2022) that understandably were not easy to navigate and completely issue-free but have nonetheless offered invaluable outcomes and have had and continue to have long term impacts on local communities.

The field trial of home-based neonatal care was conducted in Gadchiroli, India during 1993 to 1998. Owing to its new approach and the success in reducing newborn mortality in a rural area, it has attracted considerable attention. [This article explains] the background work and philosophy of the organization, SEARCH, which conducted the study. [...] We also hope that sharing this will be of use to other researchers and program managers working with communities in developing countries (Bhang & Bhang, 2005, 83).

Furthermore, the knowledge of how projects like SEARCH have tested and trialled the co-produced forms of knowledge and action is available for scrutiny and a possible enhanced understanding of how other researchers might be able to consider context-sensitive research and testing of knowledge for action in other 'developing' contexts. While Oliver et al. (2019, 3) contend that “co-productive research can cause conflict, consume resources, and lead to misunderstandings”, the SEARCH project seems to have addressed and dealt with such hurdles adequately in order to achieve its goals. If such concerns are dealt with similarly within DRR, especially in the case of PAMs, then PAMs may also achieve their DRR goals more effectively.

4.6. Conclusion

In this chapter, I analysed hazard-centric and vulnerability paradigm perspectives and found that both use generalisation for universal applicability of concepts, methodologies, and a dominant Western construction of DRR epistemology. Vulnerability proponents claim that disasters are social constructs; however, just like the technocratic proponents, they resort to concepts, methodologies, and epistemologies that are taken as universal. Thus, the process of DRR knowledge generation and dissemination (including media) currently assists in perpetuating some of the hazard paradigm's core and most problematic tenets.

Mainstream DRR research has not moved from the silo of Western science and academic institutions, which remains embedded within broader neo-colonial relationships imposed by Western governments onto other non-Western contexts. The sole epistemic focus of DRR remains squarely within Western scholarship without any challenge to hegemonic rules in the knowledge generating and disseminating processes. Western science underpins the whole transfer of knowledge and technology and thus remains the dominant and default strategy for DRR. While a degree of acknowledgement is sometimes made of local researchers and people affected by disasters being as capable as Western scientists, their views are still stifled based on geo-academic inequalities perpetuated by dominant DRR narratives. This is the current epistemic framing within which expert-generated PAMs are developed.

I extended the analysis of generalisation for universal applicability further to Protective Action Measures (PAMs) used in DRR as a type of heuristic or simplified rule, signalling appropriate actions to take during events like earthquakes. However, I argued that generalisation for universal applicability, especially with regard to PAMs, is antithetical to the awareness of disasters as social constructs. The generation and dissemination of DRR knowledge, which includes PAMs, requires a context-sensitive and specific approach as societies world-wide are not homogeneous, and thus dominant generalised DRR concepts, methodologies, and epistemologies are problematic.

Research investigating the vulnerability of people to landslides is rare, yet protective actions during landslide events are a critical component of landslide DRR. Only two published papers that address PAMs for co-seismic landslides were found: Milledge et al. (2019),

which is generalised (for wide applicability) but implied for possible use in mountainous Nepali areas, and Pollock & Wartman (2020), which is generalised for use. I critically examined and analysed these recent publications as examples of universal and technocratic discourses in prescribing landslide PAMs to highlight the impacts from published research on PAMs for co-seismic landslides.

Milledge et al. (2019) and Pollock & Wartman (2020) acknowledge some of the impact of vulnerabilities and exposure, as well as the existence of socio-political issues; however, their approaches still remain hazard-centric as per the hazard paradigm. These technocratic, hazard-centric approaches fail to adequately address the vulnerabilities they acknowledge. Critically, they do not integrate other forms of knowledge (other than the Western corpus) or any of the available data on integrated social, political, and economic factors available within the Western corpus. I have argued for co-production, and while this faces some challenges, I argue that these can be met.

Chapter 5

Factors that Impact the Implementation and Performance of PAMs: Nepal

5.1 Introduction

The devastating 2015 earthquakes had their epicentre in the Gorkha district of Nepal; the tremors and aftershocks had a major impact on more than 30 other districts, including the Kathmandu Valley. The disasters caused a staggering loss of lives numbering 8969 officially, left 22,321 injured, and completely destroyed in excess of 602,592 homes. Over 60,000 people were left displaced, while the country's economic losses were over US\$9 billion.

However, there is an understanding that this event was not 'the big one', which had been and is still expected; there are fears that the next earthquake(s) will lead to higher fatalities and much further devastation (Ruszczuk, 2018).

Experience after the 2015 Gorkha earthquake in Nepal has shown that (1) landslides were a major cause of damage and loss of life in many parts of the 14 earthquake-affected districts and (2) areas that were badly affected by earthquake-triggered landslides in 2015 have been especially prone to further landslides in the subsequent monsoons. Thus, landslides triggered by earthquakes pose both an acute hazard and a persistent threat that can continue for years, and possibly decades, after any large earthquake (Milledge et al., 2018, 3).

In the immediate aftermath of the disaster, international response and aid was abundant. I/NGOs offered personnel and support for immediate search and rescue, equipment and machinery, medical aid, goods and services, emergency relief items, and assistance in the recovery and rehabilitation process. With support being pledged in a variety of forms, it seems as if the immediate relief response could be considered a success, as reiterated by some interviewees in the research conducted by Cook et al. (2018). However, the appearance of success is contrasted in Cook et al's (2018) literature review, which highlights the slow pace of the recovery efforts; along with various other authors who report and discuss issues encountered. Nepal was not an exception to some of the major issues that affect DRR and disaster response worldwide, albeit to varying degrees.

In Nepal I conducted my fieldwork in the Bahrabise region of the Sindhupalchok district, in the villages of Listi (Figures 5.1 and 5.4), Listi-Gumba, Kodari, Tatopani, and Larcha (Figures 5.2 and 5.3), mountainous communities most heavily affected by earthquakes and co-seismic landslides. Meeting community members on their terms offered insight into generally overlooked details that impact communities' abilities to function during disasters. Throughout the fieldwork, between planned activities, I spent time listening to locals' perceptions and observing regular activities.

Figure 5.1. The view from Listi village looking out at Listi-Gumba in the upper centre of the picture (Photo credit: author, 2017).



Figure 5.2. Approaching the settlement of Larcha with landslides prominent (Photo credit: author, 2017).



Figure 5.3. Crossing the Bhoté Koshi River with the Larcha settlement and landslides in the background (Photo credit: author, 2017).



Chapter 4 discussed the conceptual underpinnings and the epistemic framings from which PAMs are currently generated and disseminated. I have emphasised that PAMs do not occur

in a vacuum; rather they require consideration of several factors prior to and during knowledge generation, dissemination, and implementation processes for effective DRR.

In this chapter, this point is concretised via the case study of Nepal. I highlight the importance of considering contextual factors prior to and during knowledge processes for effective DRR by examining and analysing some of the factors for closer consideration in developing PAMs for the context of Nepal. To make this point I also highlight what can go wrong when contextual factors are not considered. The relevant factors are: building codes and infrastructure, DRR governance and governments, the use of science, education, and culture. I show that these factors are important and should be considered simultaneously, and thus do not follow any hierarchical order of importance.

5.2. Building Codes and Infrastructure

According to Hyndman (2011), building codes, zoning policies, environmental regulations and the subsequent law enforcement have a combined influence on the outcomes of major earthquake events. Pollock & Wartman (2020, 2) view the correlation of infrastructure and vulnerability as worthy of researching for improved DRR: “The physical vulnerability of infrastructure to landslides has been the subject of an emerging body of data-driven studies and practical tools for practitioners[...] Human casualties in landslides are often **related to the collapse of occupied buildings** and thus are indirect, a function of structural vulnerability”. Nepal’s landscape is over 80% mountainous (Ruszczuk & Robinson, 2018) and when coupled with poorly developed infrastructure, especially substandard road construction, areas without roads, and where landslides have washed away any possible access route, logistics become a major issue within the country (interviews, 2017).

Figure 5.4. In Listi, a building lost most walls in the earthquake while a window-shutter holds on (Photo credit: author, 2017).



The National Society for Earthquake Technology (NSET) was established in 1993 by Nepali professionals involved with development of the national building code (NBC), in response to global DRR discussions leaning towards proactive approaches. After recognising the dire need for trained and skilled masons in Nepal, NSET began mason training in order to implement the NBC (NSET interview, 2017). Since several of the 753 municipalities¹³ did not have an engineer, the majority of new buildings in urban and urbanising areas were built without NBC compliance despite the Building Act¹⁴ (1994). Many new buildings did not have a basic plan and were built without permits. Making alterations to buildings without permits was prevalent even for public buildings (NSET interview 2017). “Director of the Asian Development Bank in Nepal, said that building codes are widely ignored, caused by poor law enforcement and even the possibility to buy an approval for building designs” (Wendelbo et al., 2016, 42).

¹³ The number of municipalities has increased often during the last couple of decades, thus documents are inconsistent concerning the number of municipalities. 753 is the number of municipalities recognised at the latest local election (May 2022).

¹⁴ The Building Act was drawn up in 1994 and was made mandatory after governmental approval in 2003, and has been legally enforced since 2005.

Another aspect of infrastructure related to DRR efforts concerns airports. In the earthquake aftermath, accessing Nepal was a logistical issue, as only one international airport serves the entire country. “The airport became a major chokepoint despite the Nepali government’s relatively quick call for international assistance within 3-4h of the disaster. Many international responders were only able to get into the country after 72h” (Cook et al., 2018, 542). Before arrival at Nepal’s airport, several international aircraft had to divert to neighbouring airports like Delhi, Calcutta, or Dhaka, which had to host international aid teams, their equipment, aid packages etc. for many hours, days, or a full week. Logistical difficulties extended beyond the airport and included travel within Nepal from Kathmandu to severely affected outlying areas in dire need of aid, resulting in the mass of international responders and their relief supplies remaining concentrated in the Kathmandu Valley (interviews, 2017).

It became clear that much relief aid was unilateral, with the airplanes full of relief goods arriving and offloading without any prior notice on what the items were, whether they were needed and who was supposed to collect and distribute them. This further choked an already fragile and overstretched system (Cook et al., 2018, 542).

Eventually, numerous items were discarded in a vacant building corner (Cook et al., 2018). According to three interviewees (2017), unwanted relief items were plentiful, but for needed items demand surpassed the supply. Tents and tarpaulin sheets were direly required because in rural regions homes made from mud, stone, and brick could not withstand the earthquake. As the focus shifted to providing shelter, needs for basics like food, water and hygiene items, including sanitary pads, were left completely unmet.

During the earthquake aftermath, Nepal’s hospitals faced countless challenges while recovering facilities, including power restoration, and working with unsafe buildings, which made medical treatment arduous and hazardous (interviews, 2017). “The Asia Development Bank (2015) reports that hospitals operated beyond capacity with many wounded left waiting, while many patients were treated in the open due to unstable hospital structures” (Cook et al., 2018, 541). These were some conditions posing great difficulties in actioning and accomplishing the humanitarian response (interviewee, NGO, 2017).

5.2.1. Analysis of Building Codes and Infrastructure Reconstruction

During NSET's interview (2017) with Dr A.M. Dixit, then Executive Director, he mentioned how masons were being trained in an attempt to adhere to the NBC laid out in Nepali law (1998). However, not many 'builders' knew how to implement the codes as they had no formal training in building construction, let alone earthquake safety building construction, or in retrofitting existing buildings for earthquake safety (Figure 5.5). It was expressed that most buildings did not have basic plans and were built without permits, and that this was prevalent even for public buildings (interviews, 2017).

Figure 5.5. Dr. A.M. Dixit commenting on a cartoon featuring him during a NSET group interview (Photo credit: author, 2017).



During the interview, the difficulty encountered in ascertaining and assessing whether or not a building has been retrofitted came to the fore. There are currently no assured forms of testing that can be applied to a building in Nepal to determine its compliance with construction methods.

It is widely known and a point of general awareness that although there is a NBC it is not usually applied, as the former UK humanitarian coordinator in Nepal has pointed out:

A building code to regulate construction standards in this earthquake-prone area exists on paper only, with just a fraction of construction meeting minimum standards. [...] Most residential buildings are non-engineered structures, owner-built and slapped together in stages with another floor added whenever money permits. Concrete has replaced wood. [...] No one's job is on the line if the emergency services fail to show up. Underpaid, transient civil servants are responsible for certifying that new building projects are "to code", but they would have to get out

from behind their desks to see that the designs they have certified on paper do not remotely match the actual construction (Piper, 2013).

During the earthquake, retrofitted schools served as safe-houses for communities. G.K. Basyal (interviews, 2017) mentioned that only a few individuals obtained some temporary shelter as efforts made by government and local markets were neither organised or sufficient to meet demand.

Since the distribution of temporary shelter materials and other aid was concentrated on roadsides, people in remote areas grew frustrated with seemingly preferential treatment (interviews, 2017), with many forced to rebuild with whatever material could be found after the disaster. Deutsche Welle (DW, 2015) reported journalist Shiwani Neupane's perspectives about the reasons behind Nepali public discontent over the government's handling of relief efforts.

Fear and anger is [...] directed towards the government due to perceived corruption in the distribution of aid [...] homeless and bereaved survivors of the disaster are growing increasingly angry and frustrated over the pace of the rescue. They accuse the government of being too slow to distribute the international aid that has flooded into the country and of leaving them stranded in remote areas waiting in desperate need of temporary shelters against the rain and cold. [...] According to George Varughese, Nepal country representative for The Asia Foundation, this level of anger is justified from the victims' perspective for a number of reasons. 'Many have seen or heard their loved ones die for want of timely rescue and treatment. Others remain hungry in far-flung areas and are at risk. Information is simply not flowing to and from affected areas' (DW, 2015).

Exposure to the elements and the impending monsoon season, compounded with discontent with the government inefficiencies and seemingly preferential treatment, among other factors, led to rural communities reusing debris to rebuild within a few weeks of the earthquakes (interviews, 2017).

The NBC does not cater for rural and mountainous contexts (Figures 5.6–8), and should include a NBC for earthquake-safe rural housing. Currently, the NBC offers guidance for buildings that are to be built according to modern construction methods, usually in Kathmandu or other municipal areas. There are no guidelines or DRR messaging for buildings that may be built according to local or traditional construction methods and using materials that are locally available. As discussed earlier, the modern construction methods that the NBC offers guidance for require the importation of most materials. "Building codes

and housing designs mandated or recommended by governmental and other implementing agencies and organisations should be flexible to ensure culturally appropriate and economically affordable outcomes for affected people and communities, with adequate space to accommodate existing residential patterns, livelihoods and practices” (SSB, 2022a, 3).

Figure 5.6. A child plays on a building en route to Listi, with landslides prominent (Photo credit: author, 2017).



In a collaborative policy brief (SSB, 2022b), an example illustrates how reconstruction aid was refused because the donor and the local municipality had different visions of reconstruction. Moreover, the past experience of this municipality with development projects led by a German agency in the 1970’s was very controversial as the central wooden pillars of a structure were replaced with steel beams encased in concrete. These experiences led to the municipality’s resistance to German assistance proposals. “Officials were concerned that accepting such aid might go against sentiments about historical Newar architectural design, which people perceived as being part of their cultural identity and hurt their self-respect by excluding them from decision-making about their own city” (SSB, 2022b, 3).

Catalogues of house designs that were meant to be used in housing construction were offered after the earthquakes by Nepal's Department of Urban Development and Building Construction (DUDBC). A series of correction manuals were offered afterwards because the original catalogues were not in line with people's resources and cultural needs. "DUDBC officials acknowledged that the initial house designs were implemented based on external assumptions of what people needed, in a top-down approach while the correction manuals were based on information collected from the ground, in a bottom-up approach" (SSB, 2022a, 2).

Many rural houses are made of stone with mud mortar and a wooden frame; this type of reconstruction continued after the earthquakes when many families repaired their homes. The reconstruction comprised stonewalls on ground floors and lighter wood or corrugated galvanised iron sheets on the upper floors (Figure 5.7). "These self-repaired houses were usually smaller than the multi-storey pre-earthquake houses, but still much bigger than the NRA-prescribed houses. People preferred to live in these self-repaired houses as this suited their lifestyle" (SSB, 2022a, 2).

Since the National Reconstruction Authority (NRA) was mainly concerned with building houses compliant with building codes and thus qualifying for the reconstruction grant instalments, they did not consider traditional forms of knowledge in building construction. "Houses built with people's own traditional knowledge were generally assumed to be vulnerable and hence, unsafe, while the government-prescribed houses were deemed to be 'earthquake-resistant', and thus stronger and safer. This simplistic notion led to the disqualification of numerous houses built or repaired by people" (SSB, 2022a, 2).

These examples reinforce the issues with top-down approaches to DRM in building reconstruction, which has a knock-on impact on future DRR efforts as building safety and performing PAMs like DCH are intrinsically linked. Moreover, it diminishes the role of local knowledge in building construction according to people's contexts and available resources. Part of the issue with negating traditional knowledge in this way is that it creates epistemic and participatory injustices whereby local people are not considered epistemic agents of suitable standing or comparable with the NRA's reconstruction criteria and epistemic requirements/qualifications (I will return to this discussion in Chapter 7). Traditional

knowledge therefore is rendered ‘unsafe’ to use and therefore cannot be integrated in the reconstruction process. This also excludes local people from participating in the reconstruction processes. Conversely, traditional knowledge should be valued, and integrated, and local participation is recommended (SSB, 2022a, 3): “People’s [...] skills [...] should be considered alongside earthquake-resistant engineering as reconstruction plans are formulated”. In this way, local people would be respected as participants in reconstruction efforts from the start.

Figure 5.7. Buildings in Listi in the foreground, using brick and corrugated galvanised iron sheets and in the background, timber frames on brick (Photo credit: author, 2017).



Figure 5.8. A collage of images from Listi-Gumba where the village's Gumba (Temple) was destroyed by the Gorkha earthquakes (Photo credit: author, 2017).



5.3. DRR Governance and Government Structures

National-level responsibility for disaster risk management (DRM) sits with the Ministry of Home Affairs (MoHA) and has its foundations in the 1982 Natural Calamity (Relief) Act; a Disaster Management Bill was passed in 2017, and Nepal has adopted the Sendai Framework for DRR. The Local Self-Government Act 1999 devolved responsibility and authority for disaster management to local level. Under the new constitution (2015) more responsibility is delegated to the provincial and municipal levels. This has coincided with the

establishment of the National Disaster Risk Reduction and Management Authority, which is the (relatively new) lead agency for DRM within MoHA.

Within Nepal, six main groups comprise the humanitarian sector: government, military, UN agencies, Red Cross and Red Crescent movement (RCRC), civil society actors, NGOs, and the private sector. Private sector companies have become increasingly involved in disaster response as donors and direct service providers (interview, 2017). Logistics collaborations with aid agencies have assisted and enabled actors to deliver larger volumes of aid by working with firms like DHL and UPS. “Of late the private sector has contributed more extensive support [...] provision of training and operational management schemes and the transfer and application of technologies” (Cook et al., 2018, 539). Local governmental officials were away from their posts for prolonged periods of time (interviews, 2017) and are the first point of support for communities, but lacked resources to respond (interview, G.K. Basyal, 2017).

Nepal’s airborne resources are scarce; thus, the biggest challenges were inaccessibility to several affected regions, then air-accessible only. Foreign military air support became a crucial element of disaster response efforts and was a vital asset. For example, shortly after the 2015 earthquakes, the UK had offered the Nepali government three Royal Air Force Chinook helicopters, but the aircraft were grounded in Delhi while negotiations took place between the UK and Nepal. The UK’s contribution was subsequently refused for political reasons (BBC, 2015). This governmental decision directly affected and impacted mountainous rural communities. Here political concerns were prioritised over DRR concerns even during the immediate aftermath of the disaster.

According to the Asia Foundation Report (2015), some aid agencies bypassed governmental relief channels and distributed aid along highways and access roads. Some agencies acted without required coordination, leading to confusion and additional tension (group interview, 2017). UN agencies and several humanitarian organisations, including those unaware a system existed, worked alone, and others actively worked outside and apart from the system (Cook et al., 2018). Parallel disaster response structures were created, leading to confusion over jurisdiction and responsibilities between the military and civilian government. Cases of conflicting instructions and poor management emerged (interviews,

2017). In some reports, near mid-air collisions, among other mishaps, occurred within Nepali airspace, as it remained ambiguous and unclear whose instructions pilots and aircraft operators ought to follow, as instructions conflicted (Cook et al., 2018).

Remote management from Kathmandu and sometimes outside the country surfaced as problematic for humanitarian response, due to imprecise information broadcast from affected areas (NGO interview, group interviews, 2017). Consequently, some regions had multiple response teams arrive, whereas disaster-affected areas had none. Cook et al. (2018) claim this issue is not new; rather, it has often been raised in past disasters. Official information and directives, when shared by Nepali authorities based in Kathmandu, especially changes in customs rules governing aid materials, were communicated extremely slowly to humanitarian agencies, which significantly affected their abilities to plan and strategise relief delivery (interviews, 2017).

News and reports from the government, media and other organizations often conflicted and made it difficult to identify and assess challenges, particularly for humanitarian staff on the ground and those coordinating the response from outside the country. [...] The Nepal experience further highlighted the inaccuracy of information that such remote management depends upon (Cook et al., 2018, 543).

The main issue is the withdrawal from face-to-face engagement due to remote management processes in DRM as analysed by Duffield (2016) in *The resilience of the ruins: towards a critique of digital humanitarianism*. In Nepal, decision-making based on sometimes inaccurate information had repercussions that directly affected aid delivery to rural communities, and their ability to access response teams within the crucial hours and days after the earthquake, as these decisions were made remotely, usually in Kathmandu (NGO interview, group interviews, 2017).

An elected official from Langtang, a high-mountain region, listed the environmental changes his community had been noticing. His speech in Nepali, translated into English, highlighted how Kathmandu-based experts visit the region, write their reports based on limited stay, and bring 'solutions' to problems that do not necessarily fit local conditions or are effective in the long run (Chakraborty & Sherpa, 2021, 49).

Chakraborty & Sherpa (2021) highlight here the two main issues with remote management for DRR, which I also critiqued in Chapter 4. The first issue being with experts who propose knowledge and possible 'solutions' to issues that fail to account for the local context. The second issue being that these 'solutions' are usually focused on the short-term

considerations, especially ‘urgency’, rather than ascertaining the effectiveness and usefulness of expert knowledge and ‘solutions’ in the long term.

Coordination roles are indispensable to planning for disasters, but during the aftermath, roles of coordination were actually taken up by ad-hoc actors, rather than pre-designated agencies (interviews, 2017, NSET group interview 2017). Unlikely responders, like the private sector, business clubs, professional associations, volunteer youth groups, religious orders, Buddhist monasteries, and the local Rotary clubs, played crucially important roles in immediate response and were a valuable resource in understanding local communities, and identifying their needs.

Years after the earthquakes, survivors were still living in temporary shelters made of tarpaulin and zinc sheets (field observations, interviews, 2017). One of the main reasons being that the government’s reconstruction model emphasises an ‘owner-driven’ approach, requiring proof of land-ownership to qualify for rebuilding grants. This completely ignores Nepal’s historic feudal land tenure system and local informal tenure relationships. Consequently, tens of thousands of those worst affected, already vulnerable and marginalised, including the landless, women, caste-based and ethnic minorities were left out of reconstruction schemes.

The Nepal government has failed in its duty to ensure that people have access to reliable and clear information they need for the reconstruction efforts. For example, the lists of those found eligible for reconstruction grants were only available in English in the villages and local level announcements of grant distribution days relied primarily on word of mouth. The government also failed to consult people and even its own local level officials on key aspects such as models of housing, banking services and availability of building materials (Amnesty International Report, 2017).

According to Campbell (2018), villagers spoke with a sense of injustice concerning the disregard for people’s emergency shelter needs by national park authorities. Permission was sought for timber for temporary dwellings to survive the monsoon, as post-earthquake reconstruction efforts had not materialised for destitute families. The park office responded that it was unable to deal with small amounts of timber; they would only process applications for 100 cubic feet or more. Experiences like this reinforce rural community perceptions of inaccessibility and indifference of state institutions to their plight (interviews, 2017; Burbank, 1995). “The government is also not ensuring mechanisms are in place for

residents to have their voices heard and needs met in this uncertain environment” (Ruszczuk, 2018, 11).

5.3.1. Analysis of DRR Governance and Government Structures

During and after the Gorkha earthquakes, particular issues emerged in DRR governance with I/NGOs, civil-military relations, and the government. This analysis highlights the process-like nature of DRR governance because it looks at the immediate aftermath, and beyond. There is much insight in understanding the challenges that local people face in the immediate aftermath of disaster events and in general in order to improve on future DRR efforts. Understanding these contextual factors can provide insight and understanding of components to be taken into account when developing PAMs.

Some volunteer responders had preconceived ideas of what Nepal was like that did not manifest in actuality; instead, many preconceived notions led to struggles on the ground (interviews, 2017; Cook et al., 2018). For example, I/NGOs focused the majority of their efforts and programmes in easy-to-access locations (interviews, 2017), which led to a duplication of efforts in those areas and left other areas without any assistance (Limbu et al., 2022):

No matter how many INGOs came, the same kind of project went to the same village; this happened a lot. There was too much duplication. Oxfam was doing the same thing there, so was World Vision, Save the Children, they all had the same programme in the same area. None of them wanted to go a bit further away from there (Limbu et al., 2022, 23).

Co-seismic landslides occurred in numerous regions during the aftermath of the earthquake, blocking off access to earthquake- and landslide-affected areas. Oftentimes, major roads are the only access routes to areas; hence, if routes were impassable for extended periods no overground alternatives could reach remote areas until excavation and repair happened. Inaccessibility is a common occurrence, as road infrastructure becomes increasingly sparse the further one travels out of Kathmandu (fieldwork notes, observations, 2017). Far from being a mere commuting inconvenience, blocking of sole access routes cuts off communication channels, and possibilities of lifeline aid delivery.

A lack of understanding of the impacts of co-seismic landslides before attempting disaster relief response results in further confusion and frustration. The effects (like blocking access

routes etc.) that arise from co-seismic landslides are not so far removed from the effects of monsoon or rainfall-induced landslides and thus knowledge of these effects would be relevant. Some authors (Rosser et al., 2021, 6) may have opinions that differ: “Critically, co-seismic landslides and the debris that they release are very sensitive to rainfall, reducing the post-earthquake intensity-duration threshold for debris flow triggering. In this context, the degree to which (local) knowledge and lived experience of pre-earthquake landslide hazards remains germane in a post-earthquake setting is poorly understood.” I would argue that local knowledge, lived experience, along with understanding the effects and related issues caused by pre-earthquake landslides is extremely relevant. This is especially relevant for the application of knowledge into practical action for INGOs and volunteer responders, particularly for gauging (in)accessibility to affected mountainous regions.

Prior to the 2015 earthquakes, Nepal experienced significant rainfall-induced landslides which affected accessibility to remote areas and communities. By understanding the geography and topography of mountainous regions in Nepal and being aware of previous landslide effects like the blocking of main highway access routes (in the case of the 2014 Jure landslide) to rural communities, INGOs and their volunteer responders could have better managed their own expectations and perhaps organised the necessary logistics to transport responders and/or relief to mountainous communities. Papers like Kinsey et al. (2021) and Rosser et al. (2021) have pointed out that landslide numbers increase in the aftermath of a mountain region earthquake.

The humanitarian motive is to provide relief where it would do the most good, in terms of saving lives and reducing human suffering. Arguably, this motivation would drive relief to larger disasters in low-income countries, although such an outcome is not completely obvious, because low-income countries may have poor infrastructure and more prevalent corruption limiting the effectiveness of relief (see the discussion in Collier and Dollar, 2002, in Strömberg, 2007, 213).

The activities of humanitarian actors and influx of aid were difficult to monitor. The Nepali Army produced a report (2015) on their operation ‘Sankatmochan’ and the lessons learnt from earthquake aftermath experiences, and challenges in practice. Concern about random aid distribution, which resulted in inequalities, was expressed during interviews (2017) with

people in mountainous communities. They reported a lack of transparency as they witnessed socially, and politically advantaged members of society receive greater proportions of aid and support for their households compared to those who had no such ties and were in the worst conditions imaginable. Limbu et al. (2022) report cases of malpractices by I/NGOs that billed much higher costs for construction than actual amounts. Certain NGOs promised to build homes but never returned to act on promises, and likewise NGOs pledged to reconstruct schools and later backed out from their pledges.

There were thus various activities, including some dubious ones, prevalent with regard to I/NGOs' involvement in Sindhupalchowk's reconstruction. By the conclusion of the project, the impact in the community could be unsatisfactory but the project itself would be called a success as long as they 'looked good on paper.' However, the long-term implications of these activities remain a matter of contestation (Limbu et al., 2022, 25).

Social exclusion featured prominently in key components of the 2015 disaster response as detailed earlier, amplified by political party representatives, who are not locally elected nor part of the government structure, but nevertheless wield power to play prominent roles in decision-making, especially about aid distribution. Although governmental responsibilities seem axiomatic and meant to protect vulnerable citizens during disasters, merely having titles and responsibilities on paper is insufficient to be implemented in practical terms for beneficial results. In Nepal, the proper procedure to ensure enactment of these responsibilities is lacking, and thus accountability is also difficult to assess and assign. Governments often fall short in fulfilling their responsibilities towards those they govern, and numerous examples show this as a practical reality in Nepal. "As a post-conflict country in the early stages of democracy with a weak system of governance, [...] numerous stakeholders are emerging to fill the 'gap' left by weak government apparatus" (Jones et al., 2014).

After the 2015 earthquakes civil-military relations were strained by differences in priorities, cultures, and operating methods. Enhanced dialogue is required for effective coordination to improve relations, DRR operations, and the quality of humanitarian assistance. Developing a framework within which to operate may help overcome some challenges faced by diverse actors that are bound to work together but are not acquainted, and do not share a common language, culture, method of contextual analysis, or an understanding of roles

co-actors play in the overall process. The UN Humanitarian Country Team has attempted to address this issue by providing a framework for possible use. However, if only some members and stakeholders are involved in this process, there is still room for issues among DRR stakeholders, like some of the experiences in practice encountered and mentioned above. These DRR efforts would require an 'all stakeholder' approach to mitigate strains on relationships. High degrees of coordination are critical to an operation's success or failure. Local government structures were very complex, and when coupled with a heterogeneous mix of responders, achieving coordination proved difficult (Cook et al., 2018, 540-41). The result of encountering such complexities meant that those most vulnerable and at risk were especially affected (interviews, 2017).

Local communities in Nepal are among the most vulnerable to the effects of uncertain and variable climate, not only because of the intense biophysical impact of climate change, but more importantly because of the weak institutions and exclusionary governance at different scales. While local communities have been able to cope with gradual risks and with some level of natural hazards in the past, the emerging climate change crisis is by no means avoidable through the actions of local communities alone, especially in the context of active political and social drivers that result in exclusion and marginalization (Ojha et al., 2016, 419-420).

Humanitarian action ought to be more inclusive and strive towards improved participation and integration of affected populations. The people-centred approach is preferred to a top-down style of management aiming to control and command rather than attentive inquiring and action. Examples like the unsuitable food relief provided above show a lack in the representation of local people and the under-consideration of their cultural norms and dietary requirements, and thus the limits of their inclusivity and participation.

Community-based organisations are heavily underrepresented in national and municipal structures, but their partnership is crucial to assist in immediate relief efforts and ensure long-term recovery. According to interviews conducted (2017), and authors like Merin et al. (2015) relief supplies did not address the needs of those affected, based on a lack of understanding of the local context. Local actors, because of their close proximity and understanding of local contexts, can offer their experienced assistance for effective disaster response. Locals in mountainous communities are always the first to respond in disasters, and engagement with them to harness their capacities and abilities may lead to improvements in response strategy and overall efficiency. While the people-centred

approach may have been intended for use, failing to understand the people that organisations attempt to assist makes this approach ‘aid-centred’ rather than people-centred. For international teams to improve coordination and management, a pre-appointed, locally based coordinator is required, who is familiarised with the local concerns and sensitivities. “Foreign teams that arrived without prior arrangements in place or without a local partner, often led to additional confusion and mismanagement of time and resources” (Cook et al., 2018, 544; Cook, 2016). Unlikely responders played crucial roles in immediate response and were valuable resources in understanding local communities; establishing collaborations with unlikely responder groups may be highly beneficial for responders and the overall goal of DRR.

Broadcasting of unclear and inaccurate information from affected areas negatively impacted decision-making, often in Kathmandu, and thus relief efforts and dispatching of response teams to mountainous communities (interviews, 2017). Remote management in DRM is not always beneficial, as detailed in section 5.2.2, and does not always optimise DRR. Likewise, Duffield (2016, 147) has found in the context of Nepal that “harnessed to the neoliberal project, new technology locks-in the negativities of actually existing capitalism”. The ongoing neo-liberal governmentality trend tasks various privately run entities with risk minimisation and promoting stability of populations; a responsibility which once lay solely with the state and historical forms of sovereignty. However, this results in a hollowing out of the role of government, and an over-reliance on NGOs and other responders, leaving vulnerable people destitute during disasters when assistance of neither is immediately available.

There is an overall lack of transparency and there are no clear and reliable organisations or independent auditors to hold different institutions like the government or NGOs accountable. The positions of chief of the Commission for the Investigation of Abuse of Authority (CIAA) and national auditor-general were vacant for several years. In 2014, while no CIAA chief was appointed by the commission for seven years after the formation of the commission, a theme song was produced, and no reports published that year. “[T]here has been no official mechanism to monitor the transparency of NGOs (of which there are 36,000 registered with the Social Welfare Council) as the anticorruption agency ([...]CIAA) currently

only monitors the activities of the government” (Jones et al., 2014, 82). Piper (2013) reiterates that “the real game-changer will only come about when risk reduction measures align with governance reforms. And when ‘duty of care’ enters the political lexicon of the country.”

5.4. Use of Science

Datta et al. (2018) examined how scientific information was used during the 2015 Gorkha earthquakes disaster response. The report is based on 40 in-depth interviews with disaster managers in the government of Nepal, military, UN agencies, international and national NGOs, information managers, and scientists. Disaster managers were under significant pressure to act and pausing to consider scientific evidence and its implications for the response was challenging. Promoting the uptake of any science produced in the required timeframes was difficult (Datta et al., 2018). Any requests for scientific evidence about these earthquakes were largely concentrated at the national level, within the wider humanitarian community, who often sought information from overseas experts. Conversely, “District-level Disaster Relief Committees, seen as one of the most influential groups in directing relief efforts, articulated no apparent demand for scientific evidence” (Datta et al., 2018, 9).

National disaster managers sought information pertaining to possible after-shocks and landslides, to target response and support logistical operations, and for staff safety. However, a clear gap existed in understanding what types of useful, operational information scientists could provide, and at what time. “In the absence of scientific information, disaster managers relied heavily on their past experience and practical judgement” (Datta et al., 2018, 9). Scientists’ involvement was limited by a lack of understanding of the disaster response community’s information requirements, and the needs assessment process, as well as the disaster managers’ limited knowledge of what scientists could offer. Disaster managers were inundated with information in the weeks following the earthquake, including scientific information, like maps indicating the location and intensity of earthquake-triggered landslides. “However, this information (often relatively technical) was not always presented or packaged in a way that encouraged its use by disaster managers” (Datta et al., 2018, 9). Information managers were potentially important brokers between the humanitarian and science communities; however, as non-specialists, they did not always

possess hazard-specific knowledge, or the expertise required to access and communicate the scientific information produced. The scientific information that eventually did find its way into discussions tended to not be distributed outside those groups, reflecting the siloed nature of response operations (Datta et al., 2018).

Two organisations that I visited and had group interviews (2017) with, shared how science was being used in their DRR efforts. The first, Practical Action (PA), a prominent INGO, engages in development and DRR activities using sustainable technology to improve the lives of Nepali people. During a group interview (2017) it was evident by way of past and ongoing projects that PA actively engages with communities to build and improve the capacities of locals. For example, one project focuses on improving and promoting farming that is in tune with nature, that helps farmers adapt to the newer climate improving their resilience to climate hazards, such as floods, droughts and landslides. The background of these efforts is that Nepal was already considered 'overgrazed' (Smart & Wehrheim, 1977), and has not been able to subsequently recover and improve ground cover. The concerns for DRR are particularly tied into what implications this may have for landslide risk. Research shows the correlation between ground cover and landslide risk: "Landslide risk is greatly increased by slope disturbance especially where appropriate precautions are lacking. Activities that increase erosion and slope instability include logging, road and trail construction and forest conversion. In undisturbed forest catchments, there are usually relatively few landslides" (Forbes et al., 2013, 12).

Second, the International Centre for Integrated Mountain Development (ICIMOD) offered a group interview (2017) where representatives presented a brief introduction, outlining types of work undertaken and scientific outputs produced. ICIMOD develops and shares research, information, and innovations in the Hindu Kush Himalaya region. While ICIMOD's slogan indicates their purpose is 'to empower people', their lack of distinct direct links or work undertaken specifically for this purpose leads to the impressions that in Nepal ICIMOD operates as an information provider to the government, rather than the people directly. When asked about how the DRR information and knowledge ICIMOD gathered could assist those who most needed it, their response was generic, merely pointing out that all the data gathered, along with DRR information, was available on their website for people to use. The

underlying assumption that information that may be available on organisational websites benefits hazard-prone communities and at-risk populations is doubtful, since not many affected and potentially at-risk people have access to computers, or other electronic devices with operational internet facilities, or a good enough understanding of written English (the language used in the materials) rather than conventionally spoken Nepali or indigenous languages. Chakraborty and Sherpa (2021, 49) interviewed villager and local hotel owner Dawa:

In 2011, when I asked Dawa what he thinks of the researchers, he said quite bluntly, **“they come, ask questions, and leave. They make money and never return. Researchers are just useless.”** Dawa’s words of irritation rolled out of his tongue with ease, unguarded, during a casual conversation about climate change research I was interested in. Although his statement was not directly pointed at me, like many researchers he knew, I was asking questions, recording interviews, and taking notes for months without a visible, tangible, and immediate benefit to the local people. But I was also a fellow villager, somebody he knew personally. His words did not surprise me. It was not the first or the last time I heard someone complain about the **“researcher-type”** folks.

Locals, when given the chance to voice their opinions, are sceptical, annoyed, and feel like they are ‘used’ in an extractivist manner by experts for the purposes of their pre-set research agendas. While experts may reap benefits of their own research, local people often do not receive any tangible benefits, even when research ‘findings’ are shared with communities. This often leads to antagonism or ambivalence towards ‘researcher-types’ and research. Rusczyk (2019) is next conversing with a senior Nepalese disaster-oriented NGO official, who expresses his views frankly about the state of DRR in Nepal:

Who is leading DRR in this country? Who is the main driver of DRR in this country? Basically it is the foreigners! The government is basically guided by foreigners. For me, right from the very beginning, without the involvement of the local people and local culture and local authorities, I do not accept [the premise of] any of the DRR programmes. They are bound to fail! (Rusczyk, 2019, 827, emphasis in original).

The government accepts foreign expert knowledge which does not take into account local people and cultures and therefore would probably not be effective or beneficial for locals. Local communities and NGOs that hold these perspectives may not be inclined to follow or use science (even PAMs), seeing no substantial local involvement or prospects of local benefits.

5.4.1. Analysis of the Use of Science

NSET has quite literally gleaned knowledge from the international landscape and applied it to the Nepali context. “NSET absorbed international knowledge on hazards and risks in Nepal, contextualised global principles to the local conditions; translated scientific terminology into simple everyday language; and disseminated the knowledge” (NSET 2001; 2009; 2018, 16). The extent of knowledge-contextualisation, the effectiveness of the ESD’s, and information disseminated at schools requires further examination and evaluation. Moreover, current research indicates that in countries with less stringent building codes, the chances of being injured in building collapse are higher than those of being injured while trying to move during earthquake shaking (Rapaport & Ashkenazi, 2019; Goltz et al., 2020; Vinnell et al., 2022). Therefore, in circumstances where the NBCs are not usually followed/implemented, experts would often recommend exiting buildings as quickly as possible.

While taking DRR knowledge from 'developed' contexts, almost verbatim, might be better than having none, issues that stem from such an approach are many pronged, especially in light of the examples relating to seemingly problem-free PAMs like DCH. It is vital to understand a 'developing' country’s context and specific issues faced, and to develop measures to assist from the ground up; not that such an approach would be entirely problem-free either but would at least be developed with the end-users in mind, and serve to eliminate a larger percentage of incompatibility, thus minimising the scope for fatal errors. Moreover, there seems to be considerable science available for the context of Nepal as evidenced by the Datta et al. report (2018) and ICIMOD, etc. Therefore, more science may not be required, and instead knowing what to do with the science is more of a pressing issue. “The start date to prepare for Nepal’s next earthquake is now. Lessons in resilience do not only come from new technology and modern building techniques, but from the past as well [...] Knowledge is not lacking in Nepal” (Cross, 2015).

5.5. Education

The Kathmandu Valley Earthquake Risk Management Project (KVERMP) was implemented by NSET in 1997-99 in collaboration with GeoHazards International, the Asian Disaster Preparedness Centre, and the US Office of Foreign Disaster Assistance. The KVERMP

included the development of a school earthquake safety programme (SESP), NSET's "most successful program" (Dixit, interviews, 2017; Dixit et al., 2018, 21) for making schools safer, creating earthquake awareness, and DRR. The programme began with seismic retrofitting of school buildings, and/or earthquake-resistant reconstruction. However, materials for retrofitting are not readily available in Nepal: "On all pilot retrofitting sites, the highest proportion of costs was for materials that couldn't be sourced locally, such as cement, steel bars, GI wire, CGI sheets, and paint [...] materials came to more than 60% of the overall construction costs" (NSSP, Learning Brief, 3). Although costs may be a barrier to the import and use of materials to retrofit buildings, nevertheless during the Gorkha earthquakes people were made aware of the safety of several retrofitted schools that were able to withstand the shaking. These examples also served an educational purpose as communities took shelter in retrofitted school buildings during the earthquakes and in the days after, rather than staying in other non-retrofitted structures that were affected by the earthquake. Some buildings are visibly hazardous and vulnerable to damage in earthquakes where building designs do not comply with NBC or safety standards.

The Earthquake Vulnerability Tour (NSET, 2017) allows one to observe different vulnerability factors of buildings, through a Kathmandu city-walk and interactive discussion. This serves the educational purpose of understanding what buildings to avoid, especially in the event of earthquakes.

Figure 5.9. Some examples from the NSET Vulnerability Tour, highlighting buildings that are particularly vulnerable to earthquakes (Photo credit: author, 2017).



An example of NSET’s initiative for DRR education is the shake-table demonstration performed with local people in different areas. Shake-tables demonstrate how construction risk-reduction techniques help buildings withstand earthquake forces. Two identical buildings, one built using earthquake-resistant techniques and one without, are exposed to forces that buildings endure during earthquakes; the weaker building collapses. This raises awareness about safe building construction. NSET’s director shared his experience during interviews (2017) of dealing with authority, DRR education, and testing processes. After the first shake-table demonstration, a prominent academic instructed him to stop remaining demonstrations ‘because there was no reason to think that it would work in the way you are thinking, the real buildings are different’. ‘He was concerned about his own integrity’ and ‘he was such a towering figure’. The director said ‘okay’, as he had to ‘out of respect’, but

nevertheless continued with demonstrations when the academic was not present. 'Eventually the tests were successful, and the academic became agreeable; since then we have conducted 30 demonstrations'.

Figure 5.10. A shake-table demonstration by NSET Nepal (NSET, online).



Education at government schools undergoes crippling transformations during disasters and post-disaster uncertainty. Under normal conditions children from outlying communities

travel great distances to attend school for a few hours and must travel the great distance again after (field observations, field notes, interviews 2017). Education in hill tribes/ethnic clans often comes largely from other children (Burbank, 1995). Tuladhar et al.'s (2013, 204) analysis shows most students do not have adequate knowledge of disasters or mitigation methods: "Although 94% of the questioned students have experienced a disaster, [...] They do not think that disaster readiness behaviours and disaster adaptation are important tools for DRR [...] Likewise, they are not aware of associated or secondary disasters that usually follow a major disaster." Sometimes when there is awareness, the ability to do something about it can also be problematic. "Schools are eager to make their buildings safer – but technical expertise is hard to come by" (NSSP, 2018, 4). In response to the shortage of technical experts, NSET has offered mason training for earthquake-resistant construction, and several programmes for enhancement of emergency response.

NSET has set up annual Earthquake Safety Days (ESDs), community-level disaster preparedness and planning, and collaboration with community and private radio stations to propagate earthquake safety messages (Dixit, interviews, 2017). In interviews with Omkala Khanal (2017), NSET's social development officer responsible for dissemination of knowledge to communities, it was revealed that messages for earthquake safety were being conveyed through cartoons, local song, and through dance compositions that resonated with certain groups.

During the ESDs, guidance like 'duck, cover and hold' (DCH) is taught as the primary PAM that one should take in event of earthquakes; this is also taught within schools (interviews, 2017). However, universally well-recognised PAMs like DCH proved counterproductive within the context of Nepal during the 2015 Gorkha earthquakes, according to interviews and field reports (2017). During the 2015 earthquakes, people were under the mistaken impression that it was safer to run into buildings to DCH rather than stay outside, away from hazardous buildings, resulting in an avoidable loss of lives.

Although NBC exist, they are seldom used in construction, thus leading to highly unstable buildings that cannot withstand shaking during earthquakes (Awale, 2022; Maharjan, 2022). "More worrisome is that whatever has been rebuilt in Kathmandu Valley mostly flout building codes and permits. The Gongabu neighbourhood saw 160 deaths in 2015, most of

them were crushed under illegally built concrete structures. Most of those high rises have been rebuilt using the same faulty techniques” (Awale, 2022, online).

During an NSET group interview (2017) a senior official responded to questions about DCH and its effectiveness, by frankly acknowledging that “we have never done any checks/tests to ascertain if DCH was the proper PAM to take with our types of buildings” (Interview N8, Nepal, 2017).

Comparable experiences were encountered by personnel involved in projects managed by PA, which were shared during an interview with their representatives (2017). For example, while mobile phone text messages were sent to all those in high-risk areas, the personnel deploying this system of risk communication made the problematic assumption that everyone owning mobile phones is literate and able to access such information. In reality, however, many people in mountainous regions tend to use their mobile phones to have conversations and rarely use texting as a means of communication. Thus, many were unable to adequately respond by taking PAMs because they were simply unable to understand what was being conveyed.

Subedi et al. (2020) have recently led efforts to promote earthquake education in schools and in a short space of time (approximately 2 years) have established the Seismology at School in Nepal programme. The framework has been implemented in 22 schools (out of more than 100 that submitted a request form to participate) where the Nepal School Seismology Network (NSSN) was established. The authors have found that schools play a vital role in imparting common values and culture, and students were very interested to learn about earthquake science but lacked the basic initial knowledge to start the process. Educational activities involve students, teachers, and communities. Educators gave positive feedback on the workshops conducted: “*I am more interested in Earth sciences after this workshop*” said one teacher after the conference; a school principal expressed his gratitude because we were more worried about their earthquake safety than they were” (Subedi et al., 2020, 10, emphasis in original). During the workshops’ open *ask-me-anything* session, experts who were presenting received queries for clarifying terms and concepts, but also questions like: “Which discipline studies the relationship between Hinduism and earthquakes?” (Subedi et al., 2020, 9), which prompted insightful discussions.

This effort is an example of research led by local researchers and supported by foreign experts, which enabled effective and substantial collaboration on the project, and reduced the time required for the overall research work and steps for actions.

An excellent knowledge of the region’s geography and social relations, as well as communications skills were required [...]. The non-Nepali co-authors of this work believe that foreigners alone would have had no chance to start and implement this project due to a lack of sufficient local contacts and knowledge of Nepali society (Subedi et al., 2020, 6).

The educational materials used across the NSSN are based on international seismology initiatives, mostly from 'developed' contexts—UK, US, EU, and Australia—and expert suggestions and experiences. The authors claim the materials are adapted for Nepali school systems and language. The flyer (Figure 5.11) is adopted from the original, designed by the Earthquake Education Center, Switzerland and translated into Nepali.

Figure 5.11. Teaching material; a Nepali language flyer illustrating what to do before, during, and after an earthquake (Subedi et al., 2020, 6).



5.5.1. Analysis of Education

People are currently taught at school level (and beyond in ESDs) that DCH is the most suitable PAM to take in case of an earthquake; however, there are no qualifying stipulations or contextual guidance, for example 'DCH if one is unable to go outside', etc. Testing of PAMs is necessary to ascertain what the most suitable and effective context-sensitive PAMs are, and thereafter educational messaging for DRR needs to change accordingly. It should not be assumed that people would automatically have the required situational awareness for application of PAMs, especially as these are high-stakes contexts where decision-making is done under pressure and time constraint. Therefore, prior testing and training are an invaluable part of the larger DRR knowledge processes for eventually recommending PAMs and knowledge for use. Lack of awareness or removal of situationally influencing factors from the outset of research without duly considering and deliberating on the impact of effects can prove disastrous during the stages of dissemination – and fatal during real-time application while facing life-threatening risks. Testing may not render PAMs completely error-free in their practical application, but the margin of error can be reduced.

As detailed above, during my fieldwork I learned of tragic examples of PAMs that had adversely affected people during the Gorkha earthquakes, where dissemination of contextually inappropriate 'assistive' knowledge had caused more fatalities. 'In school programmes children are taught to DCH but many buildings are non-engineered' (NSET interview, 2017). Although simple guidance like DCH has only gained popularity in recent years, the overall effectiveness of the measure has not been critically analysed in most cases where it is encouraged. Above, I gave accounts of cases within Nepal where DCH has proved counteractive, because although building codes exist, they are seldom used in construction, leading to highly unstable buildings that cannot withstand shaking during earthquakes. Thus, if people are outside during an earthquake, it is perhaps contextually advisable to stay outside, further away from buildings. Tragically, during the earthquakes, people who were originally outside ran into unsafe buildings to perform the DCH PAM, resulting in more lives lost in building collapse.

The problem with the unsuccessful DRR messaging example in the Practical Action interview above was the assumption that everyone would understand the risk communication

messaging sent through text message format. This system of communication assumed that everyone owning mobile phones is literate, able to assimilate information, and take action. However, being unable to read and understand the risk communication conveyed, many people were unable to take adequate action. This correlates with the evidence provided in section 4.4.2 concerning literacy in the critique of Milledge et al. (2018, 2019), who similarly assumed that mountainous communities would know what an angle is, and how to measure angles with their hands (assuming further being able-bodied) and therefore apply the simple rules. What researchers and experts may assume and perceive as unproblematic may actually be problematic and a cause for concern with local people who would act on expert assertions. Expert assertions, especially within the DRR domain, tend to have lasting impressions on people and shape their perceptions of suitable PAMs, as presented in section 4.3, the example of 'doorframes' vs 'DCH' searches during the period 2004-2022. In Chapter 4, I also discussed how outdated expert advice like sheltering under a doorframe was currently recommended in Nepali educational programmes (Subedi et al., 2020; Subedi & Hetényi, 2021) without testing for effectiveness as a PAM.

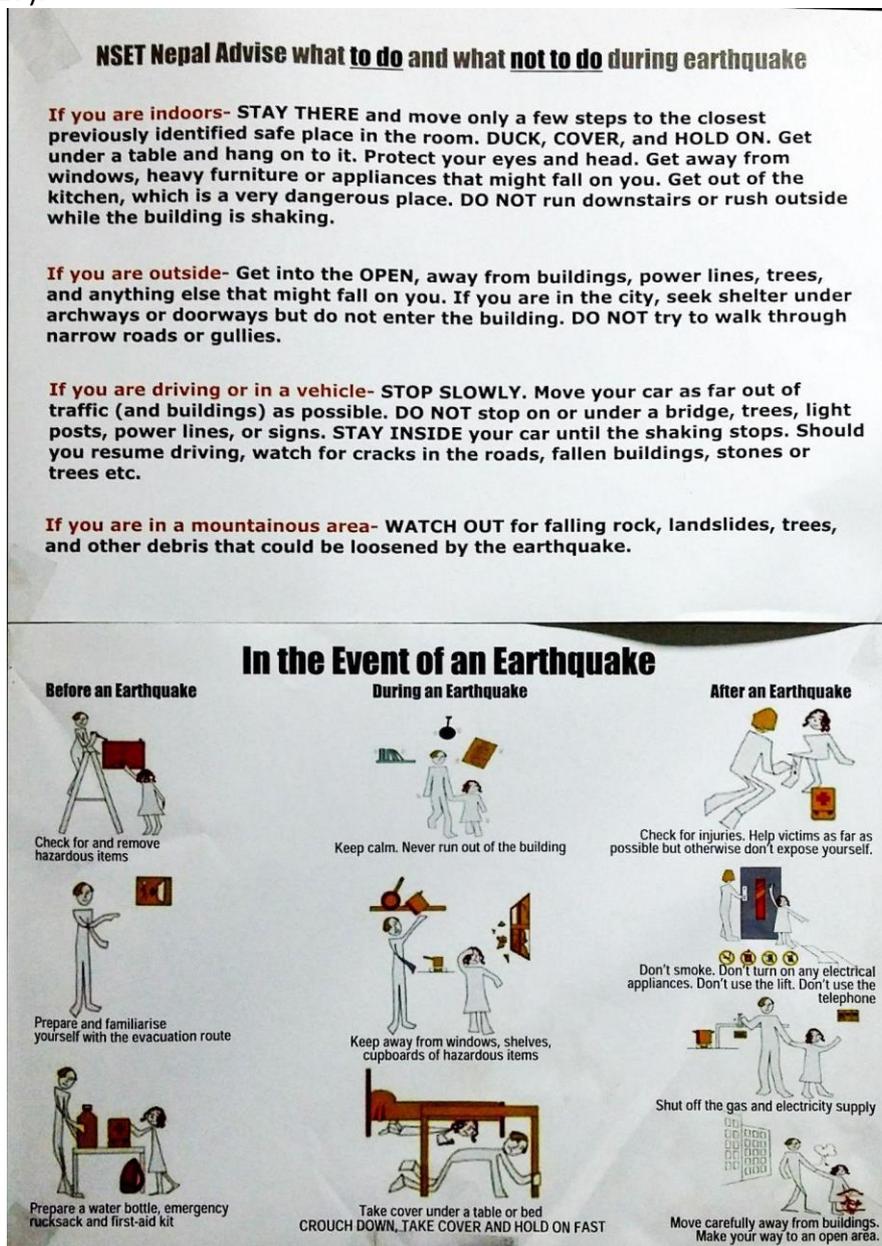
While I appreciate DRR educational efforts like Subedi et al. (2020), I have argued against knowledge generated for 'developed' contexts being taught in a 'developing' context like Nepal without first testing for contextual suitability and DRR effectiveness. Moreover, it would be preferable to begin co-producing context-sensitive educational materials and PAMs for the various contexts within Nepal by initially taking into account the in-country situational factors rather than employing the 'adopt and adapt approach', which proves unsuitable in the case of PAMs like DCH.

Furthermore, during my fieldwork (2017) I noted (Figure 5.5.) that NSET advice for what to do in the case of an earthquake also recommended seeking shelter in "archways or doorways". More concerning is that this advice is offered to people who are already outside and contradicts the advice to get out into the open, away from buildings and anything else that might fall on a person.

Moreover, the advice to never run out of a building during an earthquake event (Figure 5.5) requires further testing, especially as NBCs are not widely implemented, which results in building and infrastructure hazards. This advice is contrary to current expert advice for

countries where the NBCs are not usually followed/implemented (Rapaport & Ashkenazi, 2019; Goltz et al., 2020).

Figure 5.12. Advice for what to do during an earthquake by NSET Nepal (Photo credit: author, 2017).



5.6. Culture

During a disaster event, the cultural factors that precede the event will affect people during and in the immediate aftermath too. Hegemonic relations based on caste stratifications cause marginalisation in everyday life contexts which in turn affects decisions about where

marginalised groups can live and the types of services that are accessible. Accessibility to disaster relief and post-disaster rehabilitation endeavours are therefore likewise affected. Disaster response processes including aid distribution are hampered if cultural norms are not acknowledged. Culture is an important factor to consider, since it impacts the effectiveness of DRR efforts.

In Nepal, clearly defined social systems stemming from traditional beliefs still dominate social relations. The historic social system focused on a division of occupation based on proclivities, not on birth-caste, but has been subsequently altered by the powerful in order to retain power, resources, and control (interviews, 2017). As a result, if one is born into a particular caste, it limits one to caste-characteristic livelihoods, rather than the historic mobility between social orders based on inclination and ability. Hegemonic relations here dictate that those in power influence systems in line with their own interests (interviews, 2017; Burbank, 1995). These unequal power relations affect DRR efforts as outlined below and in further detail in Chapter 7.

Marginalised communities from lower castes, or outside the caste system, are unfairly discriminated against in many aspects of social life. This especially impacts where they can live; intermingling with members from other castes and so forth is prohibited, which often leaves no choice but to settle in hazard-prone locations (interviews, 2017). Moreover, if people are unable to meet their basic needs for food, clothing and shelter, hazard-prone areas are not avoided if there might be a chance to earn some livelihood to meet basic needs. Nevertheless, people's options are severely restricted in terms of the services that they could possibly access, and this extends to and thus excludes them from relief and rehabilitation efforts following disasters (Assessment Capacities Project (ACAPS), 2015; Oven, 2009). Marginalised and vulnerable groups, having insubstantial livelihood opportunities, resources and possessions, are already in a fragile position in relation to general society. Therefore, when a disaster strikes, this section of the populace has a greatly diminished capacity to somehow cast influence in relief efforts, to be heard, or counted among those eligible for receiving aid, and thus face added barriers to accessing assistance (interviews, 2017; ACAPS, 2015).

...political party representatives [...] not locally elected [...] play a prominent role [...] Their role in decisions about the allocation and distribution of aid was a frequently-

cited cause of dissatisfaction in discussions undertaken for this research. [...] “there is a tendency to make political power influence the distribution process, and this trend needs to be avoided to make fair and equal distribution.” [...] those with political connections were able to access relief more quickly and easily than those without (Barbe, 2016, 7).

Caste-based discrimination has been observed in several contexts (field observations; interviews, 2017); denial of access to temples, public water taps, and further discrimination within government offices occurs (National Dalit Watch-NCDHR, 2011). Due to social marginalisation and subsisting in highly susceptible and disaster-prone areas, marginalised communities are additionally vulnerable to natural hazards and man-made disasters (interviews, 2017). Such people are often not engaged in local governance structures or decision-making bodies, nor were they engaged in the earthquake response by international responders (GoN, 2015). Furthermore, discrimination was reported in the distribution of relief in terms of caste and gender, as well as political favouritism and patronage, regardless of what people needed (Barbe, 2015; Cook et al., 2018; Dominelli, 2018).

The Government of Nepal's Nepal Earthquake 2015 Post Disaster Needs Assessment identified that the overwhelming majority of the affected population were from vulnerable and marginalized groups; 41 per cent of houses damaged belonged to Dalits (lower caste) and indigenous communities, 26 per cent to female-headed households, and 23 per cent to senior citizens (Cook et al., 2018, 541).

Aid was sometimes unsuitable, and/or failed to match people's needs; vital factors went unnoticed (interviews, 2017); we “have received things like tuna fish and mayonnaise. What good are those things for us? We need grains, salt and sugar” (Wendelbo et al., 2016, 41).

Merin et al. (2015) and the Asia Development Bank report (2015) highlight the importance of involving local people in disaster response processes, to aid in informing and sensitising external support personnel to local culture, general social norms, medical acceptability, and understanding local medical culture. For example, in the aftermath of the 2015 earthquakes, humanitarian agencies faced challenges due to limited working knowledge of local communities, and the predominant norms in healthcare delivery.

culture played a vital role in delivering healthcare particularly when to perform surgery and with end-of-life decisions among others it was therefore important to establish communication with patients and families to foster trust and mutual respect for effective medical treatment [...] outside medical teams should be competent to deliver effective services to racially, ethnically, and culturally diverse patient groups (Cook et al., 2018, 541).

Women menstruating are particularly vulnerable as they are considered “polluted” (Burbank, 1995, 106), and often have to isolate outside, in ‘menstrual huts’. This cultural observance, *chhaupadi*, banned since 2005, leads to a higher death rate for women forced to reside in unsanitary and unsafe dwellings (group-interview, 9mc-report, 2017; Adhikari, 2020). This issue becomes compounded during disaster events when marginalised women may not be able to seek safety and shelter due to the observance of segregation during menstruation. Gender is an especially important factor to DRR consideration for reasons like the example above; however, a further analysis is outside the scope of this thesis.

5.6.1. Analysis of Culture

Ingrained social prohibitions are still followed as if they were laws, although caste laws have been abolished; therefore, eliminating the legislation has “done little to change social attitudes” (Burbank, 1995, 30). Since governmental authorities adhere to cultural structures already in place, although marginalised communities may raise objections, inadequate action is practically taken to rectify inequalities. Whereas governments make overarching political and strategic decisions, the higher strata of society are often catered to, with vulnerable sections left fending for themselves. Robert Piper, former UN resident and humanitarian coordinator comments: “After five years working on this in Nepal, I have come to recognise that addressing Nepal's vulnerability to natural hazards is first a governance problem, and only second, about funding and expertise” (Piper, 2013).

While reports like Barbe (2016), highlight the dire needs that every humanitarian response ought to address, there is no specialist mechanism, framework or authority that can guarantee or enforce this in practice. Barbe’s report for *Save the Children* states that humanitarian efforts should ensure that an assessment and analysis of the needs and vulnerabilities of different groups is carried out, and the response should be targeted to address these needs and strengthen the capacities of the most vulnerable (Barbe, 2016; Cook et al., 2018).

Concerning cultural issues centred on ‘respect’ and various cultural undertones in NSET’s interview about shake-tables; this type of social constraint can severely hamper and restrain DRR education and efforts as one must defer to authority irrespective of whether it is favourable for DRR. The director had some power and could thus by-pass the instruction;

others without prominence might not be able to. This results in epistemic injustices, which will be discussed in further detail in Chapter 7.

In analysing the unsuitable aid issue, Nepal's national animal is the cow, representative of a nation steeped in centuries of Vedic, 'Hindu' and Buddhist cultural traditions still currently practised (interviews, 2017; Figure 5.13). One of the key components is dietary selection; dhal-bhaat-tarkari (lentils, rice and curried vegetables) being the staple, and goat, chicken, or fish being consumed by some of the castes (interviews, 2017). Nevertheless, unless one belongs to the Tamang people, the meat that is consumed would under no circumstances be beef, as it is considered completely against the tenets of Nepal's stratified social culture. During the Tihār festival, cows are worshipped with red tikas (dots) on their foreheads; their milk has religious symbolism (Burbank, 1995). Hence, it was highly inappropriate for food relief containing beef in particular to be offered unilaterally to Nepali people (interviews, 2017).

...obvious sensitivities concerning food, which were overlooked, for example, some food aid included meat or its derivatives, which also contained beef. Nepal is a predominantly Hindu-Buddhist country where eating beef is considered taboo. This therefore led to a trust deficit and created avoidable food waste. Lastly, it was found that some packaged relief food items had past their shelf life and expiry dates. Similar issues also surrounded medicine and medical items (Cook et al., 2018, 543).

In DRR efforts, when there is an omission of cultural sensitivities and understandings, the omission undermines efforts because of the trust deficit that results. A people-centred approach would address some of these issues before disasters and possibly build people's trust instead.

Figure 5.13. Landslides and rainbows as the cows come home in Listi (Photo credit: author, 2017).



5.7. Conclusion

Building codes, zoning policies, environmental regulations and the subsequent law enforcement have a combined influence on the outcomes of major earthquake events. There is a correlation of infrastructure and vulnerability where human casualties in landslides are often related to the collapse of occupied buildings. In Nepal it is widely known that although there is a NBC it is not usually applied. Moreover, there are currently no assured forms of testing that can be applied to a building to determine its compliance in construction methods. The NBC does not cater for rural contexts, and should include a NBC for earthquake-safe rural housing, rather than just modern construction methods for municipal areas. There are no guidelines or DRR messaging for buildings that may be built according to local or traditional construction methods using local materials.

Government decisions impacted mountainous rural communities in the immediate aftermath of the Gorkha earthquakes and thereafter, when political concerns were prioritised over DRR, leaving mountainous communities without the governmental assistance that would normally lie within the scope of governmental DRR responsibilities.

Further, DRR decision-making usually took place remotely with decisions for mountainous communities being made in Kathmandu and outside Nepal, which led to miscommunication. This highlights the issues with withdrawal from face-to-face engagement in DRM and the repercussions that directly affected aid delivery to rural communities and impacted their ability to access response teams within the crucial hours and days post-disaster.

Requests for scientific evidence about the earthquakes were largely concentrated at the national level, within the wider humanitarian community, who often sought information from overseas experts. Scientists' involvement was limited by a lack of understanding of the disaster response community's information requirements, and the needs assessment process, as well as the disaster managers' limited knowledge of what scientists could offer. Moreover, technical information was not presented in a manner that encouraged its use. Locals were sceptical and felt 'used' in an extractivist manner by experts for research. While experts reaped benefits of their own research, local people received no tangible benefits, which led to antagonism or ambivalence towards 'researcher-types' and research. Foreign experts conducting research without the involvement of the local people, local culture, and local authorities, was unacceptable to locals. Thus, local communities and NGOs were not inclined to follow or use science, seeing no substantial local involvement or prospects of local benefits.

People are currently taught at school level (and beyond in ESDs) that DCH is the most suitable PAM to take in case of an earthquake; however, there are no qualifying stipulations or contextual guidance. However, universally well-recognised PAMs like DCH, proved counterproductive within the context of Nepal during the 2015 Gorkha earthquakes, according to interviews and field reports. During the 2015 earthquakes, people were under the mistaken impression that it was safer to run into buildings to DCH rather than stay outside, away from hazardous buildings, resulting in an avoidable loss of lives. NBC are seldom used in construction, thus leading to highly unstable buildings that cannot withstand shaking during earthquakes. Moreover, there have never been any checks/tests done to ascertain if DCH was the proper PAM to take. The issue with the unsuccessful DRR messaging example in the Practical Action interview assumed that everyone owning mobile phones was literate, able to assimilate information, and take action. However, being unable

to read and understand the risk communication conveyed, many people were unable to take adequate DRR actions.

There are positive examples of research like NSSN, led by local researchers and supported by foreign experts, which enabled effective and substantial collaboration. However, the discussion in this chapter has illustrated that it is hazardous to use knowledge generated for 'developed' contexts in a 'developing' context like Nepal without first testing for contextual suitability and DRR effectiveness. Since government authorities adhere to cultural structures already in place, although marginalised communities may raise objections, inadequate action is taken to rectify inequalities in practice.

Chapter 6

Factors that Impact the Implementation and Performance of PAMs: Aotearoa (New Zealand)

6.1. Introduction



Figure 6.1. Map of Aotearoa with the areas of focus in the red outline (Source, Alamy; outline added by author).

The 2010 Waikirikiri (Darfield) earthquake struck Te Waipounamu (the South Island; see Figures 6.1-2) with a magnitude (M_w) of 7.1 at 4:35 am on 4th September on the Greendale fault, which was previously unidentified (Potter et al., 2015). There was extensive damage because of the MM9 shaking, particularly to buildings and infrastructure but fortunately no fatalities. A few people were seriously injured, and there were approximately 100 total injuries. By contrast the M_w 6.2 earthquake occurred in Ōtautahi (Christchurch) on 22nd February 2011 at 12:51 pm local time, also situated in the Waitaha (Canterbury) Region of Te Waipounamu but caused devastation and loss of a far greater magnitude. It claimed the

lives of 185 people and destroyed buildings and infrastructure. “The Canterbury earthquake sequence in New Zealand was characterised by high-energy earthquakes, a complex pattern of faulting and an extended series of aftershocks. The mainshock occurred in September 2010, yet the largest aftershock occurred 172 days later” (Reyners et al., 2014, 34).

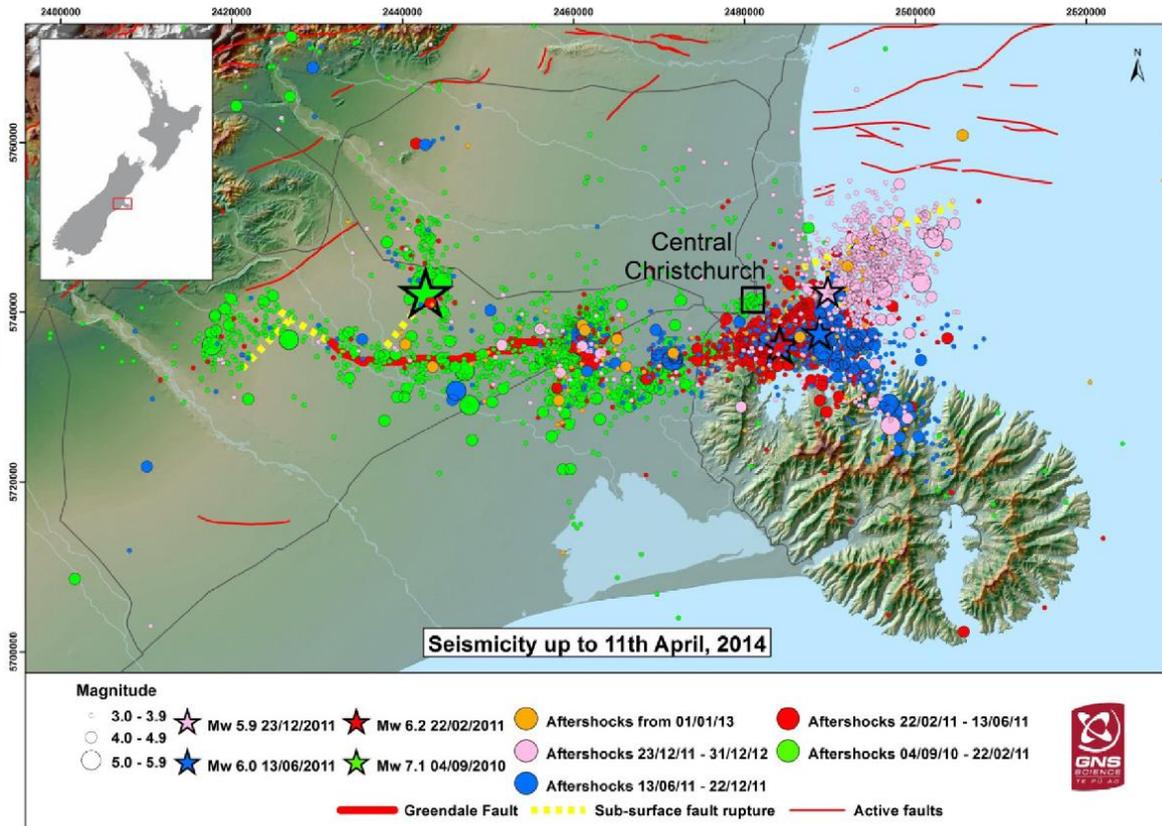


Figure 6.2. Location of epicentres during the Waitaha earthquake sequence (Source: Marshall et al., 2012, 1092).

Aotearoa is riddled with major active faults, many of which are known and documented; however, the fatal 6.3-magnitude earthquake of February 2011 was caused by a fault that was not previously on the known list of active faults (GNS Science, online).

Christchurch has never been identified as a major earthquake zone, because no one knew this fault ran beneath [...]. It now appears likely that the Christchurch quake resulted from a previously unknown fault extending directly eastward from the Alpine fault. It first came to light last September when a stronger but less calamitous quake shook Darfield, 40 kilometres west of Christchurch. Seismologists believe the latest quake resulted from an eastward continuation of activity on the same fault. ‘It has probably not moved for tens of thousands of years, so lots of strain built up’ (New Scientist, 2011; Cf. GNS Science, online).

Aotearoa experienced another major earthquake on the 21st of July 2013 centred in Te Moana-o-Raukawa (the Cook Strait) region at 5:09:30 pm on a previously unknown extension of the London Hills Fault. The earthquake measured Mw 6.5 and occurred around 20 kilometres east of the town of Seddon in Taihu (Marlborough). Although the damage caused was minor in the region of Seddon, there were more significant impacts experienced in Te Whanganui a Tara (Wellington), followed by a series of aftershocks. This sequence consisted of four events: two significant foreshocks (M5.7 and M5.8) and a mainshock pair, the Te Moana-o-Raukawa earthquake, M6.5 and M6.6 Lake Grassmere earthquake on 16th August (Doyle et al., 2018). Fortunately, no lives were lost during the earthquake events; however, they caused NZ\$30 million of insured earthquake damage to residential properties (Toka Tū Ake EQC, 2013).

Thereafter, the Kaikōura earthquake occurred on the 14th of November 2016 at two minutes after midnight. The Mw 7.8 Kaikōura earthquake and aftershocks produced and triggered between 80,000 and 100,000 co-seismic landslides over the north Waitaha region (GeoNet, 2016).

Geonet, the official monitor, recorded 313 quakes, taking the total since the initial magnitude 7.5 quake to 1,212. [...] Some landslides caused blockages of river valleys that simultaneously created lakes. These newly formed lakes are potential hazards as they could possibly collapse or burst and cause catastrophic flooding downstream (Phipps, 2016).

The earthquake caused serious damage to infrastructure and changed the shoreline due to the coastal uplift that took place. Many hundreds of people were stranded without road access.

Four air force helicopters have airlifted more than 130 people out of the town, but reports say it could be four days before all those who want to leave are evacuated. NZ HMS Canterbury is on its way to the town to deliver supplies and carry out further evacuations. [...] The confirmed death toll from the initial quake remains at two. Officials said there were a number of people injured, but not seriously (Phipps, 2016, online).

Based on calculations inferred from the natural history preserved in the geologic archives, contemporary scientific data and paleo-seismic understanding, the current geological setting in Aotearoa is indicative of the next massive earthquake (Stirling et al., 1998). Based on prehistoric earthquake (paleoseismic) records (Berryman et al., 2012; Cochran et al., 2017), a major earthquake is experienced once every 250-300 years (Clark et al., 2013)

across the Alpine Fault region, although precisely where the earthquake will occur may not be known. Nevertheless, it is likely to occur along the large fault line that runs across the South Island, and it is actually expected to happen sooner rather than later, as it may already be slightly overdue (Orchiston, 2018). The evidence for this is clear, and knowledge is being systematically made available for comprehension in understandable terminology because the level of destruction that it will bring is expected to be substantially severe and will present a risk of national significance (Stirling et al., 1998; Norris & Cooper, 2001; Sutherland et al., 2007; Dowrick & Rhoades, 2011; Berryman et al., 2012; Bradley et al., 2017; Cochran et al., 2017; Orchiston, 2018).

I will use the Aotearoa case study to further highlight the importance of considering contextual factors in DRR (initially argued for in chapters 2, 3, 4 and 5). The case study also shows the limitations of existing attempts at knowledge integration and use in a developed context where a large amount of scientific knowledge is available and communicated; this addresses the assumptions that more science is exclusively required for effective DRR (argued against in Chapter 4) and that more science equals implementation. I will again focus on building codes and infrastructure, DRR governance and governments, the use of science, education, and culture, highlighting the importance of these factors, and what can go wrong if they are not considered. As in the previous chapter, these are five main areas I discuss and analyse that affect DRR knowledge production, dissemination, and implementation processes, including PAMs. These factors should be considered simultaneously, and thus do not follow any hierarchical order.

6.2. Building Codes and Infrastructure

All building work in Aotearoa is required to comply with the Building Code (BC) to ensure buildings are safe and durable. The BC, under the Building Act 2004, governs the building sector, setting out rules for construction, alteration, demolition, and maintenance of new and existing buildings (interviews, 2019; building.govt.nz). Plans and specifications are assessed through building consent authorities (BCAs), usually the local government council, to confirm proposed work is BC compliant. The BCA then issues building approval for work to proceed. To confirm requirements of the BC have been met, a code of compliance certificate must be received, and structures built to approved plans. The BC works in

conjunction with legislation for health, safety, consumer protection, and land use in Aotearoa (interviews, 2019; building.govt.nz).

Compared with other recent major earthquakes affecting urban areas, the number of casualties in the Canterbury earthquakes was low. [...] Likely reasons for the low mortality rates are the strict building codes in New Zealand and the dominant residential construction type of light and robust timber-framed buildings (Johnston et al., 2014, 636).

In Ōtautahi (Christchurch), the serious earthquake damage to modern, rather than older, traditional structures was surprising (interviews, 2019). This was attributed to the violent shaking, and the city being built upon damp sediments of an alluvial plain, prone to liquefaction. While shaking, the ground lost its rigidity because it behaved more like a liquid than a solid and as a result buildings were shaken far more violently, causing immense amounts of damage (Jha & Sample, 2011). About 900,000 tonnes of liquefaction silt was removed from the Ōtautahi area and the land level changed in parts (Potter et al., 2015).

Two factors set the Ōtautahi earthquake disaster apart from the Waikirikiri (Darfield) event. Firstly, the earthquake occurred 5 kilometres within the earth, limiting the quantity of seismic energy dispersed from its epicentre, en route to reaching Ōtautahi, which received a vast amount. Secondly, rocks found on either side of the fault line accelerated almost three times faster than in a more typical earthquake context (Johnston et al., 2014). As a result, extra-violent shaking occurred that was drastically greater than the levels of shaking that the structures in Ōtautahi were designed to withstand (interviews, 2019). There have since been updates and amendments to the BCs for the region (Cf. MBIE Guidance, 2021). “Changes from the November 2019 BC Update have revised B1/AS1 to ensure new buildings are built safe and strong enough to withstand liquefaction effects” (MBIE, 2021).

6.2.1. Analysis of Building Codes and Infrastructure

This case highlights the limitations of BCs in a 'developed' context where they were implemented properly. The Ōtautahi earthquake occurred on a previously unknown fault and the levels of shaking were unpredictably higher than previously known to earthquake scientists and seismologists. Implementation of BCs in this particular case was not adequate for safety in an earthquake, therefore PAMs like DCH which are usually performed within buildings under a desk would also prove inadequate under these circumstances. This

provides some support for the conclusion that areas prone to liquefaction and its resulting effects on infrastructure during earthquakes require more suitable, context-sensitive PAMs. Further research and testing could be undertaken in future to ascertain what the improved course of action(s) could be.

During the Ōtautahi earthquake many sturdy and seemingly robust buildings collapsed, leading to fatalities, despite rigorous BCs. This highlights issues with thinking that the BC alone is sufficient protection during earthquakes. Being overly optimistic about disaster response results from a lack of understanding and leads to optimistic bias. Inexperience may also contribute to ineffective disaster response, as an adversity-free experience during times of disasters may lead people to be overly optimistic about future disasters. “Such optimism prevents individuals from recognising that having a degree of preparedness is important for effective disaster response and recovery” (Becker et al., 2013, 1721). Placing one’s safety in the hands of other agents or legislation is a risky decision to make. In an interviewee’s words: “How the structure can withstand an earthquake is probably the outstanding risk. I don’t see fire as being a risk at all. It’s relatively modern. I take it for granted that it is built to design code” (Becker et al., 2013, 1721).

While Aotearoa is a developed country, placing one’s faith in buildings that may not be earthquake-safe, and assuming the safety thereof is akin to a gamble. Nevertheless, some are willing to place their safety in something as intangible as the look of a ‘modern’ building rather than take personal responsibility for their safety. People might sometimes be open to and willing to prepare when that preparation means getting supplies or doing the needful in terms of simpler tasks. However, when more complex tasks like retrofitting are required, people are less likely to implement these measures. Arguably, making sure that a building complies with earthquake safety standards, rather than merely assuming or taking for granted that it does, would be a far more effective adjustment adoption measure for better disaster preparedness.

In Aotearoa, which has a well-regulated building industry with modern building codes, earthquake casualties and injuries are determined by the behaviour of individuals during and immediately following earthquake shaking (Horspool et al., 2020). People’s behaviour inside and outside buildings is worth considering for DRR efforts to succeed; they are rarely

considered, but should be fully considered especially when designing both structural and non-structural elements of buildings (Vinnell et al., 2022).

6.3. DRR Governance and Government Structures

Emergency response and assistance efforts involve governmental structures, military deployment, and civilian organisations working together for a concerted effort towards overarching DRR goals (interview, CO, 2019). The government is a signatory to the Sendai Framework and prioritises DRR efforts to improve societal outcomes. Through management structures, like the National Emergency Management Agency, the government is willing to undertake preparatory PAMs: it actively funds scientific and academic research, trains necessary personnel, offers use of specialised equipment, offers resources for citizens' protection, and for building resilience to future disasters (interviews, 2019). "Officials from local civil defence and emergency management groups will spend tonight 'going door to door to check on households' in affected communities that have not yet received assistance" (Phipps, 2016).

During the Waitaha (Canterbury) earthquakes, Aotearoa declared its first ever state of national emergency (Beaven et al., 2017; NMEA, 2022) wherein a multitude of actors served different roles in DRR governance. Activation of the Canterbury Earthquake Recovery Authority (CERA), a purpose-built government agency to assist with reducing obstacles faced in recovery decision-making, ended the state of emergency. The Natural Hazards Research Platform (the Platform), formed in 2009, was tasked with bringing research organisations together with other stakeholders and policymakers to coordinate national research funding and activities, supporting governmental response efforts, and to benefit various response and recovery agencies (Beaven et al., 2017). The Platform achieved a good level of research networking, playing a role in producing and offering high-quality earthquake-related scientific outputs, which influenced policy and practice decisions relevant to the needs of operational agencies (interviews, 2019).

However, the Platform's firm grounding within the science and research sector meant that its contractual arrangements reflected the predominance of research domain drivers above integration and joint production of socially robust knowledge (interviews, 2019). The lack of

a balancing, formal integration mechanism became distinct by its absence, resulting in an imbalance in integrating cross-disciplinary research with varied organisational structures and boundary organisations, including businesses, NGOs, and local communities (interviews, 2019). Observations and lessons were drawn from the work of the Platform for Project AF8 (Alpine Fault Magnitude 8), funded by the government for the following three years (2016-2019). Project AF8 is a practicable framework for a multi-agency, coordinated response to major natural hazards affecting Aotearoa. Although initially a 3-year project reflecting Aotearoa's DRR preparation efforts for a magnitude 8 earthquake, AF8 is now ongoing with engagement, outreach and response plans. The project began intentionally and purposefully reaching across traditional boundaries of policy, practice, and research (in contrast to the Platform) to cooperatively and collectively address a common objective: to improve the ability of Civil Defence Emergency Management (CDEM) groups, infrastructure utilities, welfare organisations, and communities (including in rural areas) to respond to future hazards. AF8 is a multilevel exercise in 'preparedness in the first week of a disaster', focusing on co-seismic hazards and issues, whereas usually "the focus is so much on earthquakes, not the rest" (interview, CO, 2019).

By acting as a boundary organisation (Beaven et al., 2017), AF8 created channels of open communication, working relationships of trust and mutual concern through stakeholder involvement in the process, and attempting to be collaboratively better prepared. "Most previous hazard planning developed by CDEM in Aotearoa has used a functional and generic 'all-hazards' approach [...] The use of risk scenarios, such as the Alpine Fault hazard scenario, is seen as important for determining future risks and working to reduce them" (Orchiston et al., 2018, 390-91).

Planning processes for AF8's hazard scenario informed the development of the South Island Alpine Fault Earthquake Response (SAFER) plan, one of the project's three major outputs. The others were the ongoing contribution to enhancing Alpine Fault research, continued efforts to build community resilience through practical engagement and communal outreach, and spin-off initiatives East Coast LAB, and volcano response projects (interview, CO, 2019).

6.3.1. Analysis of DRR Governance and Government Structures

While some might think that top-down knowledge production is no longer prominent and more scope for collaboration exists across domains and boundaries, relevant practical examples in the form of recent case studies may be offered to exhibit just how deep-seated the top-down academic system actually is (as discussed in Chapter 4). Some of the best, well intentioned, integrative plans are put to the test during emergencies, in the DRR context. The Platform was established to foster networking across disciplines, organisations and sectors; however, the distinct cultures of different domains and their traditional spheres of reference prevented the scope of consideration required in order to pursue meaningful collaboration. “Legitimacy involves fairness and balance, and is enhanced by transparency, inclusiveness, and consideration of the values and interests of all stakeholders” (Beaven et al., 2017, 2-3). The lack of a balancing, formal integration mechanism led to an imbalance in integrating cross-disciplinary research with varied organisational structures and boundary organisations, including businesses, the non-governmental sector, and local communities, among other stakeholders. As alluded to earlier in the discussion of the traditional academic trajectory of knowledge production and quality assurance standards that are measured solely within the academic domain itself, the Platform is an illustrative example of how such self-assessment standards may not properly serve the intended purposes for greater coproduced DRR goals.

Research productivity and quality standards were measured with reference to disciplinary peer-review quality assessment processes, and the quantity and impact status of peer-reviewed publications (Buwalda et al. 2014). Rather than simply reflecting an oversight on the part of Platform leadership or management, [...it] was strongly reinforced by contractual obligations, which thereby worked against the development of a research strategy focused on resilient outcomes (Beaven et al., 2017, 9).

Furthermore, the Platform case exemplifies the great divide that exists between theory and practice. There is a gulf of difference between accepting and allowing for measures on paper in terms of contracts, policies, rules of law, or simple guidance, that are developed and disseminated but are almost never assessed and evaluated in practical terms of achieving purported goals when theory ought to be put into practice. Usually, there are no mechanisms in place to act as a set of checks and balances to weigh the actual usefulness, relevance, or practicality of measures. “Academics, policy makers and practitioners alike

have largely ignored the opportunity M&E [Monitoring and evaluation] offers for understanding and building adaptive capacity. As a result, the dynamics of the changing environment have been sidelined and the very processes of change that lead to adaptation obscured” (Villanueva, 2012, 43). The UNDRR (2015) framework for M&E details how these processes might be engaged with. However, in theory, because measures are drafted by experts, they are accepted as reasonable, ‘workable’ and useful in most instances, without the practical assessment phase (including M&E) to verify this.

Decision-making principles and stand-alone references in the contract and strategy documents emphasized the coproduction-with agency end users [...]. This emphasis was **undermined** by the structural emphasis on scientific credibility apparent in the design of contractual and participation arrangements, and decision-making roles and responsibilities [...]. The Platform, however, lacked the balancing grounding in the policy sector required to ensure that collaborative processes and outcomes are as relevant as they are scientifically credible” (Beaven et al., 2017, 9).

Further structural resistance to coproduction was only compounded at higher levels by a focus on contractual performance standards of research quality and productivity measured according to evaluation criteria dominated by typical monodisciplinary journals and review processes, rather than the much-needed performance standards that ought to have been concerned with coproduction. Numerous lessons can be learnt from the Platform case, but most vitally, the need for balance, impartiality and respect for all stakeholders to facilitate integration efforts in producing relevant and effective DRR outcomes. The converse has been shown herein when academic and research-led organisations, agencies, and communities exercise more power and exert more influence over other contributing members.

Some scientists and academics are setting their focus on understanding the problems experienced in prior events and seeing value in addressing these issues to provide effective DRR solutions. Experts managing AF8 opened avenues for communication with others from non-specialist, non-expert backgrounds, although the project is backed by a scientifically informed and expert team; also consisting of members with practical experience working together with DRR organisations and community projects. “The Shakeout scenario-based approach, as far as I’m aware, didn’t get down to the nitty gritty of how do we actually respond to this, and how do we get everyone on board” (interview, Orchiston, 2019). While drills play a practical part in the DRR learning and education processes they also test the

limits of what might be possible to achieve in the short term. A long-term focus on preparedness as a process that includes relevant stakeholders is needed. The use of risk scenarios is one of the types of testing I see as integral to DRR processes because it is important for determining future risks and working to reduce them.

6.4. Use of Science

The Institute of Geological and Nuclear Sciences (GNS) is the leading scientific advisory research institute in Aotearoa producing reports and guidance on geohazards. Collaboration between the Earthquake Commission (EQC) and GNS formed GeoNet, responsible for seismic monitoring and communication. Throughout the Canterbury earthquake sequence, reporting remained clear and accurate with adequate use of statistics and relevant science offered by GeoNet, and widely used by reference in news reports and other forms of media (interviews, 2019).

AF8 has a dedicated outreach and engagement team organising 'Roadshows' wherein science is disseminated through contextualised, region-specific knowledge and interactive meetings with communities, creating DRR awareness and understanding of PAMs required. Professor Brendon Bradley works tirelessly in developing impactful visual representations (interview, CO, 2019). These videos help convey usually complex scientific research in more understandable and user-friendly formats. I will next look at a particular town, Waiau (Franz Josef) that the AF8 Roadshow visits, for the purpose of evaluating the use of science more contextually.

6.4.1. Waiau (Franz Josef) Case Study

Waiau (which means swirling waters) town is situated on the West Coast of Te Waipounamu (the South Island) of Aotearoa. Unique characteristics of the town's natural environment and attributes, especially its position at the foot of the Kā Tiritiri o te Moana (Southern Alps), place Waiau high on lists of renowned tourist destinations. Five kilometres from the town's centre, the prominent attraction, the Kā Roimata o Hine Hukatere¹⁵, or 'The Tears of

¹⁵ Ngāi Tahu, the local Māori tribe, speak of Hine Hukatere who lost her love in an avalanche while climbing the mountains. Hine Hukatere was strong, fearless, and loved climbing mountains. She persuaded her lover Wawe to climb with her; he was an inexperienced climber but enjoyed accompanying his beloved. An avalanche hit them as they were climbing, sweeping Wawe from the peaks to his death. Hine Hukatere was

Hine Hukatere' (Franz Josef Glacier), descends from the Alps into rainforest close to sea level. The glacier is quite accessible to visitors who would normally trek further and higher to reach mountainous glaciers. Due to this accessibility, numerous tourists have visited Waiau over the years, with numbers increasing yearly (site visit, field notes; Strong, 2017; Tonkin+Taylor, 2017; WDC, 2013).

Figure 6.3. Waiau village (centre left) and valley with the Waiho riverbed (Photo credit: Wikimedia).



However, the unique environment also generates and poses immense multiple hazard risks. The two main forms of natural hazard in the area are a) weather and climate related, including heavy rainfall, flooding, severe thunderstorms, landslides, and snow-related hazards; and b) geological effects like fault rupture, earthquake ground shaking, landsliding from range front collapse, alluvial fan growth, river blockages and breakouts (GNS Report 2011b; Langridge & Beban, 2011). While being situated on the Alpine Fault is an earthquake and landslide disaster risk hazard, the Waiho River system has already caused several large

heart-broken and in her grief cried rivers of tears, which flowed down the mountain and were frozen by the gods. Her frozen tears of aroha (love) stay as a reminder of her grief and give the glacier its name, Kā Roimata ō Hine Hukatere, the tears of Hine Hukatere.

floods and landslides. For example, in 2016 the “river broke its banks near Franz Josef overnight, forcing 186 people to evacuate [...] Cars are submerged, a hotel has a ‘river running through it’, and a new water channel is running through an area 1 km north of the town” (Truebridge et al., 2016).

Figure 6.4. Hundreds were evacuated after floods swept through Waiau in March 2019 (Photo credit: Jakob Zwart).



During my 2019 fieldwork, my field itinerary had to be continually amended on account of severe flooding in Waiau (Figures 6.4-5). The extreme March-April flooding completely devastated the only access roads to Waiau tearing down the Waiho River Bridge, which washed away (Gorman et al., 2019). “There are a series of floodwalls along the river at Franz Josef, one of which on the south side of the river, dubbed by locals the Milton wall, was destroyed along with the Waiho Bridge after heavy rain on March 26 this year” (Carroll, NZ Stuff, 2019). The river flooded the town, inundating access routes, causing NZ\$30 million worth of damage (Carroll, NZ Stuff, 2019), and posed further high-risk health issues after flooding because of compromised sewerage and wastewater treatment systems.

Figure 6.5. The aftermath of the flooding which wiped out the Waiho bridge (Photo credit: Stuff NZ).



Rather than shock occurrences or media hype, multiple hazard risks and destruction have become norms associated with Waiau. “West Coasters face a multitude of risks in their everyday lives. Some risks can be reduced but in other instances living with the risk may be the only possible outcome” (Civil Defence WCEM, 2016, 19). Glacial retreat is a growing and ongoing concern, as potential hazard risks for tourists; from glacial retreat, unstable rock wall exposure creates hazardous paths along hillsides that could suddenly give way. Hundreds of tourists visit the site while these dynamic processes are ongoing, creating issues of safety (in-field observations, site visit, field notes, interviews, 2019). In 2015, the Waiau and Fox glaciers receded so significantly that pedestrian access onto the glaciers was banned; consequently, these sites can only be visited by helicopter operators (Department of Conservation, online). Since the pedestrian access ban, adjustments for increased numbers of visitors by air have had to be made by local helicopter tour operators.

Much of the West Coast is prone to landslides (Robinson 2015). [...] Landslides cause damage by direct impact and burial, landslide dams, and slides falling into water bodies causing seiches. All of these events have been recorded in the Region. Many of the region's settlements are partly located on, or at the base of unstable slopes (Civil Defence WCEM, 2016, 13).

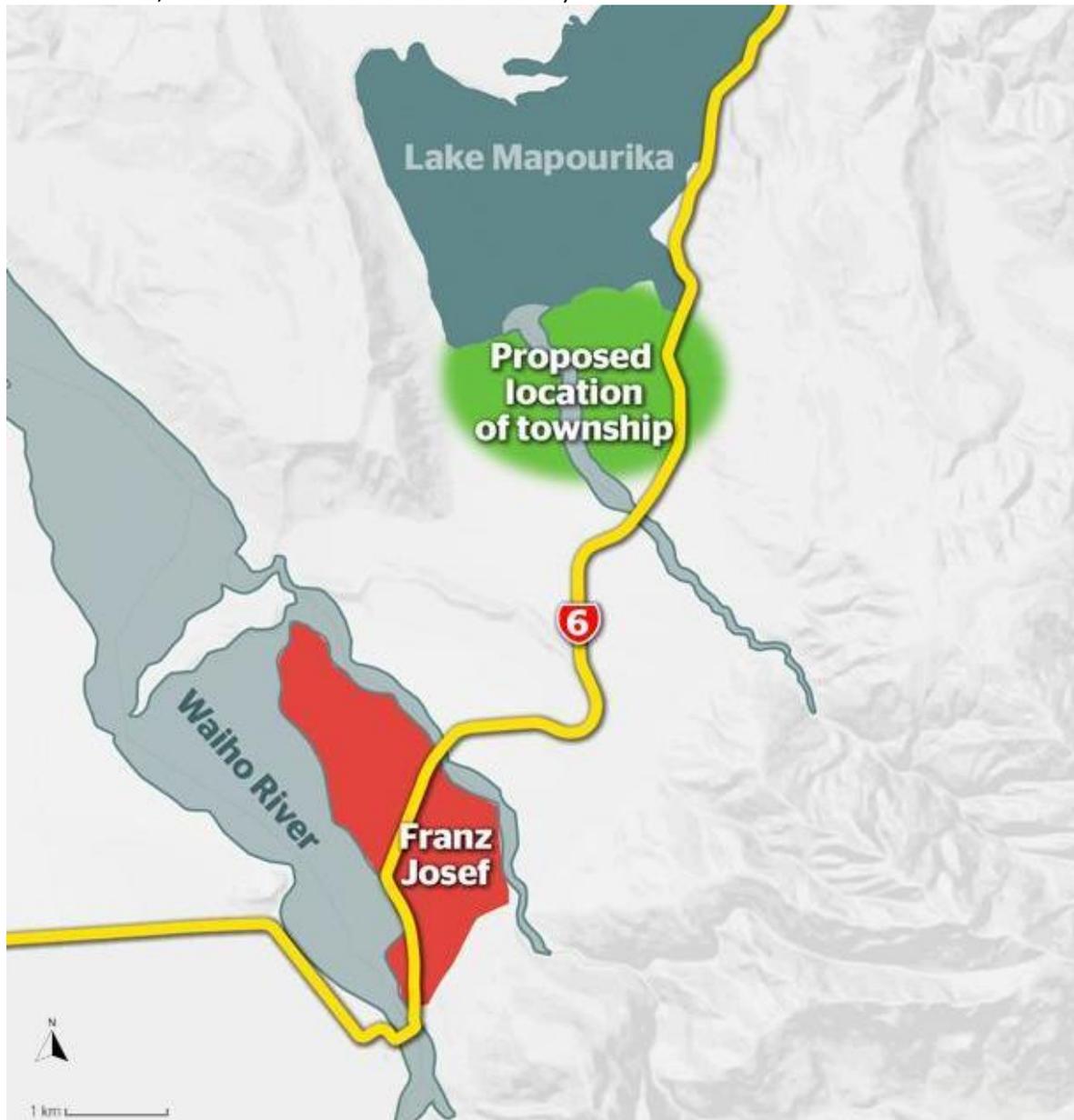
There is an ongoing debate about the costs and benefits of investing in ‘patchy-temporary-fixes’ like stopbanks, or having the residents move away altogether from Waiau. Residents

were grateful for stopbanks currently in place as further damage would have resulted; however, the consensus is that short-term measures are inadequate (interviewee 6, interviewee 7, 2019). It seems both short- and long-term measures are simultaneously indispensable.

A survey of Franz Josef residents in April 2018 found most support either completely or partly moving their town away from natural hazards, including the river and the Alpine Fault, which runs through the town. The survey was a follow-up to a 2017 Tonkin & Taylor and EY report, commissioned by the council, which analysed three options for Franz Josef's future. It said doing nothing was not an option. Franz Josef resident and Franz River rating group spokesman Logan Skinner said locals were extremely upset with the lack of action by the regional council (Carroll and Heard, NZ Stuff, 2019).

Later in 2019, further severe flooding caused a huge landslide and left tourists and residents stranded. "Up to 1000 people are stranded in Franz Josef after heavy rainfall caused a huge slip in the area" (NZ Herald, 2019). With flooding events occurring often (Goodsell et al., 2005), affecting almost every Waiau resident, the option of moving the town seems plausible (see Figure 6.6). However, the move would cost an estimated NZ\$35m. The West Coast has been stereotyped as usually installing "patch protection" measures focused narrowly on each individual district, rather than developing measures to support the region as a whole, as acknowledged by the West Coast Regional Council (WCRC), who hope to change the outlook from narrow to collaborative (WCRC, 2017, 38).

Figure 6.6. Waiiau’s proposed relocation, about 10km away, at Lake Mapourika (Source: Aaron Wood; with scale and orientation added).



However, some community members, although aware of and directly affected by several multiple-hazard risks, are still unclear and irresolute, expressing concerns about navigating the present issues and the future (interviews, 2019). Poppy Gordon, a Waiiau resident, expresses an awareness of risks in an interview but feels equally unsure about what to do (Strong, 2017). This mood persists although experts from GNS Science presented research showing that a relocation of Waiiau, out of the way of multiple-hazard risks, may be a viable alternative. The research undertaken by GNS Science has resulted in multiple consultancy and science reports, and scientific inputs for other consultancies. The Tonkin+Taylor (2017) report outlined concerns that were already highlighted by Langridge and Beban (2011),

while offering updates and inclusions, further enhancing their report; Langridge and Beban's report findings were presented before the Waiiau community, Westland District Council (WDC) and WCRC. The communal presentation allowed for the possibility of anyone in the town to air their views and concerns and to engage in active discussion on the topic of the town's possible relocation. With due proceedings, a 'Proposed Plan Change 7' (Managing Fault Rupture Risk in Westland) was drawn up highlighting essential concerns and motivations earlier highlighted in consultancy reports and in the town meeting. The media have been reporting extensively on the matter of the town's possible relocation.

6.4.1.a. Proposed Plan Change 7—Managing Fault Rupture Risk in Westland

In 2015-16 Proposed Plan Change 7 (PC7) detailed fault avoidance zones in an attempt to move existing infrastructure (police station, Mobil fuel station, etc.) out of direct impact zones and restrict siting further infrastructure on the fault line. However, on February 15, 2017, an official decision was announced rejecting PC7, withdrawing the proposal entirely. Although propositions were put forward to discuss possible alternatives to institute the town's changes, the propositions did not appeal to some. "WDC decided at their 15 December 2016 meeting, and confirmed January 2017 meeting, to withdraw PC7 (Managing Fault Rupture Risk in Westland) (Plan Change) to the Westland District Plan" (Minutes of meeting, Agenda 15 March 2017, WCRC, 5-7).

I first accessed public records in December 2018 for PC7 and the subsequent withdrawal decision on the WDC website. However, since July 1, 2021, the same website no longer displays any information regarding PC7 or its withdrawal. Currently, the last change listed is plan change 6, which became operative on January 31, 2008. No further records or proceedings for PC7 are catalogued after this date even for the purpose of historical reference (WDC, online).

6.4.1.b. Provincial Growth Fund (PGF)

The Government allocated 3 billion dollars in 2018, over a 3-year-term, investing in regional economic development, through the Provincial Growth Fund (PGF). "The PGF aims to lift productivity in the provinces. Its priorities are to enhance economic development opportunities, create sustainable jobs, enable Māori to reach full potential, boost social

inclusion and participation, build resilient communities, and help meet Aotearoa's climate change targets" (mbie.govt.nz). The PGF's main purpose, according to government websites (tpk.govt.nz; mbie.govt.nz), is "to accelerate regional development, increase regional productivity, and contribute to more, better-paying jobs by investing in projects" (tpk.govt.nz).

These purported goals, however, seem to be left unmet, as the PGF faced severe criticism for their decisions, indecision, and inappropriate decision-making (interviewee 6, interviewee 7, 2019). Members of the WDC, headed by Simon Bastion made an application to the PGF intending to fund the relocation of Waiau. In the application, Lake Mapourika, situated approximately 10 km away, was the town's new possible relocation site. The report further outlined the major issues that Waiau currently faced by not implementing longer-term measures: multiple hazard risks, and further losses that certainly will be incurred due to loss of infrastructure and future regional economic losses. However, the application was rejected, and the PGF continued to receive criticism; the PGF "faced criticism of benefits not having flowed through to the desired recipients" (Edmunds, 2021).

In an article titled 'Provincial Growth Fund rejects Franz Josef township move' (2019), journalist Joel MacManus outlines the situation's dynamics, while attempting to reach the parties involved for their comments:

Minister of Regional Development Shane Jones, who oversees the PGF, refused to answer any questions about why the application was denied earlier this year, saying it was an operational matter.

A spokesperson for the fund's provincial development unit said: "The scale of any project to move the Franz Josef township will require a wider response from both central and local government."

A request to discuss further details was refused, with the spokesperson saying it was "commercially sensitive".

Westland District Council chief executive Simon Bastion said the rejection was "frustrating" and the dangers the town faced were real (MacManus, 2019).

While the Tonkin + Taylor (2017) report was cited in the article, highlighting risk predictions Waiau faces over the next 30 years, some of these risks, like the destruction of the Waiho river bridge and overtopping of the sandbanks, happened just 2 years after the report was

published. According to the latest governmental update, as of July 7, 2021: “Most of the government's \$3 billion PGF has been fully allocated, as a result of the government reset of PGF funding to help the country recover from the economic impact of COVID-19” (Govt. NZ, 2021, online).

In a structured interview (2019) with Caroline Orchiston, Deputy Director at the Centre for Sustainability, University of Otago, I inquired about her professional opinions on the Waiiau case, and particularly why the science seems to go largely unheeded and un-implemented. (Orchiston is on the QuakeCoRE leadership team, the NZ Centre for Earthquake Resilience, co-lead for Flagship 5, Pathways to Societal Resilience, and is the Science Lead for AF8).

‘Money’, in a word. Franz Josef is a multi-hazard environment; west coasters are used to living in isolation and living in tune with the environment.

If one of the big operators decided to move then that might have started a domino effect, but unless everyone committed to moving, no one was going to be the first to say they would; because there’s too much of a competitive advantage with being closer to the glacier, being in the town and having the existing infrastructure there.

There was a letter my colleague Virginia Toy wrote on behalf of a bunch of us and we all co-signed it, urging the community to see sense and put themselves in a safer place. It’s relatively safer to the north but I wasn’t going to risk my reputation by saying if you move up north you will be safe because there could just be another landslide that takes out that place too. Sure they’re safer from flooding but the earthquake, when it happens, the shaking etc would impact their new developments. It is safer, it would be safer to move the town, absolutely, but it is a highly dynamic environment, so there’s no guarantee of safety even up there.

6.4.2. Analysis of Science

The town of Waiiau has received sound scientific guidance based on its unique characteristics and associated risks. Along with scientific reports and community involvement, different council representatives have attempted to achieve both short and longer term DRR goals; however, the town and its inhabitants remain at risk. While there were plenty of local residents that supported the PC7 (Cf. Annex 1) it seems that the commercial enterprises who opposed the PC7 were larger in number, which would have contributed to the withdrawal of PC7. “Essentially the community decided for themselves, given quite a lot of knowledge from the top-down knowledge coming in and saying this is how bad it is, you really should move. No, they didn’t want to” (CO, interview, 2019).

From the Summary of Submissions on the PC7 document, the motivations for rejecting the change can quite clearly be ascertained. In most cases the motivations were economic, owners were concerned about their property or their livelihoods. For example: “Opposes plan change. The plan change affects a business that represents a lifetime of work and retirement plan. The plan change will prevent future business development and the sale of the business, creating financial and emotional destruction” (WDC, 2013, 3). However, a hazard of national significance might also negatively affect one’s lifetime of work and impact carefully thought-out retirement plans.

‘Commercially sensitive’ decision-making seems to thus triumph over scientifically backed DRR focused decision-making, and therefore the prioritisation of commercially sensitive decision-making stands in the way of implementation of DRR measures. This is simultaneously reported by Mcmanus (2019), asserted/confirmed in the interview (2019) with Caroline Orchistan, and detailed in the Summary of Submissions (2013, Annex 1) document. The volume of context-specific scientific reports generated is large for a single town; however, generation does not automatically equate to implementation, as is still generally assumed within DRR literature (discussed in section 3.5.1). The gaps between knowledge and action in this case study seem to be based on (i) the prioritisation of economic considerations rather than DRR efforts, and (ii) a miscommunication or misinterpretation about the aspects of the science.

Some submitters seemed to think that meeting building codes would be sufficient by itself:

Certain types of buildings and building materials can withstand large earthquakes without risk to life or unacceptable damage. Proposed rules go to[o] far and are unnecessary. Lives and property can be protected by rules requiring modern materials and building techniques designed to withstand earthquakes rather than proposed change (WDC, 2013, 1).

However, other submitters were aware that the council stated that getting existing infrastructure to comply with codes for earthquake safety would not be possible. For example, a committee has expressed: “The Section 32 analysis includes a statement to the effect that it is not possible to strengthen buildings within the rupture zone to withstand the magnitude of quake predicted” (WDC, 2013, 7). Nevertheless, this committee opposed PC7; the basis of their opposition stemmed from the misunderstanding or misinterpretation of Sec 32 as a refusal on the part of the council to reinforce existing buildings and

infrastructure, whereas the council declared those buildings as ‘incapable’ of being strengthened. This case highlights the dynamics of having science and how it might be used or interpreted. The scientific verdict (from Tonkin+Taylor, 2017; Langridge & Beban, 2011) was that reinforcement would not be a viable solution; this was then interpreted as a refusal to adopt those measures, which in turn caused the public to reject the scientific recommendations.

Rapid glacial retreat is also swiftly gaining attention, but not for reasons of conservation, rather the focus remains on negative impacts for tourism (Mitchell, 2016) and economic losses that may result. These financial losses are considered for scenarios where the town might be relocated or if transportation routes, like the only access road in and out of town, and the infrastructure that connects Waiiau were damaged and unusable after a major disaster. However, these considerations are similarly concentrated solely on profits from tourism that could potentially be lost, should these scenarios become a reality. There is a distinct lack of focus by some members of the community on communal safety and well-being for the longer term. Rather, their considerations seem consolidated on how the community operators may earn as much as possible while the glaciers are still present, visible, and attracting tourists. Shorter-term commercial interests seem to vastly outweigh the considerations for the longer term. In the meantime, the effects of a changing climate, geohazards, and potential disasters that result from the changes cannot be checked. Scientific advice on long-term matters has varying degrees of effect and impact upon listeners, affecting what information they may gather, retain, and choose to act upon.

6.5. Education

ShakeOut drills following instructions to DCH were discussed in Chapter 4, along with further research that evaluated the usefulness of DCH and examined whether or not the actual performance might be achievable. Beyond the required testing for PAM suitability in different contexts, protective action messaging requires further research and understanding to improve and achieve effective DRR communication. The Ministry of Civil Defense & Emergency Management (MCDEM) provides radio and television messages with passive written warnings that disasters may occur at any time; however, messages are largely unheeded and unincorporated into belief systems. Earthquake educators need to consider

how salient beliefs can be addressed in education programmes, to foster beliefs that enhance people's motivation to prepare, use PAMs, and counter unhelpful beliefs (Becker et al., 2013). Along with important beliefs, socio-political and cultural factors, and imbalances of power should be considered as core:

Issues of cultural identity, power and trust need to be brought **centre stage**. Their absence in much of the literature speaks to a profound theoretical limitation, grounded in late modern political and cultural frames. These seek to explain behaviour as if it was purely a matter of **(ir)rational individual choice** in a controllable world. Rationalistic and individualistic perspectives bring some useful concepts to the field. However, without acknowledging the theoretical limitations and practical implications of these perspectives, the international communities of disaster risk researchers and the practitioners who look to their work will **never** reach a satisfactory explanation of the complex relations between individuals, organisations, societies and earthquakes. Neither will they properly address the root causes of seismic adjustment (Solberg et al., 2010, 1674).

Current research models do not offer insight into how beliefs concerning earthquake risk are formed, enacted or function in relation to preparedness processes (Lindell et al., 2000; Whitney et al., 2004; Solberg, 2010). For proper information dissemination, delivery mechanisms are vital. However, participants' moods also affect their abilities. Few researchers have attempted to identify and classify a range of beliefs capable of exerting influence on people's decisions regarding preparedness. This lack of understanding constrains the practical development of effective earthquake risk communication strategies and educational approaches (Becker et al., 2013). It is necessary to first believe that risks exist for people to prepare; this was reflected in interviews where people reported that they prepared by taking more specific actions (interviews, 2019).

Despite efforts to increase household preparedness, levels of earthquake adjustment adoption remain universally low even when people acknowledge the risk they face. Thus, **knowing of one's risk and mitigating that risk are not the same**. This has stimulated interest in how to bridge the **risk action divide** (Becker et al., 2013, 1710).

Research interviews conducted in Aotearoa (Becker et al., 2013) revealed that many individuals consider 'preparedness' to mean having a collection of basic survival items, retrofitting buildings, securing items in place, or creating emergency plans; but broader conceptions of preparedness included 'getting to know one's neighbour'. Interviewees expressed a need for 'forward thinking', that it was a 'state of mind', greatly valuing day-to-day safety; consequently, people who are already safety conscious were more inclined to

undertake hazard preparation. However, tasks viewed as complex, like building retrofitting, ensuring restraint of furniture, or formulating emergency plans, were not as likely to be carried out (interviews, 2019). Others felt prepared for disasters by having an adequately stocked pantry. “Most interviewees did actually think that it was important to undertake a degree of preparedness, but this belief did not lead to adjustment adoption because of conflicting beliefs or contextual factors” (Becker et al., 2013, 1718). Therefore, such cases are illustrative of decision-making processes that may not specifically consider earthquake preparedness, but nevertheless concern some level of general preparation that could also assist in case of disasters. “People’s interpretation of their preparedness varied considerably as well, with some very prepared people considering themselves not prepared enough, and other less prepared people thinking that they were well prepared” (Becker et al., 2013, 1718).

In interviews (2019) it emerged that numerous beliefs also discouraged preparedness; beliefs that earthquakes: may not happen, are a low-risk event, or were not imminent. When risk perception was low due to optimistic bias, people were not inclined to engage in disaster preparation. People also did not prepare because they believed they would receive warnings before and would thus prepare/respond only once warning was given (interviews, 2019). However, there is no early alert system currently in place in Aotearoa. “Unlike other quake-prone countries and regions around the world, New Zealand doesn’t have an earthquake early warning system” (Robson, 2022). It is therefore unclear on what basis people may have formed the belief that they would be warned before an earthquake. While the monitoring on the GeoNet website allows people to check for and report experiences of tremors and earthquakes, the system is not intended to provide early alert messages. Becker et al. (2020) shows that 97% of people (of 3084 people surveyed) thought an earthquake early warning system would be useful.

When individuals feel there is nothing they can do about natural hazards, they tend to locate the locus of control externally. Some do not perceive it as a personal responsibility at all, believing instead that others may offer aid; and that responsibility for dealing with natural hazards lies with agencies like local or central government, or societal groups like

emergency managers, response personnel, or insurance companies, thus transferring responsibility onto them:

Participants assumed because there was legislation in place to address earthquake risk in buildings that most recently constructed residential buildings would comply, and thus would be safe in an earthquake. This belief meant that many did not feel a necessity to undertake household earthquake adjustment measures. Interviewee 26, who had not undertaken any retrofitting, describes how he **assumes the safety of his apartment is covered by the Building Act 2004** (Becker et al., 2013, 1721).

There does seem to be a misconception that experts and organisations can alone ensure the safety of people, without mutual participation in the preparedness process, whereas in fact everyone has a role to play. Further education, communication, and awareness is needed for people to form a more realistic understanding of the parameters of assistance that organisations and experts can offer. A sole dependence on agencies even for an alert before hazard events occur may not be the most reliable system for individual safety or to understand what actions are needed. During an informal exchange with a member of the AF8 team the subject of earthquake alert systems was discussed. Currently Android has an early alert system, which is a project from Google, used in some regions prone to earthquakes, but it was unclear whether Aotearoa used or endorsed the use of this system of alerting people. The AF8 member explained how the Google project is not linked in-country to any national organisations, current mobile alert system or local seismometer networks. There is a forthcoming system¹⁶ in the research and development phase for an Aotearoa-based system, tailored to specific geographic and local needs. Because the technology used in Android systems is different to seismometer technology there is a need to research and assess how this might work before deciding on the best fit for Aotearoa to use.

An educational effort led by Te Hiranga Rū, QuakeCoRE, the Aotearoa centre for earthquake resilience, focuses on a systemic view of resilience with socio-natural hazard laboratories that integrate scientific and local knowledge. The centre is funded by the Aotearoa Tertiary Education Commission. QuakeCoRE aims to establish and link multi-institutional national research programmes that are internationally networked. The research programmes assist

¹⁶ A Google representative presented to the Aotearoa CrisisLab researchers earlier in 2022, and there may be a future collaboration for the development of a contextually sensitive alert system: <https://crisislab.org.nz/.../google-presented-at.../>

in advancing science and implementation of earthquake resilience through integrated collaborations across engineering, physical, and social science research institutions.

Through partnership with key sectors of Te Ao Māori, Te Hiranga Rū QuakeCoRE research activities seek to develop and harness mātauranga Māori perspectives on earthquake resilience, to achieve the resilience aspirations of tangata whenua¹⁷. Additionally, we have a focus on leading the development of initiatives that will nurture Te Hiranga Rū QuakeCoRE Māori researchers and students; foster understanding [...] and provide pathways for Māori student-led research in earthquake resilience (QuakeCoRE, online).

Te Toi Whakaruruhau, the Māori disaster research centre, an affiliate of QuakeCoRE, holds joint discussion meetings, noho marae¹⁸ (overnight stay in traditional marae) and allows QuakeCoRE scholars to join other disaster scientists, policymakers, practitioners, and leaders for discussions:

The three-day hui¹⁹ was underpinned by the kaupapa²⁰ of kaitiakitanga²¹ and this was reflected in field trips with Akaroa Dolphins and Pohatu Penguins, who shared knowledge of the volcanic, seismic and cultural genealogies of the region, and the increasing impacts of climate change [...] QuakeCoRE affiliates were able to engage directly with these rangatira²² to explore support possibilities and aspirations for Māori disaster risk reduction (QuakeCoRE, 2022, newsletter; footnotes added for explanation).

This is an example of an integrated educational effort for more inclusive and effective DRR with Māori research leaders who offer an opportunity for others to understand facets of their DRR epistemology and ontology.

6.5.1. Analysis of Education

Literature focuses on participation in ShakeOut campaigns; however, several people choose not to participate for numerous reasons (as discussed in Chapter 4), and non-participation has seldom if at all been explored in the literature (interviews, 2019). Understanding reasons for participation and non-participation is useful; much learning is possible from issues, mistakes, and generally well-meaning advice and informative messaging offered to

¹⁷ Describes the Māori people of a particular locality, or as a whole as the original inhabitants of Aotearoa.

¹⁸ Marae means 'meeting grounds' and is a gathering place for a particular tribe or whānau (family).

¹⁹ A large social or ceremonial gathering.

²⁰ A philosophy or set of principles, values, and plans which people have agreed on as a foundation for their actions; the collective vision, aspiration and purpose of Māori communities.

²¹ The care and guardianship of lands and waters in all their interconnected realities.

²² A Māori chief or noble.

societies in an endeavour to minimise risks from disasters. It is advantageous to evaluate the effectiveness of advice and guidance offered to assess its usefulness in reaching its purported DRR goals.

Periodically, it can be observed that, for various reasons, such messaging changes, but especially when historically accepted messaging no longer seems to serve the interests of practical PAMs (interviews, 2019). Names, catchphrases, and PAMs ought to be tailored for different contexts in countries according to their sensitivities, usefulness, and appeal to relevant audiences.

The physical performance of DCH might not be achievable. Such a finding calls into question the practical applicability of DCH actions in real-life earthquake circumstances. If people are taught to DCH but are unable to practically carry it out, as the earth is shaking, it seems imperative that such a PAM ought to be reviewed and necessary changes made in order to ensure that protective action works more effectively where possible for the decision-maker, operating under conditions of duress, anxiety and extreme pressure, and the environment within which the action is to be performed.

Even almost universally accepted measures need to be reassessed to ensure that the theoretical motivations for espousing such guidance to those who are direly in need of precautionary information and protective assistance are in keeping with its practical performance, effectiveness, and overall safety as a PAM.

many injuries are trip and fall hazards. It therefore stands to reason that the 'drop' part of DCHO is the most important step to prevent fall and trip injuries. Further studies could assess the benefits of 'drop' or 'hold' and the time required to complete these actions (Strauss et al., 2017, 12).

McBride et al. (2019) recommend that since DCH may be difficult to perform or entirely unachievable, people should be advised to stop and drop wherever they are, and if able, to cover their head and neck. If at all possible, people should shelter under something like a table in an attempt to avoid injury. Such advice is favourably recommended by McBride et al. (2019), and consistent with the findings of Lindell et al. (2016) that people's behaviour during the earthquake did not conform to the standard actions within DCH. Instead, people's initial reactions were consistent with a shock response, i.e., they froze on the spot; lower levels of earthquake preparedness produced higher levels of freezing in place. "These

findings presented interesting questions as to the overall efficacy of DCH and whether the recommended actions are appropriate for many of the situations that people find themselves in during earthquakes” (McBride et al., 2019, 4).

Avoidance of excessive and unnecessary movement may be beneficial, as Johnston et al. (2014) found that most injuries during both earthquakes were due to tripping and falling. The Waikirikiri (Darfield) earthquake happened at 4:00 am and most injuries were caused by getting out of bed and moving to door frames or protecting children. Although some advice exists regarding remaining still if outside and away from buildings, it is not universally recommended to stay still in an earthquake; this can lead to severe fatal injury if one is within a building, with falling furniture, etc. but especially within buildings that may not be able to withstand intense shaking. Moreover, the advice given along with the recommendation of remaining still usually emphasises that people ought to remain in a brace position shielding their necks and heads.

6.6. Culture

Human behaviour is influenced by social interactions, and we form our beliefs through them. Beliefs play a large role in meaning-making processes and interpreting information about ourselves and our surroundings. Preparedness beliefs align with what people believe preparedness means, personal understandings of disasters, and how to deal with impacts (interviews Massey University, 2019; Becker et al., 2013). Aotearoa’s multiculturalism accommodates for diverse languages, cultures, and religions, protected under the Human Rights Bill, prohibiting discrimination on grounds of race and ethnicity. Permanently resident non-citizens and ethnic minorities have the opportunity to participate in civil and political life. Government representatives engage ethnic communities in grassroots consultations and forums on an ongoing basis (interviews, 2019; Simon-Kumar, 2019).

Declaring that Aotearoa would be enriched by its various cultures, a range of official initiatives were instituted [...] Community-based organisations and activities proliferated during this time [at the turn of the XXI century] to preserve diverse groups’ languages, cultures, and arts. [...] Ethnic-language media (television, radio, and newspapers) were also established. [...] Perhaps, for these reasons, in 2015, Aotearoa received the Global Creativity award from the Martin Prosperity Institute for being the most racially and ethnically tolerant country. [...] Special protections

are accorded to marginalised groups within ethnocultural communities (Simon-Kumar, 2019).

Nevertheless, during my fieldwork in Ōtautahi (Christchurch, 2019), several tributes to victims of an unarmed racial attack were prominent, as were the outpourings of support and unity among residents across ethnic, racial and religious beliefs. This incident of violence demonstrates that despite the presence of a legal framework that is focused on inclusion and respecting diversity, these types of events are still an ongoing concern.

Knowledge production that includes scientific, social and cultural knowledge for DRR is challenging, particularly operationalising hazard science at the science–policy–practice interface (Gaillard & Mercer, 2013; Weichselgartner & Pigeon, 2015). Collaborative arrangements between scientific, policy, and public domains are viewed as ‘boundary organisations’ with the aim of facilitating the joint construction of knowledge to enrich decision-making by understanding and managing the intersection or boundary between domains (Orchiston et al., 2018; Beaven et al., 2016). Project AF8 responds to the challenge with co-produced knowledge for nationally significant hazards; “Of specific relevance to Project AF8, the framework describes the need to ‘strengthen disaster risk governance and coordination across relevant institutions and sectors and the full and meaningful participation of relevant stakeholders at appropriate levels’” (Orchiston et al., 2018, 390). From AF8’s inception, knowledge production was a collaborative effort, with all involved given the space and representation necessary to voice concerns and offer knowledge from diverse perspectives (interviews, 2019). This is a stark contrast to typical academic research models that offer linear forms of knowledge production and dissemination, where scientists and specialists in the field are almost exclusively responsible for the majority of thought input and decision-making. Weichselgartner and Pigeon (2015) suggest the next steps in DRR require “a shift in focus from the production of risk information per se towards co-produced risk knowledge that is understandable and actionable by different kinds of users”.

6.5.1. Analysis of Culture

Ōtautahi’s (Christchurch) Eastern side, most significantly impacted by the earthquakes, comprises communities with limited socioeconomic resources. Māori were disproportionately affected, with reduced access to basic necessities, sanitation, power,

transport and support from responders. However, anecdotal stories emerged of Māori resilience, inferring that they drew upon “cultural values and perspectives to institute effective earthquake response initiatives” (Kenney et al., 2015, 10). Aotearoa is formally bi-cultural, where both Māori and Pakeha (those of European descent) contribute to national identity. “Pakeha justify opposition to policies that redistribute resources to Māori by negating the relevance of historical injustices” (Sibley & Liu, 2007, 1223). Nevertheless, Māori have symbolic power to validate national identity for many Aotearoa nationals. “The question now then, is how such symbolic power may be best employed to affect material outcomes and hence promote greater equality between advantaged and disadvantaged groups within NZ” (Sibley & Liu, 2007, 1242).

With Aotearoa’s recent decade of experiencing numerous earthquakes, people may have become sensitised to the effects and after-effects of quakes and might thus be more inclined, or paradoxically less inclined, to forms of participation in drills and PAMs. A phenomenon known as ‘earthquake fatigue’ was reported in 2012 by officials in some of the regions in Waitaha (Canterbury), which related to anecdotal evidence of people’s reluctance to participate in the ShakeOut drills. This may be, as Aotearoa and particularly Waitaha, has experienced large and intense earthquakes like the M7.8 Kaikōura earthquake and the M7.1 Te Araroa (East Cape) earthquake; hence fatigue may well be a factor in future non-participation (McBride et al., 2019). “Few theories account for the complexity of risk communication to include social and cultural elements [...]. We argue here that cultural and social environments could be considered when developing protective action campaigns” (McBride et al., 2019, 7).

Psychological and socio-cultural interpretive processes do not emanate from risk management processes; rather they reflect people’s cumulative experiences.

Interdependent relationships are pivotal in how risk beliefs are developed and enacted:

people’s DRR actions are not driven by experience (direct or indirect) of damaging hazard activity [...] McClure et al.’s work reiterates the need for more searching analyses of the diverse ways people relate to the potentially hazardous characteristics of their environment and to understand how psychological, social, societal and cultural factors influence interpretation and action (Paton & Johnston, 2015, 2-3).

As mentioned previously in this chapter, socio-political and cultural aspects are core factors, which, if not accorded priority consideration, will not lead to effective DRR outcomes (Solberg et al., 2010).

6.7. Conclusion

During the Ōtautahi (Christchurch) earthquake, despite rigorous BCs, many seemingly sturdy and robust buildings collapsed, leading to fatalities. While Aotearoa is a 'developed' country, placing one's faith in building and BCs alone is a risky decision, especially when factors like liquefaction bring further complications.

The Platform case study shows that although attempts were made to foster networking across disciplines, organisations, and sectors, the distinct cultures of different domains hindered meaningful collaboration. Experts managing AF8 opened avenues for communication with others from non-specialist, non-expert backgrounds, although backed by a scientifically sound, informed, and expert team it also has members with practical experience working together with DRR organisations and community projects. The use of risk scenarios is one of the types of testing integral to DRR processes for determining future risks and errors and working to reduce the margins of errors and risks where possible.

The town of Waiau has received sound scientific guidance based on its unique characteristics and associated risks. Along with scientific reports and community involvement, different council representatives have attempted to achieve both short- and longer-term DRR goals. However, the town and its inhabitants remain at risk. Waiau, a developed context, with a large amount of scientific knowledge and communication, serves to address the assumptions that more science is all that is required for effective DRR (argued against in Chapter 4) and that more science equals implementation. Rather, 'commercially sensitive' decision-making triumphs over scientifically backed DRR-focused decision-making, and therefore the prioritisation of commercially sensitive decision-making stands in the way of implementation of DRR measures.

Numerous people choose not to participate in ShakeOut campaigns for a variety of reasons; however, non-participation has seldom been explored in the literature. It would be

advantageous to evaluate the effectiveness of advice and guidance offered to assess its usefulness for DRR.

Although Aotearoa is formally bi-cultural, where both Māori and Pakeha contribute to national identity, Māori were disproportionately affected by the earthquakes, with reduced access to basic necessities, sanitation, power, transport and support from responders. Knowledge production that includes scientific, social, and cultural knowledge for DRR is especially challenging when power imbalances, socio-political and cultural facets are not prioritised as the core factors that they are.

Chapter 7

Epistemic Injustice within Disaster Risk Reduction & Standpoint Theory as a Methodology

When I write, I always ask myself, have I avoided reinforcing hegemony or reproducing the status quo? Language is power—those who control language control representation or misrepresentation of reality, ‘knowledge’ and ‘truth’. They define themselves and the ‘other’. Writing to power requires reading against the grain.

Mukta Singh Lama-Tamang, in Robertson (2021)

7.1. Introduction

In this chapter I look at some of the impacts of epistemic impairments within DRR. I argue that these impairments result in what is termed epistemic injustices, an injustice that someone suffers in their capacity as a knower (Fricker, 2007). I show that a possible approach to addressing some of the epistemic injustices that result from epistemic impairments is to endorse an approach to DRR that is more inclusive. Standpoint theory is a people-centred approach that from the very beginning considers contextual elements and power dynamics, arguing that marginalised perspectives bring unique knowledge, and I suggest that standpoint theory provides an outline of a methodology that could facilitate more inclusive DRR. The aspects of methodology I discuss could be used to improve and enhance the processes of knowledge production and decision-making within DRR. I argue, moreover, that some aspects of these perspectives and standpoint methodology are especially appropriate to the context of Nepal and the approach to mitigating risks from co-seismic landslides. Often unheard marginalised perspectives have an epistemic advantage and can offer valuable multilevel contributions when heard and considered in DRR processes, including the development of PAMs.

Marginalised perspectives may have an epistemic advantage in that their knowledge of the contexts in which disaster risk reduction practices are put into operation. For example, marginalised perspectives may provide insights about local practices and environmental

circumstances that are first-hand and undistorted by the experiences and perspectives of people from the other social classes. The other social classes' standpoints about mountainous regions, local knowledge, and people are distorted because they can only imagine or assume what the circumstances for mountainous Janajati communities must be like (interviews, 2017).

Unless there are open channels of dialogue where each stakeholder's contributions are valued, marginalised standpoints rarely take the form of testimony or spoken assertions, because marginalised perspectives are not given the space to be expressed formally, or when expressed informally, are rarely valued. Much of local people's involvement in the processes of generation and implementation of PAMs happens only at the very end when some information from a top-down technocratic process may reach them (the last mile problem vs the first mile problem discussed in Chapter 3). Since locals are usually not able to offer any of their epistemic inputs into the prior PAM-generating process, I therefore discuss how they suffer injustices as epistemic agents who have first-hand knowledge of their immediate mountainous surroundings. Such distortions and epistemic injustices are, some argue (cf. Gurung, 2003; Subedi, 2011), due to culture, or to following certain religious doctrines; I will examine and assess if this argument holds true.

Culture plays a large part in meaning-making and the identity and social standings of local Nepali people (interviews, 2017). People deal with the dangers and risks they face in ways that are in accordance with their worldviews and ontology. Risk is therefore a social construct, which is the result of societal perceptions, decisions, and actions. That risk is also thus a feature of a specific location and region, and has been endorsed and discussed by several authors including Müller-Mahn and Everts (2013) and Krüger et al. (2015).

The problem is that if culture is left out of the analysis of disaster and risk (risk already being a social construction and therefore always 'cultural') then the extent and importance of hazards, DRR and related issues of adaptation, coping, intervention, knowledge and power relations cannot be fully grasped. But because culture is so complex, it eludes a clear and simple definition (Krüger et al., 2015, 4).

Since risk is a social construct, cultural considerations should be understood and analysed for more effective, context-sensitive DRR efforts like generation, testing, and implementation of PAMs. "[...T]he significance of 'culture' must be understood and

incorporated into any attempt to deal with natural hazards, rather than being viewed as largely irrelevant” (Krüger et al., 2015, 1-2).

For the purposes of my discussion, culture can be divided into two components: the first comprises historical cultural contexts based on cultural and religious tenets, and the second the current cultural context, which can sometimes be very far removed from the historic reference point. This distinction is worth making: some of the systemic issues and impacts of marginalisation attributed to historic cultural factors are actually distortions of the concepts and tenets. These distortions are due to hegemonic and neo-liberal governmentality factors that suit specific agendas of the dominant class. I will especially elaborate and expand on these two components of culture in the section on varṇa āśrama and caste. In that section, I will show how historic culture has been twisted and tweaked (Gurung, 2003; Subedi, 2011) rather than applied, and the resulting inequalities and injustices have been misleadingly attributed by those in power to historic cultural factors. Thus, the blame for such injustices and inequality can be conveniently passed off as ‘historical cultural factors’ rather than blaming the structures enabling manufactured power dynamics and neo-liberal governmentality. This shift in blame makes it difficult to hold persons and the structures they represent accountable for inequality, injustices, and their resulting impacts, especially for DRR.

As I will argue in this chapter, epistemic injustices currently exist within the field of disaster studies, particularly through DRM channels and more specifically through DRR knowledge generation and dissemination processes. I will examine some examples of latent and explicit epistemic injustices to shed light on practices that continue to hamper DRR efforts and perpetuate vulnerabilities, marginalisation, and the creation of disaster risks.

Specifically, I show how the (a) dismissal of certain histories as mere myths, (b) colonial conceptions of identity, (c) superimposition of alien terminology like ‘resilience’, (d) neo-liberal governmentality, and (e) dismissal of local perceptions, conceptions, and perspectives on hazards, mean that information that could make a crucial contribution to DRR efforts is unjustly missed.

To show that these practices still hamper DRR efforts, I present a selection of ethnographic perspectives in support of the ontological perspectives (worldview or cosmovision) of a

section of Nepali communities, which are different from standard DRR expert worldviews. I will show that these perspectives can contribute to DRR by offering local knowledge, and understandings for consideration in DRR efforts, but they are unjustly marginalised. The value of these perspectives shows that an approach that places importance on marginalised perspectives, as endorsed by standpoint theorists, could aid in the development of successful DRR strategies. This is especially relevant for the generation of PAMs meant to be used by local people.

7.2 Epistemic Injustice

Epistemic interactions are concerned with the possession and transmission of knowledge. I have thus far looked at experts as epistemic agents in their relationship with laypersons (Chapter 2). In Chapters 3 and 4, I have shown that the involvement of laypersons in epistemic processes like DRR knowledge generation for use and PAMs is scant. I will now focus on how a lack of participation in these epistemic processes causes epistemic inequalities and injustices for laypersons, who are also essential epistemic agents.

I will argue that this lack of participation by laypersons corresponds with epistemic injustice, a concept introduced by Fricker (2007). In Fricker's account, an epistemic injustice is an injustice that someone suffers in their capacity as knowers, that is, as epistemic agents. She argues that this kind of injustice is distinct from other moral injustices, which do not necessarily have to do with anything epistemic. She considers cases like the following:

- 1) Jha does not believe what Gurung asserts because of Gurung's caste
- 2) Shresht is not given the conceptual resources to make sense of their situation, which is that they are a victim of discrimination.

In the first case, Gurung's testimony is not given the right credibility as a knower, someone who may have knowledge that is in fact worth paying attention to. Fricker calls such cases instances of 'testimonial injustice'. In the second case, Shresht is prevented from even holding an opinion on their own discrimination, so they are kept ignorant. For the same reason, they are unable to understand their own experience. Fricker (2007) calls these cases 'hermeneutical injustice'. "Hermeneutical injustice occurs when the interpretive resources available to a community render a person's experiences unintelligible or misunderstood,

due to the epistemic marginalization of that person or members of her social group from participation in practices of meaning-making” (Anderson, 2020).

Other authors have extended the concept of epistemic injustice to cover different types of cases. Of particular interest to my discussion are Hookway (2010) and Schmidt (2019), who introduced a notion of participatory injustice. Participation in epistemic exchanges involves asking questions, floating ideas, considering alternative possibilities, as well as the exchange of information. “All epistemic subjects are due not only respect for their capacity for knowledge, but also for their capacity to be epistemic participants in inquiry as part of a community” (Schmidt, 2019, 58). According to Hookway (2010), if due to prejudice of some sort, an epistemic agent makes a presumption of irrelevance regarding the epistemic assertions of another epistemic agent, and this does not allow for their meaningful participation in discussions, then this is an example of participatory injustice. Injustice can be manifest in obstacles to an epistemic agent’s ability to engage in practices that are constitutive of distinctly epistemic activities.

In other cases, epistemic agents can be denied proper recognition due to biases or prejudices, which obscure their expertise and epistemic authority (that is, they are denied proper epistemic recognition). Schmidt (2019, 59) gives a practical example:

Consider the experiences of Dr. Tamika Cross, a doctor whose medical authority was dismissed on an airline flight. When flight attendants called for a doctor due to a medical emergency, they dismissed Dr. Cross saying “Oh no sweetie, put your hand down, we are looking for actual physicians or nurses...” (Wible, 2016). Prejudicial beliefs about who is a doctor likely resulted in Dr. Cross’ dismissal. Dr. Cross in this situation is not viewed as epistemically relevant or given recognition for her actual status as a medical professional. This is a wrong of misrecognition²³.

Although misrecognition here seems to have a connotation of mistook or by mistake, this is not the case. The epistemic agent Dr. Cross was dismissed due to the biases and prejudices held by the flight attendants that denied and obscured the agent’s epistemic authority and hindered her participation.

Recognizing an agent as a possible participant is a type of social perception and occurs in a public setting. For example, if I ignore you during a conversation, I am signaling to others around us that you are not a participant in this type of inquiry.

²³ For six other similar cases of qualified women of colour experiencing participatory injustice see Wible (2016).

Over time this might shape how others perceive you, and how you perceive yourself. This type of mistreatment might also increase the chance that others dismiss or misappraise the subject, leading to a vicious cycle of marginalization. Kristie Dotson has highlighted how experiences with epistemic oppression can lead to self-silencing, where agents restrict their own testimony when predicting that they will not be seen as credible (Schmidt, 2019, 60).

By denying an epistemic agent recognition, they are denied even minimal epistemic standing. In a context like Nepal, where marginalisation is already present, and practised, continuing to behave in a manner that signals (consciously or unconsciously) to others that one accepts the status quo leads to further marginalisation. This signalling can also have the impact of epistemic oppression where marginalised people self-silence, restricting their testimony where due to the signalling, epistemic agents may feel that they will not be credibly seen or heard. Dotson (2014, 115) uses the term “epistemic oppression”, which is “persistent epistemic exclusion that hinders one’s contribution to knowledge production”, to describe cases like these. Epistemic oppression is a form of participatory injustice in my view because participation can happen or be hindered at different stages (like dissemination, implementation, and/or testing) of the knowledge process, not only in the generation phase.

In Nepal, previous examples (from Chapters 3 and 4) have shown that local expert and community perspectives have both been marginalised, and the minimal involvement of local experts has been tokenistic, rather than their contributions, if any, mentioned and considered for application in DRR.

Are experts in their relationships with laypersons conscious of these types of signals and the impacts and effects of marginalisation cycles perpetuated without such recognition? Awareness of these signals, impacts, and effects of marginalisation are part of my own proposal for more inclusive DRR. This is a significant factor in the relationship between experts and laypersons (as set out in section 2.5). A failure on the part of experts to recognise and take the required action to halt cycles of epistemic marginalisation and participatory injustice constitutes an epistemic relationship impairment. Experts can be held blameworthy for epistemic failings if the epistemic goal is not reached due to their intellectual irresponsibility (Boult, 2020, 2021; Brown, 2020a, 2020b; Piovarchy, 2021; Schmidt, 2021). Pointing out these types of epistemic failings in this epistemic relationship

through epistemic blame serves the purpose of discouraging certain kinds of epistemic behaviours that are not conducive for DRR.

Multidisciplinary and interdisciplinary collaborations have the potential to take on perspectives other than one's own, even within academia. Experts have the capacity and those willing may learn to better navigate through and work with current power structures for collaborative problem solving and identify targeted areas for research in which hybrid forms of knowledge can be created. This could assist in fostering better epistemic agency for researchers involved with the generation, dissemination, and implementation of actionable knowledge for DRR.

7.3. Standpoint Theory as a Methodology

Integration and collaboration between unequal power structures can be challenging to navigate. Standpoint theories evaluate the extent to which unequal power relations influence the production of knowledge (Collins, 1990; Crasnow, 2009; Rolin, 2009). Rolin (2009) argues that standpoint theories offer a fruitful methodology for the study of such relations. I will first give a brief overview of the specific standpoint theories that I endorse and then move on to a discussion of how they may apply to DRR.

Standpoint theory emerged from feminist perspectives, which claim that knowledge and scientific enquiry are only properly understood in the socio-political contexts in which they arise, and in terms of the biases and prejudices that those contexts generate. Thus, the epistemological assumption of a general, universal, and abstract account of knowledge is flawed (Bowell, 2022). Standpoint epistemological projects have evolved beyond the critical to reframe and reconceptualise the issues with knowledge and the epistemological project itself. It would be misleading to represent standpoint theory as a single set of epistemological commitments or a single methodological approach. These are instead 'standpoint theories' that share common commitments and approaches (Bowell, 2022).

Feminist standpoint theories assert that enquiries are best started from within the marginalised or subordinated social group's experience. Standpoints that emerge from within that experience have an epistemic advantage. For example, Harding's (1991) feminist standpoint theory claims that people considered underprivileged in terms of their social

standing and context are more likely to be endowed the privilege of the ability to gain knowledge of the reality of social contexts. Epistemic advantage is not just about location but is also about the experience of a collective political struggle. “In feminist standpoint theory, the term ‘standpoint’ is meant to designate a moral and political commitment and not merely a perspective on social reality. As Harding explains, standpoint is a collective achievement” (Harding, 1991, 127 in Rolin, 2007, 224). The perspectives of subordinated social groups have an epistemic advantage regarding politically contested topics related to their subordination, relative to the perspectives of the groups that dominate them. This is discussed further in section 7.7. in relation to the Janajati groups in Nepal. In contrast, the standpoints of the dominant groups represent recurring social patterns in relation to their own interests, “and *misrepresent* them as necessary, natural, or universally advantageous” (Anderson, 2020, online, emphasis in original). This is discussed further in section 7.5. in relation to the corrupted caste system (a misrepresentation of the historic varṇa āśrama system), which perpetuates marginalisation, oppression, and political struggle. Standpoints of dominant groups are also discussed in section 7.7. especially in relation to the impacts of neo-liberal governmentality and the epistemic injustices that come with the universalising of English-medium instruction within education.

Material life [...] not only structures but sets limits on the understanding of social relations [... T]he vision available to the oppressed group must be struggled for and represents an achievement which requires both science to see beneath the surface of the social relations in which all are forced to participate, and the education which can only grow from struggle to change those relations (Hartsock, 2003, 37).

Recognising the effects of socio-political and historical factors and understanding the effects of social location on epistemic agents and on knowledge reaffirms standpoint theorists' view that all attempts to know are socially situated. The social situation of epistemic agents (gender, class, race, ethnicity, physical capacities, etc.) plays a role in the agents' epistemic processes and influences what agents know and are able to know. “[This] can affect what we are capable of knowing and what we are permitted to know. The influence of social location on epistemic content and capacity can be felt throughout our epistemic practices, shaping not only the way in which we understand the world, but also the way in which it is presented to us via experience” (Bowell, 2022).

7.3.1. Possible Critiques of Standpoint Theory

Standpoint theory has faced numerous challenges. Since these can be raised against the current proposal, I discuss them here.

First, feminist standpoint theory has been criticised for seemingly presenting a falsely universal standpoint from which issues of power can be evaluated. In particular, it has been pointed out that there is no such thing as, for example, a 'women's standpoint', which gives anyone who is a woman a certain epistemic advantage (Harding, 1986, 26; Jaggar, 1983, 63).

Can there be a feminist standpoint if women's (or feminists') social experience is divided by class, race, and culture? [...] This kind of consideration leads to the postmodernist skepticism: "Perhaps 'reality' can have 'a' structure only from the falsely universalizing perspective of the master. That is, only to the extent that one person or group can dominate the whole, can reality appear to be governed by one set of rules or be constituted by one privileged set of social relations." [Flax 1986, 17] (Harding, 1986, 26).

However, this criticism is based on a mistaken view of the goals of standpoint theorists, and much work on their part has attempted to clear up the confusion. Standpoint theory does not need to invoke the existence of any particular universal standpoint for marginalised groups. Rather, it can account for a multiplicity of different standpoints which stand in various relations (cf. Collins and Bilge (2016) on intersecting identities).

Second, standpoint theorists could be charged with endorsing some form of relativism (Ashton, 2020): since there is no single privileged standpoint (even though different standpoints may have their own advantages), there does not seem to be a way to judge what approaches are right or wrong. Earlier, I critiqued certain approaches for their universalistic tendencies, wherein they treat the applicability of certain rules, for example, as universal. Together with my endorsement of standpoint methodology, this may give the impression that I do not think there is a way to determine what sorts of guidance are appropriate or not. However, this would be a mistake. Rather than rejecting the idea of norms (or in the present case, PAMs and guidelines) altogether, my proposal is that these norms have to be context-sensitive and incorporate several perspectives and standpoints. The position falls somewhere in between the universalist and the relativist; it is, then, a form of moderation. As Harding says:

The intent of standpoint epistemologies is not to reject objectivity, rationality, and good method—to reject science—as the standard misreading invariably sees the issue.

Instead, the point is to **strengthen these standards so that they are competent** to identify those values and interests that contribute to systematic ignorance and those that contribute to advancing the growth of knowledge. Hence ‘neomodern’ is as good a description as ‘postmodern’ to describe these epistemologies (Harding, 2001, 517–518).

Third, the bias paradox is a critique that suggests the situated knowledge thesis and the thesis of epistemic privilege are self-contradictory (Engqvist, 2022). Rolin (2006) argues that a contextualist theory of epistemic justification provides a suitable answer to the bias paradox. According to contextualism, there are sets of default presuppositions that are adopted, and even though some default presuppositions might be shared across different contexts, they are not shared in every context. Therefore, these are situated knowledge claims that can be defended from contrary evidence or other arguments. Thus, Rolin’s adoption of contextualism dissolves the bias paradox and there is no contradiction between the thesis of epistemic privilege and the situated knowledge thesis.

Contextualism suggests that opening a community to wider participation as well as to outside criticism increases the likelihood that some default assumptions are challenged in appropriate ways. The more diversity there is in a scientific community, the more likely it is that its default assumptions are challenged, and consequently either defended, modified, or abandoned. So, I suggest that a standpoint is a commitment to diversity in a scientific community (Rolin, 2006, 135).

In Chapter 2 I set out my endorsement of contextualism, which is in keeping with the endorsement that Rolin makes in the above quote. Contextually opening up science to more diverse perspectives increase the chance that viewpoints are challenged, and assumptions uncovered. In generalised and universal understandings these viewpoints and default assumptions can easily go unnoticed and thus remain unchallenged.

7.3.2. Standpoint Theory Applied to DRR in Nepal

DRR research can take on lessons from standpoint theory in order to guide and improve DRR, by attempting to understand (on local people’s terms) and incorporate perspectives from within mountainous Nepali communities. Different socio-cultural groups that have different knowledges may confer different epistemic advantages:

If, rather than being dismissive, we empathized more with Native populations and their attitudes towards plants, animals, and so on – and in so doing came to have a better appreciation of why they employ the paradigms that they do – we might generate new data, offer better interpretations of existing data, or come to understand phenomena that were obscure to us before (Toole, 2022, 62).

For example, in the Nepali context, there are personalities in charge of the various aspects of the universe (section 7.6). These are empowered personalities considered to be a superintendent or controlling deity of, for example, different elements. Mountainous Nepali people often refer to the 'Mountain God(s)', which indicates such personalities. Would it be necessary then to abstract and move away from this personalism if it is opposed to the ontological perspectives and worldviews of mountainous communities? That might be more of a hindrance in any attempt to offer DRR knowledge with such a precursor condition. Instead, if there is an acknowledgement of this perspective of personalism and an alternative ontological understanding, there is an opportunity to better understand the decision-making of mountainous communities and perhaps their behaviour in DRR contexts with high stakes. This understanding could assist in formulating more considerate PAMs in tune with rather than in opposition to ontological perspectives (discussed further in section 7.6).

It is through this lens of standpoint methodology that I will offer a hybrid alternative to current DRR approaches to PAMs. I will begin from within marginalised ontological perspectives and epistemic positions in section 7.6. Although local people may have epistemic resources like their historical accounts from which to draw on, if experts do not consider this as knowledge, the marginalised will continue to suffer participatory injustices and epistemic exclusion.

Since standpoint theories evaluate the extent of influence of unequal power relations in knowledge production and claim that knowledge and scientific enquiry are only properly understood in the social contexts in which they arise, I will next examine these considerations.

7.4. Epistemic Injustice(s) within DRR

Next, I particularly consider how epistemic injustice exists in the context of DRR and is perpetuated in the scientific-vs-local knowledge dichotomy, and as the domain of DRR is unable to account for different (non-Western) epistemologies and ontologies of risk. Thereafter in section 7.4.1, I look at some specific examples of terminology, latent language use, and its resultant impacts within DRR.

Previously, in chapters 3 and 4, I discussed problems associated with taking a hazard-centric and technocratic approach to disasters. I argued that this approach marginalises people by problematising people who ‘fail to adapt’, thereby allocating responsibility and accountability for DRR with individuals. In addition to this, I would argue that hazard approaches inherently create and perpetuate epistemic injustices in that experts assess (or assume) that the risk perceptions of affected people are inadequate, and they thereby fail to suitably adjust. This faultily renders affected people as lesser than other epistemic agents, or as non-epistemic agents because experts have deemed this to be the case. These assumptions are made without engaging with the people themselves or with literature and research that engages with affected people, in order to ascertain what people’s perceptions and perspectives actually are. To use the terminology introduced in the previous section, I find it appropriate to describe this as a kind of participatory injustice: the affected people are prevented from participating in the epistemic processes of DRR. Moreover, expert endorsement of controversial theories, and the application that stems from such endorsement without any reflexivity, critical analysis, and engagement, is, in my view, epistemically irresponsible. It is epistemically irresponsible, first, to the people who will be affected by expert-produced knowledge that is disseminated, and second, for not being epistemically responsible and accountable agents within academia and/or to other stakeholders who rely on expert assertions as rigorous and epistemically sound.

Epistemic injustices are sometimes unconsciously perpetuated by the language of academia and experts, which I have argued in the previous chapters is English; a common feature that both technocratic and vulnerability paradigms share and thus share in the issues faced. In Chapter 4, I considered local academics who spoke English but were unable to be part of dominant research circles or participate in activities of dominant organisations. These researchers face various geo-academic inequalities, participatory, and epistemic injustices.

The issue of epistemic injustice is especially important for a domain/discipline where a distinction is made between different typologies of knowledge. In particular, it is often the case that knowledge is divided into local and scientific types, where ‘local’ refers to knowledge gained through direct experience, and ‘scientific’ refers to knowledge gained through more formalised channels and methods of education (Gaillard & Mercer, 2013). The

knowledge-type-division often results in lacunas between them; local and scientific forms of knowledge are often exclusively considered and developed in isolation, rather than inclusively with a mutual understanding of each form's potential strengths and weaknesses. "Scientific knowledge can no longer be seen as superior to local knowledge, or vice versa; rather the two areas of knowledge need to converge to provide sustainable assessment and solutions to disaster risk" (Gaillard & Mercer, 2013, 96).

Scientists and experts have long dismissed local (or 'inside') knowledge as inferior and insignificant, in comparison to scientific (or 'outside') knowledge officially developed and verified within the scientific community (Mercer, 2012; Wisner, 1995). "The label 'expert' given to scientists symbolises authority and prestige, as opposed to locally generated knowledge, often embedded within a community and given no particular label" (Agrawal, 1995 in Gaillard & Mercer, 2013, 96). Therefore, the validation of knowledge is an important step to recognise, as differences in production and methods can hinder the process of finding common ground from which to initiate DRR discussions. "Such a gap in dynamics and forms of validation contributes to pulling apart global science and local knowledge within the geography of knowledge" (Gaillard & Mercer, 2013, 96). Scientific knowledge is usually expected to be verified and validated by the global academic community. Local knowledge, on the other hand, can continuously evolve through internal and external means, internally, through creativity and experimentation, and externally through contact with the external systems and locally accepted knowledge forms.

It cannot be assumed that either local or scientific knowledge can provide all the solutions necessary for the developmental challenges experienced within communities, and answers to DRR issues. For effective DRR, the discussions and processes ought to, where possible, include and integrate both forms of knowledge. Thus, several authors, including Gaillard (2021, 2022) propose coproduction of knowledge and application on a context-sensitive basis. DRR could be greatly enhanced by a combination of the most effectively applicable local and scientific knowledge carefully considered and adapted to local practices.

However, when approaching diverse forms of knowledge, it is imperative to value these sources of knowledge and the knowledge itself. If knowledge is not valued, it can be easily dismissed, and its efforts to assist in DRR diminished. "Cross-cultural understanding is

possible only if you accept other viewpoints on their own terms and refrain from judging them” (Hoggart et al., 2002, 27). Recognition of value in different forms of knowledge is a vital step in the DRR process. Although appearing seemingly trivial and often overlooked by experts, this may assist in addressing the latent power dynamics associated with knowledge production and dissemination. Furthermore, the recognition of value in knowledge impacts communication and participation in essentially positive and supportive ways, opening up avenues for DRR. Where there is a lack of recognition of the value of knowledge this can reinforce and exacerbate problems caused by latent power dynamics, leading to complex issues and barriers to communication and participation as described above.

Being unable to communicate the reality of one’s situation (both to oneself and to others), in everyday and disaster contexts, creates a barrier to understanding peoples’ lived experiences. While different languages may present potential barriers to communication and sets of different epistemic advantages, before looking at different languages, I draw attention here to the use of terminology within the English language, which remains the dominant language to research, publish, and disseminate research findings. Attention must be given specifically to the use of terminology in discussing other non-dominant systems of ontology (perspectives on the nature and structure of reality, and cosmovision), and epistemology, which I will return to in section 7.6. While these are broad concepts, I focus on their specific relevance and possible application for context-sensitive DRR. Other systems of ontology often fail to be recognised as ontology at all, let alone a coherent and comprehensible system as a whole, if aspects of alternative ontologies do not fit within the narrow confines of dominant Western ontologies.

7.4.1. Issues with Terminology as resulting in Epistemic Injustices within DRR

To illustrate the preceding considerations, in this section I will show that there are latent epistemic injustices in the current definitions and terminology used in disaster studies, in DRM, and particularly for communication related to culture within DRR. This has implications and consequences for DRR efforts and should therefore be examined and discussed. I will discuss how terms like ‘mythology, legends, stories’ and ‘epic tales’ are sometimes used as a tool to withhold epistemic authority from epistemically marginalised others. This may hamper their participation as epistemic agents within DRR efforts. The use

of myth de-historicises and de-locates cultures from their temporal, spatial, geographical, and linguistic contexts. Instead, abstract, and globalised, and colonial concepts are used that obscure the specificities of particular cultural situations. I will offer evidence (in section 7.6 where I discuss ontology) that local knowledge of earthquakes in Nepal has been dismissed as ‘myth’ and thus not considered fully legitimate, if at all. In another example, a concept is introduced (‘resilience’) that does not address the experience of marginalised groups and that generates a hermeneutical lacuna.

The first example will deal with the concept of ‘mythology’, which is laden with connotations. Reference to something as belonging to the mythological corpus generally refers to what may or may not be true. Calling something mythology suggests it can be questioned as history or can be contested as to whether it had taken place at all, and there may be different versions according to different time-periods and the channel/medium through which it is carried forward.

Often the carrier medium of mythology is culture and traditions that have a significant role in the meaning-making and defining characteristics of cultures. While referring to the ‘mythology’ of different cultures may seem harmless and without prejudice, the term carries inherent meaning-making markers of its own. This is sometimes used as a tool to withhold epistemic authority from epistemically marginalised others.

Levi-Strauss argues that what ‘we, in ‘the West’ call history is in fact myth by another name’ (Tremlett, 2008:56). Conversely, what we call myth is also history. But if so, what difference is there in calling a story myth or history? If Evolution can be called both history and myth what differs between each usage? It is, I suggest, the fact that when we speak, for example, of the Evolution myth we think of something that is false-prone and when we speak of the Evolution theory (here a synonym for history) we think of it as true-prone. **The question of which is used depends on who is speaking** (Tuckett, 2013).

The main concern is who is speaking or asserting, about whom, and the issue of dominant perspectives being imposed upon those who may have very little or no awareness/concern for what these dominant perspectives are (Le Dé & Gaillard, 2022; Gaillard & Raju, 2022). Here, pertinent questions can be asked about “whose voice gets heard and who is left behind while producing ‘authentic knowledge’ and theory in disaster studies and who benefits from it” (Yadhav et al., 2022, 177). Especially within DRR, the link between science, policy, and action is one of legitimation and guidance. “The obvious question is whose

evidence informs whose decision and in whose interests? This question cannot be fully answered without considering the underpinning ontologies that sustain our understandings of disaster as a concept but also as an object of research and focus for policy and action” (Gaillard, 2021, 62).

Although there are myths that originated and exist in cultures of the West, those myths remain clearly demarcated from the history or heritage of Western civilisations. History or heritage do not seem to be contestable concepts, as some aspects can be verified as historical fact, and some aspects of heritage have been preserved for posterity. However, when Western historians use academic language to refer to the history or heritage of others, the terminology often changes to a narrative of mythology. When terminology changes, there is also a meaning-making transformation, acknowledged or not, implicit or explicit, that is carried along with the language used to communicate and perpetuate the concepts that the West holds of others’ history and heritage.

Since mythology can be contested, describing another’s history and heritage as mythology conveys that their history and heritage can be contested and disbelieved. “Dominant groups tend to accord epistemic authority to themselves and withhold it from subordinates by constructing stigmatizing stereotypes of subordinates as incompetent or dishonest” (Anderson, 2020). This is evident in the pervading current trend toward de-mystification and addressing myths as non-factual and ahistorical. As anthropologist Goldman notes:

I want to reiterate that a myth does not have to be true or false. One of the most frequent topics in which I hear the abuse of the word ‘myth’ is in discussions on religion. Often it’s used to demean religion and religious people — ‘ah those people and their Bronze Age myths’ — in a way which shows one’s own ignorance of the topic (Goldman, 2019).

Science and expertise applied through research as a means of fact-finding are meant to have demystifying, debunking, and myth-busting powers. While this may hold true for certain domains of study, applying that lens to the history, heritage, culture, and religion of others can have significant negative impacts. The use of myth has been used to discredit, diminish, and relegate the history and heritage of others to a status less than worthy of occupying space alongside other apparently established dominant Western accounts of Western history. The use of myth as a descriptive tool for others has the effect of defining non-Western others’ histories as fictitious, as ‘stories’ that were made up by people and have

become popular folklore or legend. While folklore and stories surely have their place in many cultures, the issue lies with the lack of clear and distinct boundaries of definition(s) of what this entails and encompasses.

[...] religious truth cannot be degraded simply by referring to it as mere myth. Also, a phenomenon referred to as myth or mythical is not merely a false story related simply for entertainment, but something elevated to a dignified position above history. In fact, Campbell (2002) contends that myth is pre-history, science—particularly nature, or time—, which Watts (1968) describes as ‘behind all time’ (Averhart, 2005, 15).

There are issues with defining the whole corpus of non-Western history as fictitious mythology or made up exclusively of legends or folklore. However, this is often perpetuated by academia, which sets the trend for others, as well as non-Western others because this is what the West requires or expects of them in terms of standards for publication, etc. (as discussed in Chapter 4). An example of this is found in *Nature's* (2022) recent article *Weaving the Lore of the Land into the Scientific Method*, a series of interviews highlighting efforts to co-produce knowledge. While it is commendable and useful to acknowledge that many scientists rely on Indigenous people for their research, it is a disservice to lump together diverse local knowledges as being merely ‘lore of the land’. Moreover, the article contains an example of a researcher from the Māori community translating perhaps for convenience/explanation purposes his traditional knowledge corpus as ‘traditional stories’; however, he later uses the indigenous term Pūrākau to convince scientists of the rigour of traditional knowledge rather than stories alone.

We all have a world view. Pūrākau, or traditional stories, are a part of Māori culture with great potential for informing science. But what you need to understand is that they're codified according to an Indigenous world view. [...] Sometimes, it takes a bit of explanation to convince non-Indigenous scientists that pūrākau are a variation on the scientific method. They're built on observations and interpretations of the natural world, and they allow us to predict how the world will function in the future. **They're repeatable, reliable, they have rigour, and they're accurate.** Once scientists see this, they have that ‘Aha!’ moment where they realize how well Western science and pūrākau complement each other (Sidik, 2022, 286).

The West requires that the language constructs of the West be used even when defining and describing areas of research that largely involve non-Western others and their contexts. These are some constitutive examples of epistemic marginalisation and injustices that non-Western others face in their capacities of being knowers, like the withholding of epistemic

authority from epistemically marginalised others. This is an example of a type of epistemic injustice described by Mason (2011) as wilful ignorance. Although there are hermeneutical resources available among marginalised groups, these are not given due recognition by dominant group members, by according epistemic authority to the marginalised, therefore they remain marginalised.

Another misnomer used in DRR, which contributes to the hermeneutical marginalisation of local people is 'epic tales', which translates to fictional stories, works of imagination, rather than people's histories and culture.

Hidden within Hinduism's epic tales, multiple stories about earthquakes abound, though of course they're not called that. Earthquake scientists are working to understand these stories and entrenched beliefs to connect with Nepali citizens, and help them prepare for future earthquakes (Tremblor, 2021, online).

While the idea of assisting Nepali citizens is commendable, using dominant Western language constructs to reduce people's histories to mere stories is unacceptable.

A distinction needs to be made between beliefs (ethos²⁴) that are strongly identified with and beliefs that have 'become entrenched' due to hegemonic influences. This distinction is important and will be discussed further in section 7.5. The first step for earthquake scientists who are genuinely looking to understand an ontology that differs from the current DRR ontology is to identify and understand the impacts of their use of marginalising terminology (often steeped in Western ideology). The next step would be to identify, understand, and aim to prevent epistemic injustices that would result from using marginalising language. It would be preferable to construct this understanding of local/indigenous earthquake knowledge from the ontological perspective of Nepali communities first and foremost, which is what section 7.6 aims to do. This is keeping with applying a standpoint methodology to DRR contexts. If this is not possible, then earthquake scientists and experts should be conscious and wary of imposing Western ontological notions onto the pre-existing ontology of others.

A second pertinent example, looking specifically at the context of Nepal, is the expression 'community resilience', which might have the connotation that resilience is undertaken by

²⁴ The characteristic spirit of a culture, era, or community as manifested in its attitudes and aspirations (Oxford English Dictionary).

or developed by communities. Besides the concept of 'communities' being problematic, as discussed in the Introduction Chapter, in the context of Nepal communities are extremely varied for a multitude of reasons, like the example of mountain-dwelling communities, which have been classified in about 52 or more groups (see Table 7.1). However, here I would like to focus on the word 'resilience' for which there is no Nepali word. In an interview with a government official in Nepal, December 2016, Meriläinen et al. (2021) discovered that there is no direct translation for 'resilience' in Nepali. Resilience is a new word curated by concerned stakeholders, particularly the international aid community, and is used by government officials. 'Resilience' has become a buzzword in Nepali DRM.

Interviewer: What is the word for resilience in Nepali?

Interviewee: Uthanshilata (उत्थानशिलता)

Interviewer: Is there such a word? I have never heard of it.

Interviewee: I know! Not many people know this.

(Meriläinen et al., 2021, 279).

The reason that not many people know of this term is because it is not a direct translation, nor is it widely used outside of governmental, NGO and related stakeholder circles.

Therefore, उत्थानशिलता (uthanshilata) is an official translation, which is an alien-like term to Nepali people.

Locally, the concept of being resilient can be understood in terms of a different concept, लचक्ता (lachakta), which may be translated as being 'flexible' or having 'flexibility'. The meaning and nuances are somewhat lost in translation to English because the concept is not an individually focused one, whereby a single person is considered to be flexible, through their own means. Instead, flexibility refers to the combination of factors that enable people to be flexible (as opposed to the notion of individualistic focus), which is encapsulated in this one term लचक्ता (lachakta).

It means being adaptive or having the ability to survive in any situation. It's about inner strength, realised through the support of the family and social networks. It does not refer to any external intervention designed to build people's resilience. In this sense, resilience is a combination of personal, social and cultural capital (Meriläinen et al., 2021, 279).

Jones et al. (2016) have surveyed the governance landscape for earthquake risk reduction in Nepal and found that the discourse of 'community resilience' is far removed from the perspectives of local people, and that it is instead a framing mechanism. This is of very little benefit to local people and ties back with prior understanding of terms like 'resilience' being official governmental and NGO language. This was discussed in Chapter 3 in relation to neo-liberal governmentality and the hollowing out of the role of the government. It was echoed in Chapter 5 through testimony from a local villager who saw no benefit to locals and a local NGO representative who saw DRR efforts for community resilience without inclusion of local input and culture as destined to fail.

As the case of 'resilience' shows, there are issues with imposing concepts, terms, and names upon others when they already have their own concepts, names, and identities. A similar problem arises with the use of the term 'Hindu'. The general problem underlying these cases is that the Western perspectives of others may be very different from the ways in which insiders of different cultures view their own and others' history and heritage. Perspective plays an important role in understanding the broader picture of historical systems and events, for example. The dominant perspective usually differs from that of the dominated (Green & Troup, 2020). Oppressive colonial accounts of history and particular historical events are markedly different from the accounts of history from the view of the oppressed and marginalised. Moreover, certain aspects of current language have emerged from historical systems or past events that remain in use despite their contested nature because of latent power dynamics and geo-academic inequalities, and their resultant impacts on DRR, as argued for in Chapter 4.

Moreover, there is no single homogeneous cultural practice, even though a majority of people in Nepal consider themselves to belong to the religion of Hinduism (interviews, 2017; Gurung, 2003; Jha, 2019). The term 'Hindu' is not actually a term of description that was historically used by people who lived in the territories of the Indian subcontinent and surrounding areas to describe themselves. It is a term that originated based on the accounts of a description of the other by an outsider group. Much in the same way the name 'India' was given to an oppressed and colonised country by colonisers. The historic name of pre-colonial 'India' is भारतवर्ष (Bhārata-varṣa) and is embedded in its history and historic works

like the महाभारत (MahāBhārata) which translates into English, albeit imperfectly, as the 'Greater History of Bhārata'. 'Hindu' was a name given to people who lived on the opposite bank of the river सिन्धु (Sindhu, or Indus), which was shared by Persians (Parpola, 2015). Thus, one will not find the terms 'India' or reference to 'Hindu' in the historic accounts of those currently identified as such.

Since the late 19th century, Hindus have reacted to the term Hinduism in several ways. Some have rejected it in favour of indigenous formulations. Others have preferred 'Vedic religion', using the term Vedic to refer not only to the ancient religious texts known as the Vedas but also to a fluid corpus of sacred works in multiple languages and an orthoprax (traditionally sanctioned) way of life. Still others have chosen to call the religion sanatana dharma ('eternal law'), a formulation made popular in the 19th century and emphasizing the timeless elements of the tradition that are perceived to transcend local interpretations and practice (Dimock et al., 2022).

The need to homogenise a large group of diverse persons, often to oppress or colonise them, is a tool or device that systems of oppression required (Green & Troup, 2020). 'Hinduism' is thus a very broad and encompassing system because there are so many diverse systems of belief and cultural and religious practices that cannot be conveyed (although they are meant to be) by a singular term. This term is therefore highly inadequate in its descriptive or meaning-making capacity to actually convey even just a basic reference to any aspect of reality other than the perspectives and interpretation of outsiders. In the section on ontology, DRR, and PAMs (7.6), I will further analyse a few key problematic terms from a much larger set that can be closely scrutinised.

For the majority of people in Nepal culture and religion are of pivotal importance and play a vital role in the social aspects of life that are inseparable from the formation of one's social identity (Gurung, 2003; Jha, 2019). Nepal is a highly segregated and stratified society, with much of the segregation stemming directly from the systems of historic oppression and power dynamics used to perpetuate such inequality and segregation. In the next section, I will examine and discuss a common misperception that the segregation and stratification still prevalent within Nepali society originates from its religious systems and cultural practices. Rather, people in positions of power have skewed select sections of the religious corpus and history to suit their agendas in order to keep themselves and their extended relations in positions of power, while oppressing others into systems of labour that directly

maintain the oppressors and their artificially produced and imposed status quo (Gurung, 2003; Khatiwoda et al., 2021). The experiences of everyday marginalisation and discrimination are amplified during disasters; marginalisation does not halt or disappear. An under-consideration of these contextual factors will not lead to effective DRR. More inclusive DRR requires a consideration and examination of root causes of vulnerability and marginalisation.

7.5. Division of Labour वर्णाश्रम Varṇa āśrama Vs the Corrupted Caste System

In this section, I look at practices that continue to hamper DRR efforts and perpetuate vulnerabilities, marginalisation, and the creation of disaster risks; namely, the practice of the caste system. Caste-based-hierarchy in Nepal, based on discriminatory practices that are considered 'traditional', marginalises people in their everyday lives. These practices continue to affect and sometimes have a compounded effect on already marginalised people during disaster events (as discussed in Chapter 5). Since these practices are so central to people in Nepal, it is important to have a thorough understanding of them.

While central canonical texts like the Bhagavad-Gītā (Chapter 4, verse 13: चातुर्वर्ण्यं मया सृष्टं गुणकर्मविभागशः, cātur-varṇyam mayā sṛṣṭam guṇa-karma-vibhāgaśaḥ)²⁵ speak of different divisions of labour and positions in society, these serve the function of assisting in the smooth functioning of society wherein everyone has a place and meaningful work/livelihood and engagement that is fulfilling according to individual, familial, and societal needs. This was ascertained according to one's गुण guṇa (proclivities, abilities), and कर्म karma (performable actions). The four varṇas or divisions of labour are: brāhmaṇas, kṣatriyas, vaiśyas, and śūdrās. The brāhmaṇas are intellectual labourers, like educationalists, scientists, and philosophers; the kṣatriyas are the administrators, politicians and military; the vaiśyas are the mercantile community, businessmen, traders, industrialists, agricultural managers; and the śūdrās are labourers. The four आश्रम āśramas or life stage divisions are

²⁵ "According to the three modes of material nature and the work associated with them, the four divisions of human society are created" (1972, 235)

brahmacarya, gr̥hastha, vānaprastha and sannyāsa. Brahmacarya refers to a stage of life as a celibate student; gr̥hastha refers to the stage of married life according to the Vedic injunctions and duties; vānaprastha refers to a stage of retirement and detachment from worldly pursuits; and sannyāsa is the order of renunciation. वर्णाश्रम is a system that has both material varṇa divisions and life stage āśrama classifications that together form a comprehensive system for living within this world but elevating one's consciousness through duties at the different life stages.

Social mobility is at the heart of the वर्णाश्रम system because people's proclivities and abilities could change and transform with time and training. If one is suitably trained and can perform the actions of a particular sector, one would be welcomed into that sector based on one's training and experience. Although it is often the case that family members taught their specialisations of knowledge and passed their skills onto their younger generations, this was not always so. People who did not wish to pursue their family's prior engagement were trained and given opportunities for engagement in other sectors of society. There are numerous examples of this throughout the Vedic corpus, and I will mention two of them here. In the Mahābhārata (Chapter 4; Vedabase), the Pāṇḍavas military teacher, Kṛpa was the son of a brāhmaṇa who had adopted the kṣatriya varṇa or military profession. In the Bhāgavata Purāṇa (Canto 11, Chapter 2, verses 19-21; Vedabase), the sons of Ṛṣabhadeva are a pertinent example of kṣatriyas from the military sector who chose to become brāhmaṇas, and were adequately trained in order to perform the duties of the brāhmaṇical varṇa or sector:

तेषां नव नवद्वीपपतयोऽस्य समन्ततः । कर्मतन्त्रप्रणेतार एकाशीतिर्द्विजातयः ॥ १९ ॥
 नवाभवन् महाभागा मुनयो ह्यर्थशंसिनः । श्रमणा वातरसना आत्मविद्याविशारदाः ॥ २० ॥
 कविर्हविरन्तरीक्षः प्रबुद्धः पिप्पलायनः । आविर्होत्रोऽथ दुमिलश्चमसः करभाजनः ॥ २१ ॥²⁶

²⁶ Verse 19: Nine of the remaining sons of Ṛṣabhadeva became the rulers of the nine islands of Bhārata-varṣa, and they exercised complete sovereignty over this planet. Eighty-one sons became twice-born brāhmaṇas and helped initiate the Vedic path of fruitive sacrifices [karma-kāṇḍa].

Verses 20-21: The nine remaining sons of Ṛṣabha were greatly fortunate sages who worked vigorously to spread knowledge of the Absolute Truth. They wandered about naked and were very well versed in spiritual science. Their names were Kavi, Havir, Antaṛikṣa, Prabuddha, Pippalāyana, Āvirhotra, Drumila, Camasa and Karabhājana.

The system of वर्णाश्रम was thus not determined or 'set in stone' at the time of one's birth and was a fluid system where people chose life paths according to their inclinations, suitable qualifications, and performable actions. People were not forced into occupational engagements in sectors that they were not inclined to or suitably trained for. Moreover, they were especially not given positions of power if, even with suitable training, they did not perform administrative duties well. In Vedic culture people in power were held accountable in various ways. There are cases from the Mahābhārata and Bhāgavata Purāṇa of such instances wherein administrators were removed from their occupational posts due to shortcomings in their behaviour, and carrying out their responsibilities, and/or malpractices due to bad character. These are cases that emphasise the accountability aspect for those in positions of power.

Prince Duryodhana from the Mahābhārata:

एकदान्तःपुरे तस्य वीक्ष्य दुर्योधनः श्रियम् । अतप्यद् राजसूयस्य महित्वं चाच्युतात्मनः ॥ ३१
 ॥ तत्र दुर्योधनो मानी परीतो भ्रातृभिर्नृप । किरीटमाली न्यविशदसिहस्तः क्षिपन् रुषा ॥ ३६ ॥
 स्थलेऽभ्यगृहणाद् वस्त्रान्तं जलं मत्वा स्थलेऽपतत् । जले च स्थलवद् भ्रान्त्या
 मयमायाविमोहितः ॥ ३७ ॥ जहास भीमस्तं दृष्ट्वा स्त्रियो नृपतयोऽपरे । निवार्यमाणा अप्यङ्ग
 राजा कृष्णानुमोदिताः ॥ ३८ ॥ स व्रीडितोऽवाग्वदनो रुषा ज्वलन् निष्क्रम्य तूष्णीं प्रययौ
 गजाह्वयम् । हाहेति शब्दः सुमहानभूत् सता मजातशत्रुर्विमना इवाभवत् । बभूव तूष्णीं
 भगवान् भुवो भरं समुज्जिहीर्षुर्भ्रमति स्म यद् दृशा ॥ ३९ ॥²⁷

King Vena from Bhāgavata Purāṇa:

मैत्रेय उवाच । इत्थं विपर्ययमतिः पापीयानुत्पथं गतः । अनुनीयमानस्तद्याच्चां न चक्रे
 भ्रष्टमङ्गलः ॥ २९ ॥ इति तेऽसत्कृतास्तेन द्विजाः पण्डितमानिना । भगनायां भव्ययाच्चायां

²⁷ Canto 10, Chapter 75, verse 31: One day Duryodhana, while observing the riches of King Yudhiṣṭhira's palace, felt greatly disturbed by the magnificence of both the Rājasūya sacrifice and its performer, the King, whose life and soul was Lord Acyuta.

Canto 10, Chapter 75, verses 36–39: Proud Duryodhana, holding a sword in his hand and wearing a crown and necklace, angrily went into the palace in the company of his brothers, O King, insulting the doorkeepers as he entered. Bewildered by the illusions created through Maya Dānava's magic, Duryodhana mistook the solid floor for water and lifted the end of his garment. And elsewhere he fell into the water, mistaking it for the solid floor. My dear Parīkṣit, Bhīma laughed to see this, and so did the women, kings and others. King Yudhiṣṭhira tried to stop them, but Lord Kṛṣṇa showed His approval. Humiliated and burning with anger, Duryodhana turned his face down, left without uttering a word and went back to Hastināpura. The saintly persons present loudly cried out, "Alas, alas!" and King Yudhiṣṭhira was somewhat saddened. But the Supreme Lord, whose mere glance had bewildered Duryodhana, remained silent, for His intention was to remove the burden of the earth.

तस्मै विदुर चुक्रुधुः ॥ ३० ॥ हन्यतां हन्यतामेष पापः प्रकृतिदारुणः । जीवञ्जगदसावाशु कुरुते
भस्मसाद् ध्रुवम् ॥ ३१ ॥ नायमर्हत्यसद्वृत्तो नरदेववरासनम् । योऽधियज्ञपतिं विष्णुं
विनिन्दत्यनपत्रपः ॥ ३२ ॥ को वै नं परिचक्षीत वेनमेकमृतेऽशुभम् । प्राप्त ईदृशमैश्वर्यं
यदनुग्रहभाजनः ॥ ३३ ॥ इत्थं व्यवसिता हन्तुमृषयो रूढमन्यवः । निजघ्नुर्हुङ्कृतैर्वेनं
हतमच्युतनिन्दया ॥ ३४ ॥²⁸

Moreover, the divisions of labour do not automatically imply an unalterable hierarchy in which some divisions dominate and exert undue influence and power over others. The administrative/political class may, for example, exert some authority for the general protection of citizens and the overall management of a country. Central political authority was not extended to areas of individual decision-making in terms of a set system dictating what an individual's occupation for life would be. Neither was central political authority concerned with an exerting of influence and power over those groups who lived outside the वर्णाश्रम system, such as tribal groups. Extending the exercise of political authority to areas of individual decision-making would skew the exercise, functioning, and role of political authority, and it would foster the misconception that one has to be born into a certain family to perform a certain function and thus belong to a specific social status. Under this faulty rendition, birth becomes one's lifelong bondage to a certain occupational division and is already dictated to individuals without any room for considerations of proclivity or training. This is not supported or endorsed by evidence from any Vedic corpus but has instead been concocted by those in power in order to subjugate people and block upward social mobility in order to ensure a large available pool of 'free' labour to exploit for political and economic gain (Jha, 2019). This is the origin of the heavily distorted caste system that still holds much sway, although it has been outlawed and abolished. Besides dictating

²⁸ Canto 4, Chapter 14, verses 29–34: The great sage Maitreya continued: Thus, the King, who became unintelligent due to his sinful life and deviation from the right path, became actually bereft of all good fortune. He could not accept the requests of the great sages, which the sages put before him with great respect, and therefore he was condemned. My dear Vidura, all good fortune unto you. The foolish King, who thought himself very learned, thus insulted the great sages, and the sages, being brokenhearted by the King's words, became very angry at him. All the great saintly sages immediately cried: Kill him! Kill him! He is the most dreadful, sinful person. If he lives, he will certainly turn the whole world into ashes in no time. The saintly sages continued: This impious, impudent man does not deserve to sit on the throne at all. He is so shameless that he even dared insult the Supreme Personality of Godhead, Lord Viṣṇu. But for King Vena, who is simply inauspicious, who would blaspheme the Supreme Personality of Godhead, by whose mercy one is awarded all kinds of fortune and opulence? The great sages, thus manifesting their covert anger, immediately decided to kill the King. King Vena was already as good as dead due to his blasphemy against the Supreme Personality of Godhead. Thus, without using any weapons, the sages killed King Vena simply by high-sounding words.

individual occupational engagements by birth, the distorted system extended the idea of जन्म janma (birth) as a measure to ascertain who one may or may not socialise with, dictating that one could only marry those born in similar or exactly the same social divisions. This is skewed from the original basis of guṇa and karma being the deciding factors for the division of labour, which has instead been replaced by janma.

Nepal's state ideology on social formation is still based on the Hindu caste system of superior and inferior status by birth. The designation of the country as a 'Hindu kingdom' which sanctifies such discrimination has been the mainspring of the marginalisation of Dalit castes as well as of the Janajati, **who do not fall within the caste system**. Thus, the low castes are discriminated on the basis of ritual status and the indigenous people on cultural grounds. Such ascriptive discrimination is against the spirit of right to equality of Article 11 (3) of the 1990 Constitution (Gurung, 2003, 15).

The Muluki Ain 1854 (Khatiwoda et al., 2021) is a distorted version of the division of labour (Gurung, 2003), which became more of a division of people based on caste or class. While it sets out a version of some of the social codes being followed in Nepal, its caste categories are very different and thus diverge from the four varṇas discussed above in the historical Vedic texts detailing वर्णाश्रम. The Muluki Ain has instead three basic divisions, which are further classified into five hierarchies with orders of precedence. This scheme is biased in favour of dominant hill castes, and without reference to some of the tribal and ethnic groups (Gurung, 2003; Khatiwoda et al., 2021). This old legal code was revised in 1963, almost a century after it was introduced, through the amending of penal clauses of untouchability. In 1990, the Constitution of Nepal (Article 11.3) guaranteed the right to equality, stating that the government would not discriminate against citizens on the basis of religion, colour, sex, caste, ethnicity, or belief. However, the Muluki Ain was amended again in 1992, negating the above-mentioned constitutional right to equality. The amendment stated that 'traditional practices' at traditional places shall not be considered discriminatory. The impact of this change meant that those castes once categorised as untouchable would continue to have no access to places of worship like shrines and temples (Gurung, 2003), and by extension other socio-religious spaces. This is relevant for DRR because the current marginalisation of vulnerable communities is still misleadingly attributed to historic cultural factors rather than holding those in power accountable for systemic and imposed marginalisation and discrimination, which results in the creation of disaster risks. "Caste-

based hierarchy in Nepal affects the people by constraining them to accept lower positions and conditions of work embedded with oppression and exploitation” (Subedi, 2011, 156). Far removed from the historical cultural context, this has become the ‘new reality’. More inclusive DRR should account for the reality of others through their own ontologies²⁹ and epistemologies that may include perceptions of risk and hazard. In the next section I will cover some of the most fundamental aspects of ontology and epistemology, which are intertwined. A recognition of the epistemologies of others is core to according to them the epistemic agency required for participation in the epistemic processes for DRR.

7.6. Intertwined Ontology and Epistemology, Standpoints on Disaster, and Protective Action Measures

81.4% of the total population of Nepal are Hindus, followed by Buddhists (9.0%). [...] Until the country was declared a secular state in 2008, the country was a Hindu state presided over by a Hindu monarch. Hindu religion was the most dominant religion and mode of life of many Nepali people. Hindu concepts of purity and pollution were followed throughout history and this is the case even today (GoN, 2014, 19).

Reality for most Nepalis is synonymous with the accounts of universal creation and destruction in the वेद Veda or Vedic corpus, which includes the Upaniṣads and Purāṇas. This is the angle from which I will begin to unpack and specify where within the vast and varied scope of Vedantic philosophical traditions (rather than the homogenising and generalised ‘Hinduism’), the vast majority of current practices and belief systems are found. This I have done by a process of ascertaining through interviews (2017) what the major texts currently read or known are and where these texts are philosophically rooted; what major festivals are currently celebrated and how; and how local culture like folk songs, dance forms, martial arts performances, and theatre still embody, make reference to and find their roots in. While the roots of the texts within Vedic traditions do not change, there is much variety, which comprises the Vedic branches, in how people may choose to adopt aspects into everyday life. Moreover, it is unique to Nepal that Vedic and Buddhist adherents can be

²⁹ I acknowledge that there is much scope for further research on the multifaceted aspects of different ontologies, especially within disaster studies; while I touch on some contextualised aspects, my focus in this thesis remains primarily epistemic.

found within the same caste classifications, and in some cases, they are “adherents of both” Vedic and Buddhist schools of thought (Hagen, 1998, 105). Hagen, a Swiss geologist-turned-development philosopher, spent half a century in Nepal, and shares his decades-long observations further (1998, 125):

Unfortunately, the foreign ways of thinking have penetrated into Nepal’s state administration. Take the case of the Central Bureau of Statistics, where, with profound seriousness, figures concerning the membership of the various religions of the Nepalis are given. Together with the very ‘Western’ desire to tabulate people and identify cultural differentiation, the cultural heritage of religious tolerance is slowly decaying [...] and a demarcation between who is Hindu, who is Buddhist has begun to be made.

There are six principal schools of Vedic philosophy among a variety of branches and sub-branches of these main schools: Sāṃkhya, Yoga, Nyāya, Vaiśeṣika, Mīmāṃsā (Pūrva Mīmāṃsā), and Vedānta (Uttara Mīmāṃsā). Mīmāṃsā and Vedānta are both focused on the Vedas. Mīmāṃsā, however, focuses upon the earlier karma kanda sections of the Vedas concerned with rituals and ritualistic performance. Vedānta³⁰ is focused on the later jñāna kanda, or knowledge portion of the Vedas: the Upaniṣads. Since the majority of Nepali belief systems find their place in the two वेदान्त Vedānta philosophical traditions (interviews, 2017), I will focus on this branch. During my fieldwork (2017) it was evident that local communities such as Listi, Listi-Gumba, Kodari, Tatopani, and Larcha still currently share these understandings; for example, the largest and most important festivals like दशैं Dashain, दशहरा Dussehra, and तिहार Tihār are all linked to the personality राम Rāma and the रामायण Rāmāyana, and बुद्ध पुर्णिमा Buddha Pūrṇimā linked to Gautama Buddha; both personalities within the Daśāvatāras, principal ten avatārs (forms) of Viṣṇu (Figure 7.1). I will discuss the particular significance of the Rāmāyana along with other texts from the Vedic corpus that contain references to earthquakes, as these are not usually considered or included in DRR efforts or the processes of generating PAMs for use in the context of Nepal. To understand this particular significance in Nepali ontology, rather than the dominant Western ontology, I will next discuss some of the most fundamental aspects. In the Vedānta,

³⁰ Vedānta refers to the ‘conclusions of the Vedas’ (Gombrich, 2009, 60).

ontology and epistemology become “intertwined” (Gombrich, 2009, 61), unlike the dominant Western conceptions of distinct domains.

Figure 7.1. Lamps and colour maṇḍalas³¹ during the तिहार Tihār festival (Photo credit: author, 2017).



Within ontology, there are certain categories, which simultaneously exist and do not cross or mix even though there may be relationships between them (like elements in the periodic table). Furthermore, two fundamental distinct categories of पुरुष puruṣa or spirit, and प्रकृति prakṛti nature or materiality (often material nature) exist within Vedic philosophies. Buddhist philosophy does not use the terminology of spirit or soul directly³², but a clear endorsement of the path of detachment from matter is made. Prakṛti or matter refers to anything that is temporary and capable of being destroyed, including the bodies of living entities. Puruṣa or spirit refers to anything that is indestructible and eternal, like the आत्मा atma or spirit soul of living entities. Thus, living entities are a composite of matter and spirit much like the car and its driver; matter, which is like the car, is inert without the presence of the atma who is like the driver. Matter only works under the direction of spirit, and the atma’s absence or withdrawal from matter is what is known as death, when the atma leaves

³¹ Geometric patterned art (Cf. Rañjitaḥkāra, 2022).

³² There is a belief that giving a classification to anything (even the soul) could bring one back to cling to something in the world (Saṃyukta Nikāya 35:234; book IV (Saḷāyatanavagga), 166-68).

the material body. Since the atma is eternal, it is never subject to decay, unlike the material body that the soul may inhabit, which begins to decay immediately after the departure of the atma. The spirit soul, much like energy in a closed system, is neither created, nor destroyed. The Bhagavad-Gītā elaborates further on the categories of matter and spirit: नासतो विद्यते भावो नाभावो विद्यते सतः । उभयोरपि दृष्टोऽन्तस्त्वनयोस्तत्त्वदर्शिभिः ॥ १६ ॥; न जायते म्रियते वा कदाचिन्नायं भूत्वा भविता वा न भूयः । अजो नित्यः शाश्वतोऽयं पुराणो न हन्यते हन्यमाने शरीरे ॥ २० ॥³³

Universal creation, maintenance, and destruction are all simultaneously part of Vedic cosmology. Like any functional system of organisation for complex structures there are manifold representatives known as Devas, empowered personalities who manage universal affairs. The most prominent managers of three aspects of the material universes are Brahma who creates, Viṣṇu who maintains, and Śiva who destroys. However, since time is not a linear construct in the Vedic corpus, destruction is not the end of material nature and all creation; instead after universal destruction, the process of creation once again begins. This repetition takes place according to four earthly yugas or ages: Satya, Dvāpara, Tretā, and Kali. After the duration of one full set of these four yugas, the material universes are destroyed but the cycle of the four yugas then begins again within the cyclic conception of time. Within this construct of time through the yugas many living beings are born, live for a set duration of time and die. The occurrence of birth and death in a similar cyclic manner is referred to as saṁsāra, the cycle of repeated birth and death. This philosophy of universal cosmological functioning and saṁsāra is a key shared ontological concept of both Buddhist and Vedic philosophy and saṁsāra also remains a cycle from which both strive to overcome and break free.

Another shared key concept is karma, which translates into English as action, and the law of karma refers to the material laws of action and reaction. It is a common misconception that

³³ Chapter 2, verse 16: “Those who are seers of the truth have concluded that of the nonexistent [the material body] there is no endurance and of the existent [the eternal soul] there is no change. This they have concluded by studying the nature of both” (1972, 93).

Chapter 2, verse 20: “For the soul there is neither birth nor death. Nor, having once been, does he ever cease to be. He is unborn, eternal, ever-existing, undying and primeval. He is not slain when the body is slain” (1972, 98). This correlates with (1.2.18) of the Kāṭha Upaniṣad.

the laws of karma are spiritual; they instead form part of the broader metaphysical laws of material nature. The law of karma governs action and its resultant actions within the closed system of the material universes. Inaction is a type of action that also has resulting reactions. There are often questions posited about actions or reactions that may remain unobserved, and although this might seem like a plausible reason to think that the laws of karma are inept, unobservable reactions are attributed to the cyclic time factor (discussed above) along with other compounding or mitigating circumstances that jointly deliver karma precisely when and where it may be due.

While saṁsāra and karma are material laws of the material world, the aim is to break free from these cycles by spiritual endeavour, as there is no material solution to these material cycles that cause suffering. Spiritual life is mostly centred on theism in Vedic philosophies, but it also includes atomism, karma mīmāṃsā and other seemingly atheistic philosophies. Buddhism shares the philosophical distinction between material and spiritual, but its texts do not define the soul as clearly as Vedic philosophies do, and thus the concept remains a little elusive to grasp. Nonetheless, the understanding among the local people from selected mountainous regions (from Listi, Listi-Gumba, Kodari, Tatopani, and Larcha) is similar to the Vedic definitions that define the atma's characteristics (interviews, 2017). Here the distinction of historic cultural and current cultural is again useful, as historically Buddhists do not accept the Vedas, even though there are many aspects of Vedic thought seamlessly adopted into the current cultural context. In the historic cultural context Buddhism rejected the Vedas because people at that point in time were misusing the Vedic injunctions to justify the mass slaughter of animals. Although there are injunctions in the Vedas for anyone inclined to meat-eating, these injunctions are strict and restrictive, serving the purpose of heavily regulating meat-eating to encourage practitioners to ultimately renounce this violence-associated diet.

The Vedas do not condone mass animal slaughter or the maintenance of slaughterhouses because these practices violate the basic yet fundamental principles of compassion and the right to life³⁴. Yet, some still misuse the regulated injunctions to 'justify' killing animals on a large scale, which was the initial reason that Buddhism rejected the Vedas in the historical

³⁴ The Vedic injunction is: mā hiṁsyāt sarvā bhūtāni (never commit violence to anyone) BG 9.4, Vedabase.

cultural context. Nevertheless, because the Vedas are a vast corpus of knowledge that deal with physical, material, spiritual and metaphysical strands, there are several seamless adoptions into the current cultural context. Since the Vedic tradition accepts Buddha as one of the Daśāvatāras (Figure 7.2), there are no conflicts of interest (interviews, 2017).

Although countless empowered personalities are detailed in the Vedic corpus, there is explicitly one category of God and His different transcendental forms. Other personalities are very powerful, by dint of possessing certain limited qualities that God possesses unlimitedly. All such personalities have certain functions and duties within the system of universal management and have thus been empowered by God to perform them. God thus does not have any duties in universal management other than 'overseer'; the creation, maintenance, and destruction all take place under such capable empowered personalities as Brahma, Viṣṇu, and Śiva.

According to the Vedic corpus, God descends in avatāra forms from the spiritual, transcendental worlds to the different material worlds to: personally offer teachings on how to transcend the material worlds and live in the transcendental worlds; meet with devotees, and sometimes annihilate miscreants (Bhagavad-Gītā, 4.8, 1972; Figure 7.3).

Figure 7.2. A Nepali Paubhā³⁵ painting of Viṣṇu surrounded by major deities, Malla era. The **Daśāvatāras** are in the top row L-R (photo by Erin L. Thompson). Below is a resized version for detail, 1st row, L-R: Matsya, Kūrma, Varāha, Nṛsiṃha, Vāmana; 2nd row: Rāma, Kṛṣṇa, Balarāma, Buddha, and Kalkī.



³⁵ Cloth paintings using hand-ground mineral pigments.

Figure 7.3. A 19th century Nepali Bilampau³⁶ painting of the activities of Kṛṣṇa (Chitrakar, 2022, 63).



Because God is always completely transcendental and does not change when entering the material worlds, the English term ‘incarnation’ is an unsuitable and objectionable translation because that would mean that God appears to take on ‘carne’ or the temporary and material flesh. This is not the case, as detailed in the Vedic corpus, because the category of God is never mixed or diluted with other existential classifications and categories. According to the Vedic corpus, God, the material worlds, and the living entities are distinct categories that do not mix although there are relations between all three categories.

In the category of God, there are many avatāras or forms, but these remain distinct from the category of dutiful empowered personalities. Among innumerable avatāras there are principal Daśāvatāras, that include Rāma and Buddha, who are key transcendental personalities in the context of Nepal. The Pali canon contains texts wherein the Buddha

³⁶ “...like a Paubhā, Bilampau is also a painting in cloth, [...] but unlike the earlier, it presents a continual set of imageries – in a row, depicting mostly divine characters” (Chitrakar, 2022, 58).

(Figure 7.4) details some of his previous forms, and among them is his description of his form as Rāma with a retelling of the Rāmāyana in the Dasaratha Jātaka³⁷, Sanskrit:

दशरथजातकम् and Pali:दसरथजातकं. Dasratha refers to Rama's father Raja (King) Dasaratha of Ayodhya.

Figure 7.4. Nepali Bilampau painting on wood depicting scenes from the life of Buddha, 12th century (Chitrakar, 2022, 61).



Since Rāma and Buddha share a combined history, I will focus on that particular historical account, the Rāmāyana, its significance for the context of Nepal, and more pertinently I will draw from instances of natural hazards like earthquakes contained in the Rāmāyana.

The Rāmāyana has three chief characters, the avatāra रामचन्द्र Rāmacandra (Rāma), his consort सीता Sītā Devi, and his transcendental brother लक्ष्मण Lakṣmaṇa. Sītā is of special significance to Nepal, as she appeared in the kingdom of Mithilā in Janakpur within Nepal, to her father Raja Janaka, who ruled over Janakpur. Thus, other names of Sītā are Jānaki, or daughter of Janak and of Janakpur, and Maithili. Her appearance itself is significant because Raja Janak discovered her in a furrow in the earth after what seems to be a record of an earthquake. Sītā is therefore considered a daughter of the earth, भूमि Bhūmi, left in the care of Raja Janak. Sītā faces many trials in the course of the Rāmāyana. When she has to endure yet another major trial, she becomes morose, after constantly facing trials that were seemingly unfair and undue. She then asks Bhūmi (also called Madhavi), the personality of the earth, to please take her back, and an earthquake occurs (at Sītā's request). During this earthquake, Sītā returns to the earth and disappears from the vision of all witnessing the event and experiencing the earthquake (Rāmāyana, Book 7, Chapter 97, Verses 10-20).

³⁷ Jātaka 461 in Khuddaka Nikaya of Sutta Pitaka in the Pali Canon.

यथाहं राघवादन्यं मनसापि न चिन्तये | तथा मे माधवी देवी विवरं दातुमर्हति || १० || तथा
शपन्त्यां वैदेह्यां प्रादुरासीत्तदद्भुतम् | भूतलादुत्थितं दिव्यं सिंहासनमनुत्तमम् || ११ ||
धियमाणं शिरोभिस्तन्नागैरमितविक्रमैः | दिव्यं दिव्येन वपुषा सर्वरत्नविभूषितम् || १२ ||
तस्मिंस्तु धरणी देवी बाहुभ्यां गृह्य मैथिलीम् | स्वागतेनाभिनन्द्यैनामासने चोपवेशयत् ||
१३ || तामासनगतां दृष्ट्वा प्रविशन्तीं रसातलम् | पुण्यवृष्टिरविच्छिन्ना दिव्या सीतामवाकिरत्
|| १४ || साधुकारश्च सुमहान्देवानां सहस्रोत्थितः | साधु साध्विति वै सीते यस्यास्ते
शीलमीदृशम् || १५ || एवं बहुविधा वाचो ह्यन्तरिक्षगताः सुराः | व्याजहुर्दृष्टमनसो दृष्ट्वा
सीताप्रवेशनम् || १६ || यज्ञवाटगताश्चापि मुनयः सर्व एव ते | राजानश्च नरव्याघ्रा
विस्मयान्नोपरेमिरे || १७ || अन्तरिक्षे च भूमौ च सर्वे स्थावरजङ्गमाः | दानवाश्च महाकायाः
पाताले पन्नगाधिपाः || १८ || के चिद्विनेदुः संहृष्टाः के चिद्ध्यानपरायणाः | के चिद्रामं
निरीक्षन्ते के चित्सीतामचेतनाः || १९ || सीताप्रवेशनं दृष्ट्वा तेषामासीत्समागमः | तं
मुहूर्तमिवात्यर्थं सर्वं संमोहितं जगत् || २० ||³⁸

Within the Vedic corpus, the R̥g Veda (10.1.73) contains the earliest reference to an earthquake. The words भूमिकम्प Bhūmikampa and भूकम्प Bhūkampa refer to an earthquake; पृथ्वीकम्प Pṛthvīkampa refers to the shaking of the earth planet, or earth-wide tremors. Hagen (1998, 56, italics in original) quotes the R̥g Veda glorifying Indra who is sometimes considered a mountain and rain god, and in Buddhism, one of the aṣṭalokaṣāla (eight world protectors):

*Before whose breath both worlds indeed did quake,
Because of his strength - that is Indra, O my people.
He held fast the shaking earth,
And caused the staggering mountains to stand still...*

³⁸ "If, in thought, I have never dwelt on any but Rāma, may the Goddess Madhavi [i.e., The Earth Goddess, also called Dharani] receive me!"

As Vaidehi was still speaking, a miracle took place and, from the earth rose a marvellous celestial throne supported on the heads of Nagas of immeasurable power, their bodies adorned with divine gems. The Goddess Dharani, bidding her welcome, took Maithili in her arms, causing her to be seated on that celestial seat and, while she occupied the throne, a shower of blossoms fell without ceasing from the sky. Then the Gods burst into loud acclamations, crying "Excellent! Excellent! O Sita, your virtue is supreme!" From the heavens, the Gods, with delighted hearts, beholding Sita descend into the earth, praised her again and again, and at the place of sacrifice, where all were assembled, Sages, kings and the foremost of men were unable to recover from their astonishment. In the sky, on earth and in the nether regions, all beings, animate and inanimate, Danavas of vast stature and the foremost of the Pannagas cried out in delight, whilst others remained absorbed in their thoughts or gazed on Rama and on Sita in ecstasy. The entire assembly witnessed Sita's descent into the earth and, at that moment, a great tremor passed through the whole world. (trans. Hari Prasad Shastri, 1959).

Other accounts of earthquakes occurring are recorded in the Vedic corpus' sections (Mahābhārata, Adi parva, part 36) that detail the processes involved in the destruction of the material worlds. According to some of these accounts, within the material universes, the planetary systems rest upon the hoods of a transcendental multi-hooded snake called Ananta Śeṣa who stably supports the planetary systems. During some of the processes of dissolution and destruction Ananta Śeṣa begins to move his hoods and this movement results in earthquakes.

According to the Śiva Purāṇa (2.2.34), Brahmā narrated to Nārada: "When Virabhadra set off thus, bad omens were seen by Dakṣa and the Devas. [...] There was an earthquake (bhūkampa) at the site of sacrifice".

In another account from the Rāmāyaṇa (Bālakāṇḍa, 40th Sarga) the earth planet is considered to be supported and held in its position by an elephant called Virūpākṣa. When he feels burdened by heaviness, he shakes his head and earth tremors occur.

In the Vāmana Purāṇa (6.20.3) some accounts of actions during an earthquake are detailed. The wife of Śamīka Ṛṣi (a sage) found the earth was shaking violently and requested her husband to carry their son outside the hermitage so that he remained unharmed. Śamīka Ṛṣi complied and his family were all safe outside. This is an example of practical protective knowledge or PAMs within the Purāṇas.

However, the current universal recommendation to DCH is prevalent in Nepal without any research or testing to evaluate and ascertain this PAM's actual effectiveness, impacts and consequences, as discussed in Chapter 5. This is described further by Subedi and Hetényi (2021) who also point out limitations of the DCH advice in the context of Nepal:

In Nepal, eyewitness reported that children playing in the garden while the 2015 Gorkha earthquake occurred went into the house aiming to hide under the table (pers. comm.). It means that Nepali children assume 'Hide under the Table' is the rule in case of an earthquake regardless where they are. However, this is incorrect, as there are very few earthquake-resistant houses in Nepal and staying outside is clearly safer. This is also referred to by the religious explanation, possibly reflecting old wisdom of the communities (Subedi and Hetényi, 2021, 10).

During the course of earthquake events, Nepali people have garnered from their histories like the Rāmāyaṇa and Purāṇas that they should stay outside, away from structures and

buildings in order to avert danger. They have been taking this precaution as a PAM when there was no other risk minimisation guidance offered (interviews, 2017). This can be seen in the local experiential stories as well. Below is an excerpt from an Earthquake Story told in the Magar dialect (Grunow-Hårsta, 2008, excerpted and adapted from 583-587, keeping their transliteration). Syangja Magar is an endangered language belonging to the Tibeto-Burman group and is spoken primarily in Nepal. Magars consider themselves autochthonous to Nepal. In the story, people go outside buildings during an earthquake and find others outside their buildings too:

An Earthquake Story, in Syangja Magar

ho-ta-i JA i-ta chanR-a ragtag ragtag
ho-ta-i bahirig ga-khyoR-ag bahirig khyoR-CA
mAkoi-jRonta i-ta hoyoR-mA

Then, it began like this, shuddering and shuddering, then I just went outside; when I emerged, the corn sheaves were shaking like this.

ho-ta-i a-lak kami-ko TA bahirig khyoR-mo mu-rriA
le-o le nRis-tar som-tar JA le-a

Then, over there, blacksmiths had also come out and I was surprised that they were sitting there, indeed as many two or three of them were there.

didi-ke raR-nis didi didi hi chanR-CA le-a
i-lak raR-nis DA ga-te-a-ag

To my elder sister I said "Please come here elder sister. Elder sister what is happening? Please come here."

i-lag dA ho-ta JA chanR-mA-le mAn nani
bRuincal te-le-ko mAn te-a

The same thing is happening over here, truly, little sister. **It is an earthquake** they say, truly, so they said.

ho-nRag kan-ug im sarbaswa bRaR-WA le-a
dui pakhya im

At that time, our house was splitting apart. (It was) a two-sided house (i.e., it had a two sided roof, not a Magar round house).

[...] namsin-aij coyok jat hi kes-le-sa raR-le te-nRak-irf
rja-os-aij

In the afternoon, it made a 'crack', I looked up wondering what is apparently moving, and coming.

ho-ta-i JA tak tak thap JA lekha i-lak
a-lak coyok coyok te-a

Then there were sounds just like stepping on the stairs, here and there, there were cracking sounds.

thap-irj jRaI-le ki te-mo rja-ijos-ar) ho-ta-i
JA ma-raR-a ho-ta-i JA i-ta chanR-a
ragtag ragtag ragtag chanh-a

I wondered what was coming down the stairs, I looked, then, but nothing came, then, like that, it happened, it began to shudder and shudder and shudder.

hi a-ul-o rA jat-o le ga-te-ag [<a-ule-o]
I wondered what is this and what should I do!?

ajhai bahirig khyoR-ke a-ul-o le te-mo
ma-warR-cA rtiAn

Still, I supposed I might go outside, but, truly I didn't know!

ho-ta-i arbRa-g ga-khyoR-ag rA J'A a-se [<arbfia-arj]
pAttA-ko bahir-ag khyoR-nRak-ig ds-mA le-o le

Then I came out into the courtyard, and, indeed, after coming out, everyone was outside and looking!

Currently, PAMs like DCH are recommended for Nepali people across the entire country to perform in order to minimise their risks during earthquakes. Current research indicates that in countries with ineffective or poorly implemented building codes, the chances of being injured in building collapse are higher than being injured while trying to move during shaking (Chapter 5). Therefore, the expert advice offered for these contexts often recommends exiting buildings as quickly as possible (Rapaport & Ashkenazi, 2019; Goltz et al., 2020; Vinnell et al., 2022). This aligns with the discussion in this chapter of PAMs local people have been taking as a precaution, garnered from their histories like the Rāmāyana and Purāṇas, as well as local earthquake stories, when no externally developed DRR guidance was offered locally.

From the generalised and universal perspective, both sets of PAMs (DCH and staying outside away from buildings) do not seem to have any inherent issues or flaws and are robust and sound risk minimisation guidance. However, this appears to be the case only if the context in which the PAMS are going to be used/applied is not taken into account. When context is taken into account for the application of suitable PAMs, one has to consider factors like the percentage or rate of earthquake-safe building code implementation, the materials used in

the construction of buildings and structures in general, and the performance of buildings (in earthquakes) in various contextualised settings (urban, mountainous village, terai region). The under-consideration or omission of contextually situated factors, such as the five factors discussed in Chapter 5, may make a larger number of PAMs seem problem-free, possible alternatives, and good recommendations by way of risk guidance. Given that the goals of PAMs are to achieve the minimisation of risks and fewer fatalities rather than positing a number of probable alternatives, a context-sensitive approach for DRR is preferable to one that is universalistic. Moreover, both sets of PAMs should be researched further, assessed, and tested rigorously before being offered as contextualised PAMs.

This testing should be carried out with contextual sensitivity and an understanding of fundamental aspects of the ontology of local people. People should be allowed to participate in DRR efforts on their terms, representative of who they are, rather than ‘force-fitting’ into a Western framing of reality that has no meaning to non-Westerners. My proposal for participation is that local agents should be given a meaningful, contributive place to offer input in the construction, testing, and implementation of PAMs and DRR more generally. Western experts would also remain as participants, but not in their present roles of unilateral control of the DRR process.

Discussions and conversations regarding the development of PAMs require local experts who lead the projects in partnership with Western experts. Local experts can also be social scientists who might have knowledge of working with different social groups, and thereby include the voices of local communities in the discussion phase of the process. Local knowledge, like the above-mentioned example of staying outside, away from buildings would still need to be tested for safety, current applicability, and a reduction in any margins of error. Any knowledge to be disseminated for use in high-stakes contexts should be tested with participants to understand and ascertain its usefulness, safety, and impacts.

Currently, the use of terms like ‘myth’, ‘stories’ and ‘epic tales’ leads to epistemic injustices, as ‘myths’ are particularly contestable and can be discounted as a source of useful knowledge. This relegates people’s histories, their traditional practices and understandings of disasters and natural hazards like earthquakes to the level of mere opinion; not valued enough to be considered or included in the discussion and knowledge-generating processes

within DRR, such as the generation of PAMs. Dismissing people's beliefs as mere opinions also dismisses them personally and therefore dismisses their epistemic agency, hindering their participation.

Moreover, people have different perspectives depending on their ontology, social positions, living arrangements, and other contextual factors. An urban dweller may have a very different perspective on risk and PAMs as compared to someone who resides in the mountainous regions. While offering universal guidance for everyone might be a simpler solution it does not mean that universal guidance would be the best alternative for effective DRR. Rather, a perspective that incorporates local perspectives and standpoints has the capacity to be more just, as well as potentially generating PAMs that are more embedded in the local practices and culture, which can be tested for effectiveness.

7.7. Culture, Neo-liberal Governmentality, and their Impacts on DRR

In this section, I show how the current system of governance by the dominant caste elites seems very far removed from the perspectives of Janajati people in the central mountainous regions. Dominant caste elites have no access to the first-hand knowledge that Janajati groups have about their immediate environment, and socio-political situations that are impacted by marginalisation (interviews, 2017). This first-hand knowledge gives Janajati groups a unique epistemic advantage from within their standpoint. I thereafter show how the shaping of education through neo-liberal forces has contributed to epistemic injustice and how this relates to DRR.

Marginalised groups in Nepal are not homogeneous (interviews, 2017). There are three main social groups that have been marginalised by the government's policies. These are the Janajati (ethnic) on the basis of culture, the Dalit (untouchable) on the basis of caste, and the Madhesi (tarai) on the basis of geography. I focus here on the Janajati mountainous groups who are marginalised on the basis of their culture. The term Janajati refers to people who live outside the dominant city area and outside its stratified social constructs. Gurung (2003) classifies Janajati as 'Scheduled Tribe', the connotations of which remain somewhat unclear without further explanation. The Janajati occupy the central mountainous region,

home to 93.2% of the population (Gurung, 2003). Janajati people were not always marginalised as outlined above; their marginalisation was perpetuated for the benefit of those in power and began to take discriminatory shape from the 1850s (Gurung, 2003; Jha, 2019).

The Janajati who constitute the bulk of Nepal’s total population had a glorious history in the past. They were in the forefront of the nation in different sectors, including in governance, business, crafts, skills and other sectors. Many of the historical monuments, that symbolise Nepal’s pride, are the creations of the Janajati groups. Their contribution in defending the territorial integrity of the nation is matchless. However, the downfall of these people started after the mid-1850s when King Prithvi Narayan Shah defeated the Malla kings and held control over different parts of the country. Since then deliberate efforts have been made by the state to marginalise and exclude them in the national mainstream (Jha, 2019, 39).

Table 7.1 Classification of Janajati Groups (Jha, 2019, 42).

Classification of Janajati Groups	Groups
Endangered	(1) Kusunda, (2) Bankariya, (3) Raute, (4) Surel, (5) Hayu, (6) Raji, and (7) Kisan
Highly Marginalised	(1) Majhi, (2) Siyar, (3) Lhomi, (4) Thudam, (5) Dhanuk, (6) Chepang, (7) Satar/Santhal, (8) Thami, (9) Jhangad, (10) Bote, (11) Danuwar, and (12) Baramu
Marginalised	(1) Sunuwar, (2) Tharu, (3) Tamang, (4) Bhujel, (5) Kumal, (6) Rajbanshi, (7) Gangai, (8) Dhimal, (9) Bhote, (10) Darai, (11) Pahari, (12) Topke Gola, (13) Tajpuria, (14) Dolpo, (15) Frin, (16) Larke (17) Mugali, (18) Lhopa, (19) Dura, and (20) Walung
Disadvantaged	(1) Gurung, (2) Magar, (3) Rai, (4) Limbu, (5) Chhaintan, (6) Tanbe, (7) Tingaunle, (8) Baragaunle, (9) Marphali, (10) Sherpa, (11) Yakha, (12) Chhantyal, (13) Jirel, (14) Byansi, and (15) Hyolmo
Advanced	(1) Thakali, and (2) Newar

Since the amendment of the Muluki Ain in 1992 (discussed earlier in section 7.5), which allows for ‘traditional practices’ to not be considered discriminatory, a similar adherence to ‘traditional practices’ has implied the exclusion of ethnic minorities and lower castes. “[T]he process by which elites and counterelites within ethnic groups select aspects of the group’s culture, attach new value and meaning to them, and use them as symbols to mobilise the

group, to defend its interests, and to compete with other groups” (Brass, 1991, 75). This, therefore, perpetuates inequalities in other spheres of life and social interactions too, and is perhaps the reason that discrimination and ‘untouchability’ are still issues. “The social ferment emerging in today’s Nepal is the **outcome of suppression during the past regimes**. Monopolistic social norms of the State are being questioned and the established pattern of dominance is being challenged by activist groups based on ethnic, linguistic, religious and regional allegiances” (Gurung, 2003, 20).

The structure of governance is monopolised by members of the ‘by birth system of high caste’ (interviews, 2017). This is reflected by the entrenchment in administration and politics; a structure that has not changed since the mid-nineteenth century. “Both financial and social capital remained in the hands of the ruling elite, and most business associations continued to be dominated by them at the top, even as the membership base of these associations widened and became more diverse” (Shakya, 2018, 21). According to Gurung (2003) there is evidence of an increasing stranglehold of these castes in bureaucracy. “By 2000/2001, the newly gazetted personnel were 87.0 per cent high castes and 0.5 per cent ethnics. Thus, indigenous people and lower castes remain subjugated in governance” (Gurung, 2003, 17). This poses an array of issues, most notably that marginalised Janajati people are unable to access the constitutional provision of equal rights or equality of opportunity. **“The caste and ethnic interests of the elite became more firmly entrenched as the state promulgated new industrial policies privileging certain groups of people and businesses over others”** (Shakya, 2018, 19). While social justice and political equality are legitimate demands for citizens of a country whose constitution lays out these provisions, this does not equate to implementation of these provisions. For participatory injustices to decrease, structural change and genuine representation are required. Exclusion from governance roles leads to participatory injustice because it is rare that any group without adequate political representation has any chance to participate in epistemic contexts within the processes of policy and decision-making. In some efforts where researchers try to include marginalised persons, it is usually not on their terms, but rather in conforming to the research agenda as discussed in Chapter 5. Furthermore, Gurung (2003) notes:

Structural change in polity does not necessarily mean change in societal values. The restoration of democracy in Nepal (1990) similarly is beset with a contradiction between the new political superstructure and traditional culture. Recent ethnic

activism in the country is against the established pattern of dominance. It has taken various forms, drawing on linguistic, religious, ethnic and regional allegiances. Yet the political elites still remain entrenched in the old mould (Gurung, 2003, 17).

Governmental marginalisation in Nepal is in keeping with the current neo-liberal governmentality trend (discussed in Chapters 3 and 4). The old mould that Gurung (2003) speaks of above, which privileges certain elite groups, is in line with the current neo-liberal trend in Nepal. Shakya (2018) discusses the impact of neo-liberalism in Nepal from the perspective of the garment manufacturing industry:

A botched narrative about development which is reproduced endlessly in public media as in dinner talks: the supremacy of market forces over state regulation, and the legitimacy of the hegemony of productivity and competitiveness over concerns about social justice. **That the neoliberal conception, of competitiveness and free market receives so much attention, is a slap in the face of displaced garment workers** whose plight went unreported in Nepali media, even though the media, after its 'democratization' after 1990 and then 'revolutionization' in 2006, claimed that it now gave voice to the subaltern (Shakya, 2018, 93).

Neo-liberal governmentality serves the purpose of upholding long-entrenched systems of marginalisation and oppression, including epistemic exclusion and oppression (Dotson, 2014), with the seemingly supreme market forces having sway over government regulation, and therefore takes precedence over concerns about social justice and DRR. Sah and Karki (2020) discuss neo-liberalism from the perspective of English-medium instruction (EMI) policies in public schools, attended by minority students. Sah (2022) highlights how marginalised and poor children attend Nepali-medium government schools and that children from elite families attend private schools with EMI; however, the current trend in Nepal to make all schools EMI is steeped in neo-liberal discourse.

Although Nepal is a non-colonial country, the endowment of English was pipelined through the British colony in India, which has received a hegemonic position in both social and educational discourses today. English was first introduced in Nepal in 1885 after the Prime Minister Jung Bahadur Rana visited England and developed a belief that the knowledge of English and western education could be a powerful tool to associate with the then British colonisers in India (Sah & Karki, 2020, 4).

Sah (2022) outlines how the beginnings of EMI were attributed to higher social class, prestige, and power, which is still in some ways the prevalent notion. This ties in with the apparent access to economic development, as outlined in the School Sector Development Plan (2016-2023) that recommends "English is to be added as a second or third language to prepare students to use an international language for their future economic development"

(MoE, 2016, 27). Within the current neo-liberal governmentality discourse English holds a greater symbolic value than Nepali because it is limited to the higher social classes in a very stratified society (Sah & Li, 2018). The motivations for EMI are solely neo-liberal, in that the dominant perspective that pervades and promotes its use is that the poor need English to compete in the labour market (Liechty, 2003; Phillipson, 2017).

In what Jayadeva calls 'Below English Line' (parallel to Below Poverty Line), anyone in the lack of English literacy skills struggles to claim a space in the middle class, which is recognised as important to get jobs in the neoliberal market. However, there remains a concern whether these minoritized children have access to English skills, even by attending EMI lessons at public schools that are low-resourced (Sah & Karki, 2020, 8).

However, the reality on the ground is that there is a shortage of adequately trained teachers who might be competent to teach in English at public schools (Sah and Karki, 2020).

Therefore, public schools that want to have EMI need to hire teachers and fund their salaries, which are not funded by the government. This requires students to pay fees in order to fund the salaries of private-hire teachers, "which one can argue as an illegal practice" (Sah and Karki; 2020, 9) because all government-funded public schools have to provide free education. The Compulsory and Free Education Act (2018) of Nepal states, "Every citizen shall have the right to acquire free education up to the secondary level from the State" (GoN, 2018, 10).

However, the development of a quasi-private system at public schools has become another example of neoliberal appropriating of the EMI policy. Asking parents from lower socio-economic status to pay school fees is also an extra burden for them. For many parents who struggle to buy enough food and clothes for their families, asking for any fees means putting extra economic and psychological pressures on them (Sah & Karki, 2020, 9).

A study conducted by Thapa (2013) has shown a strong correlation between parents' poverty level and their children being left without education. A large portion of already marginalised parents are unable to send their children to school, the payment of tuition fees adds further layers of marginalisation and severely restricts educational access. This is the first of several negative impacts of the neo-liberal EMI policy. The second major impact is that there are epistemic injustices being perpetuated, of the types discussed earlier.

'the content knowledge is good, but they are having challenges to write and express in English. They have ideas in their mind, but they can't express them'. The major problem, as the teacher further noted, of not being able to express their understanding was 'because of the lack of adequate vocabulary'. [...] The lack of

English proficiency acted as a barrier to learning as the students often struggled to demonstrate their 'creativity while writing answers in examinations' (Sah & Karki, 2020, 9-10).

The issues experienced are not a lack of comprehension of subject matter, but epistemic curtailing and injustice by way of the inability to express ideas in a foreign language. This also serves as an artificial barrier for entrance into tertiary education for students who speak different indigenous languages. These impacts of EMI policy affect already marginalised groups in ways that are diametrically opposed to the intended neo-liberal motivations for instituting the policy. This results in a recurring loop of marginalisation because it hampers the social and economic transformation of marginalised groups.

In fact, the neoliberal EMI policy and the elite appropriation of languages in the practice of EMI intensify economic and educational gaps based on social class and ethnolinguistic and ethnonational realities. Although we do not endorse EMI programmes at all, any institution wishing to introduce the EMI policy must reflect on their preparedness for the new changes and critically account for the social, linguistic, cultural, and economic backgrounds of their students, moving beyond neoliberal ethos. Any education system that claims transformation for minoritized students should build their curriculum and instruction on the local realities and social justice concerns in terms of language, identity, and culture (Sah & Karki, 2020, 13).

The kinds of concern with local reality that Sah and Karki (2020) point out in the quote above also apply to DRR. EMI policies are endorsed and implemented by the government as part of the neo-liberal governmentality narrative, which maintains unequal power structures and relations. This in turn has impacts on and for DRR in mountainous areas, especially for marginalised communities. It is acknowledged that understanding societal dynamics is important for DRR:

Understanding precarity and power relations in society is a prerequisite to understanding hazards and the disasters that can manifest from them as expressed in most of the frameworks designed to assess social vulnerability (Watts and Bohle 1993; Wisner et al. 2004; Wisner et al. 2012). The unequal impact of natural hazards that can result in disasters mirrors different patterns of precarity and vulnerability across society (Gaillard et al., 2019b, 333).

Ethnolinguistic marginalisation, discrimination, and oppression are among the forms of everyday marginalisations and vulnerabilities that people in such communities face. Hazard events add further complications, as vulnerabilities are the root causes of disaster, rather than the triggering hazards. Furthermore, ignoring the impacts of policies that result in

epistemic injustice and further marginalisation will hamper efforts for participatory development and communication of PAMs in these contexts.

National governments play a vital role in disaster relief, DRR and extended DRM, which is inextricably connected with people's vulnerabilities created through their 'normal' states of existence. In this understanding of risk, the approach to hazards is not detached from the social frameworks that influence how hazards affect people; rather the social, political, and economic environments are considered and show disaster perception within wider configurations of society, which differs from conventional hazard-only focused views of disaster. As Wisner et al. (2004, 4) point out, analysing disasters "in this way may provide a much more fruitful way of building policies that can help to reduce disasters and mitigate hazards, while at the same time improving living standards and opportunities more generally". Weak disaster risk governance leads to many more deaths than do geohazards and disaster events (Ambraseys, 2010; Ambraseys & Bilham, 2011; Castree, 2005, 2014; Trumble, 2018; UNDRR, 2020). If marginalised groups like the Janajati have to face a multitude of vulnerabilities during their normal state of existence, this is bound to affect any efforts for DRR, since this hinders the Janajatis' capacity to participate in DRR knowledge development and communication processes.

The Janajati groups have been deprived of many of the opportunities of representation in electoral politics, government jobs and allocation of resources. As a result of such unequal treatment, these people are subject to marginalisation, exclusion and discrimination in the state mechanism. Under the existing situation, it will be difficult for these people to get justice and due representation in different layers of state mechanism at least in the foreseeable future. These people will be forced to live in perpetual poverty and bear the brunt of discrimination until they are brought in the decision-making process at the local, state and national levels (Jha, 2019, 65).

Although governmental responsibilities seem axiomatic and are meant to protect vulnerable citizens during disasters, merely having laws that define roles and responsibilities is insufficient for non-binding DRR obligations to be carried out in practical terms for beneficial results (Pelling & Dill, 2010; Aronsson-Storrier, 2020; Gaillard, 2021). The proper procedure to ensure enactment of these responsibilities is lacking, and thus accountability is also difficult to assess and assign.

Politically and socially marginalised individuals cannot contribute their knowledge while they lack the dominant language and the issues they face are not acknowledged and addressed. This perpetuates further social and political marginalisation which also results in epistemic injustice and oppression. The shaping of education through neo-liberal forces results in a recurring loop of marginalisation because it hampers the social and economic transformation of marginalised groups. Ethnolinguistic and epistemic marginalisation, discrimination and oppression are among the forms of everyday marginalisations and vulnerabilities that communities face; these pre-existing socio-political conditions are exacerbated during disasters and should be taken into account when developing actionable knowledge for these communities.

7.8. Conclusion

In this chapter I examined some of the impacts of epistemic impairments within DRR. These impairments result in epistemic injustices. In particular, they produce participatory injustices, because they prevent subjects from engaging in processes of knowledge production, implementation, and dissemination.

Denying an epistemic agent recognition denies them any minimal epistemic standing. In a context like Nepal, where marginalisation is already present, and practised, continuing to behave in a manner that signals (consciously or unconsciously) to others that one accepts the status quo leads to further marginalisation. Integration and collaboration between unequal power structures is challenging to navigate. Standpoint theories evaluate the extent to which unequal power relations influence the production of knowledge. Standpoint theory is a people-centred approach that considers contextual elements and power dynamics from the very beginning. It is through this lens of standpoint methodology that I offer a hybrid alternative to current DRR approaches to PAMs. Although local people may have epistemic resources like their historical accounts, ontological perspectives and epistemic positions from which to draw on, if this is not considered by experts as knowledge, the marginalised will continue to suffer participatory injustices and epistemic exclusion.

Marginalised perspectives may have an epistemic advantage in that their knowledge of context, including local practices and environmental circumstances, is first-hand and undistorted by the experiences and perspectives of people from the other social classes. This is important for my argument in favour of co-production of knowledge: since marginalised people can have relevant epistemic advantages, their participation in DRR knowledge processes is beneficial for achieving effective DRR. Furthermore, since they have an advantage, it also makes sense that they should lead these initiatives whenever possible. However, the shaping of education through neo-liberal forces has contributed to epistemic injustice and contributes to further marginalisation, which impacts DRR.

Culture plays a large part in meaning-making, the identity, and social standings of local Nepali people. Since risk is a social construct, cultural considerations should be understood and analysed for more effective, context-sensitive DRR efforts like generation, testing, and implementation of PAMs. Issues with terminology result in epistemic injustice within DRR. Other systems of ontology often fail to be recognised as ontology at all, if aspects of those alternative ontologies do not fit within the narrow confines of dominant Western ontologies.

Such epistemic injustices are misleadingly accredited to culture, or a following of religious doctrine; it is common misperception that the segregation and stratification still prevalent within Nepali society originates from its religious systems and cultural practices.

However, after a careful examination of Vedic history, it can be found that a distortion resulted when people in positions of power skewed select sections of the religious corpus and history in order to keep themselves in positions of power, while oppressing others into systems of labour that directly maintain the oppressors and their artificially produced and imposed status quo.

EMI policies are endorsed and implemented by the government as part of the neo-liberal governmentality narrative, which maintains unequal power structures and relations. This in turn has impacts on and for DRR in mountainous areas, especially for marginalised communities. These are forms of everyday marginalisations and vulnerabilities that people in such communities face. Hazard events add further complications, as vulnerabilities are exacerbated during disasters. Ignoring the impacts of policies that result in epistemic

injustice and further marginalisation will hamper efforts for participatory development and communication of PAMs in these contexts.

Chapter 8

Synthesis and Conclusion

I present a chapter-by-chapter summary of the conclusions of the thesis and then offer a synthesis of my proposed view. I thereafter return to the question of accountability and responsibility within DRR and offer suggestions and recommendations for future research.

8.1. Chapter-by-chapter Summary

In **Chapter 2**, I gave examples of cases where more than knowledge, i.e., epistemic certainty, is required for agents to be epistemically responsible, especially in high-stakes contexts. Failing to meet the requirement of certainty can contribute to a breakdown of the epistemic relationship. I have shown that experts can be held epistemically blameworthy if there is a breakdown in the relationship between laypersons and experts.

A typical philosophical mistake is to think that a single normative principle can apply in all cases, so that accounts of phenomena distort these wide principles by too much simplifying and narrowing. Previous accounts of assertion and other fields of research face this issue. I considered what epistemology has to offer in relation to its methods, validity, and scope for understanding the rationality and/or epistemic blameworthiness of persons making decisions under a variety of circumstances. Assertion is important in DRR and DRM as they are informational environments where accurate and pertinent asserters are required. I began with a discussion of arguments in favour of some of the most popular norms that claim to govern assertion, and this survey served as background for the following discussions.

I discussed the Reasonable to Believe Norm of Assertion (RTBNA), the Knowledge Norm (KNA), and the Certainty Norm (CNA) in order of increasing requirements of norm strictness, for the purpose of presenting an array of cases and examples, especially to highlight that in some cases more than knowledge is required. Even if one does not accept the CNA as the norm for assertion, this might nonetheless give some reasons to take a context-sensitive approach because in the view that I propose the norm for expert assertion is sensitive to context.

I then focused on and analysed the issues relating to knowledge attributions, concentrating particularly on contextualism about knowledge in varied context-sensitive situations. In the Bank cases, contextualists claim that the intuitive variation in assertibility is straightforwardly explained by the context sensitivity of knowledge. Due to a change in context, in the second Bank Case with higher stakes, one fails to know the proposition, 'I know that the bank will be open', and therefore one is not in a position to assert and cannot assert it. My argument for assertion contextualism can be summarised as follows:

1. If contextualism about knowledge ascriptions is true, and
2. If at least KNA is a constitutive norm of assertion,
3. For every assertion there is a corresponding knowledge ascription (from 2)
4. For every assertion there is a possibility for the warrant required for an appropriate assertion to vary according to the context (from 1 and 3) = assertion contextualism.

I apply the contextualist concepts of varying contexts and stakes in my account of DRR expert epistemic blameworthiness but use the CNA instead of the KNA.

Although stricter norms may seem restrictive, they neither halt the process of asserting, or prevent one from asserting; rather, norms prevent one from asserting as if one knows, or has knowledge, when one does not. One may assert, even without knowledge, but to be responsible one would need to disclose the fact that one's assertion is lacking in knowledge, and that it may not be proper, according to the context. If someone were to assert as if he was in possession of knowledge when he was not, then challenges like 'how do you know' would be permissible, and the asserter criticisable if he did not know. I thereafter analysed prominent issues, objections, and rebuttals, and developed a novel account of epistemic blame, CEKA, for DRR, and suggested that epistemic blameworthiness opens avenues for discussions about accountability for DRR and where responsibility for knowledge and decision-making in DRR and DRM might lie.

In **Chapter 3**, I examined a few approaches to knowledge processes, paradigms, substantive assertions, and assumptions of researchers to illustrate how they are manifest within DRR and disaster studies. I examined RCT, EUT, and heuristics because they influence and bear on DRR decision-making processes. A closer look at the nature of decision-making reveals the assumption that agents are all rational; however, individuals are not as rational as often

assumed. Hence, in DRR decision-making, if experts assume that all people act in set rational ways, since that assumption is simply false, DRR efforts will not achieve their goals.

In the examination of standard decision models and rational theories, I found shortcomings in addressing hazard and risk contexts, particularly when attempting to apply generalised heuristics with high margins of error to high-stakes contexts. I argue that by using deliberate System 2 thinking and processes for testing, the margins of error could be reduced. After testing, DRR knowledge could be distilled and simplified into heuristics. In order to effectively apply DRR knowledge in the form of heuristics, expert decision-making should include considerations of diverse backgrounds and geography including cultural diversity, social variation, and political dimensions. However, current formulations of PAMs influenced by Gigerenzer's (2008) notions of 'ecological rationality' do not directly account for these factors in decision-making environments. Instead, generalisation is the favoured approach; to have a single heuristic that can be very widely or universally applied. However, applied case studies show that more than a single heuristic is often required, and further System 2 processes are needed for functioning beyond the single-generalised-heuristic usage in decision-making contexts. Generalisation for universal applicability is not the best option for DRR efforts that require context-sensitive application.

Research programmes incorporating a fuller range of sciences and knowledge types require an innovative synthesis wherein varied dimensions of hazards issues can be integrated in an internally consistent way with broader environment and development goals. Authors discussed in the chapter emphasise structural and socio-political processes while acknowledging societal differences that need to be acted upon, and also emphasise the need for greater reflexivity in research, and in co-designing knowledge. While I endorse the concepts of co-design, co-production, and hybrid forms of knowledge (discussed in Chapter 7), I do not endorse some of the current methodologies and frameworks that claim to be inclusive but do not meaningfully include or value other forms and sources of knowledge from different epistemologies of risk, which I critiqued in the next chapter.

In **Chapter 4**, I analysed hazard-centric and vulnerability paradigm perspectives and found that both use generalisation for universal applicability of concepts, methodologies, and a dominant Western construction of DRR epistemology. Vulnerability proponents claim that

disasters are social constructs. However, they, just like the technocratic proponents, resort to concepts, methodologies, and epistemologies that are taken as universal. Thus, the process of DRR knowledge generation and dissemination (including media) currently assists in perpetuating some of the hazard paradigm's core and most problematic tenets.

Mainstream DRR research has not moved from the silo of Western science and academic institutions, which remains embedded within broader neo-colonial relationships imposed by Western governments onto other non-OECD contexts. The sole epistemic focus of DRR remains squarely within Western scholarship without any challenge to hegemonic rules in the knowledge generating and disseminating processes. Western science underpins the whole transfer of knowledge and technology and thus remains the dominant and default strategy for DRR. While a degree of acknowledgement is sometimes made of local researchers and people affected by disasters being as capable as Western scientists, their views are still stifled based on geo-academic inequalities perpetuated by dominant DRR narratives. This is the current epistemic framing within which expert-generated PAMs are developed.

I then extended the analysis of generalisation for universal applicability further to PAMs used in DRR as a type of heuristic or simplified rule, signalling appropriate actions to take during events like earthquakes. I argued that generalisation for universal applicability, especially with regard to PAMs, is antithetical to the awareness of disasters as social constructs. The generation and dissemination of DRR knowledge, which includes PAMs, requires a context-sensitive and specific approach as societies world-wide are not homogeneous, and thus the current dominant generalised DRR concepts, methodologies, and epistemologies are problematic.

Research investigating the vulnerability of people to landslides is rare yet protective actions during landslide events are a critical component of landslide DRR. Only two published papers that address PAMs for co-seismic landslides were found: Milledge et al. (2019), which is generalised (for wide applicability) and implied for possible use in mountainous Nepali areas, and Pollock & Wartman (2020), which is generalised for use. I critically examined and analysed these recent publications as examples of universal and technocratic discourses in prescribing landslide PAMs, highlighting impacts and possible consequences.

Milledge et al. (2019) and Pollock & Wartman (2020) acknowledge some of the impact of vulnerabilities and exposure, as well as the existence of socio-political issues; however, their approaches are still hazard-centric as per the hazard paradigm. These technocratic, hazard-centric approaches fail to adequately address the vulnerabilities they acknowledge. Critically, they do not integrate other forms of knowledge (other than the Western corpus) or any of the available data on integrated social, political, and economic factors available within the Western corpus. I have argued for co-production, and while this poses some challenges, I argued that they can be overcome.

In **Chapter 5**, I examined and analysed how building codes, DRR governance and the government, the use of science, education, and culture, all have a combined influence on the outcomes of major earthquake events in Nepal, and on considerations for future research. This case study provides an illustration of the need for experts to consider these five factors (and local knowledge; Chapter 7). There is a correlation of infrastructure and vulnerability where human casualties in landslides are often related to the collapse of occupied buildings. It is widely known that although there is an NBC in Nepal it is not usually applied. Moreover, there are currently no assured forms of testing that can be applied to a building to determine its compliance with construction methods. The NBC does not cater for rural contexts and should include an NBC for earthquake-safe rural housing, rather than just modern construction methods for municipal areas. There are no guidelines or DRR messaging for buildings that may be built according to local or traditional construction methods using local materials.

Government decisions impacted mountainous rural communities in the immediate aftermath of the Gorkha earthquakes and thereafter, when political concerns were prioritised over DRR, leaving mountainous communities without the government assistance that would normally lie within the scope of governmental DRR responsibilities. Further, DRR decision-making usually took place remotely with decisions made in Kathmandu and outside Nepal for mountainous communities, which led to miscommunication. This highlights the issues with withdrawal from face-to-face engagement in DRM and the repercussions that directly affected aid delivery to rural communities and impacted their ability to access response teams within the crucial hours and days post-disaster.

Requests for scientific evidence about the earthquakes were largely concentrated at the national level, within the wider humanitarian community, who often sought information from overseas experts. Scientists' involvement was limited by a lack of understanding of the disaster response community's information requirements and the needs assessment process, as well as the disaster managers' limited knowledge of what scientists could offer. Moreover, technical information was not presented in a manner that encouraged its use. Locals were sceptical and felt 'used' in an extractivist manner by experts for research. While experts reaped benefits of their own research, local people received no tangible benefits, which led to antagonism or ambivalence towards 'researcher-types' and research. Foreign experts conducting research without the involvement of the local people, local culture, and local authorities, was unacceptable to locals. Thus, local communities and NGOs were not inclined to follow or use science, seeing no substantial local involvement or prospects of local benefits.

People are currently taught at school level (and beyond in ESDs) that DCH is the most suitable PAM to take in case of an earthquake but there are no qualifying stipulations or contextual guidance. However, according to interviews, field reports and an example in the literature, universally well-recognised PAMs like DCH proved undesirably counterproductive in the context of Nepal during the 2015 Gorkha earthquakes. During the 2015 earthquakes, people were under the mistaken impression that it was safer to run into buildings to DCH rather than stay outside, away from hazardous buildings, resulting in an avoidable loss of lives. NBCs are seldom used in construction, thus leading to highly unstable buildings that cannot withstand shaking during earthquakes. Moreover, a key observation is that there have never been any checks/tests done to ascertain if DCH was the proper PAM to take. Current scientific knowledge and recommendations are thus not aligned with the context. The issue with the unsuccessful DRR messaging example in the Practical Action interview assumed that everyone owning mobile phones was literate, able to assimilate information, and take action. However, as they were unable to read and understand the risk communication conveyed, many people were unable to take adequate DRR actions. Policy and practice are thus not aligned with scientific knowledge.

There are positive examples of research like NSSN led by local researchers and supported by foreign experts, which enabled effective and substantial collaboration. However, it is hazardous to use knowledge generated for 'developed' contexts in a 'developing' context like Nepal without first testing for contextual suitability and DRR effectiveness. Since government authorities adhere to cultural structures already in place, although marginalised communities may raise objections, inadequate action is practically taken to rectify inequalities (this is linked to the philosophical discussion in Chapter 7).

In **Chapter 6**, I examined and analysed how building codes, DRR governance and the government, the use of science, education, and culture, all have a combined influence on the outcomes of major earthquake events like the Ōtautahi (Christchurch) earthquakes in Aotearoa. This case study provides a further illustration of the need for experts to consider the five factors analysed and the coproduction of knowledge. During the earthquake, despite rigorous BCs, many seemingly sturdy and robust buildings collapsed, leading to fatalities. While Aotearoa is a developed country, placing one's faith in building and BCs alone is a risky decision especially when factors like liquefaction bring further complications.

The Platform case study shows that although attempts were made to foster networking across disciplines, organisations, and sectors, the distinct cultures of different domains hindered meaningful collaboration. Experts managing AF8 opened avenues for communication with others from non-specialist, non-expert backgrounds. Although backed by a scientifically sound, informed and expert team it also has members with practical experience working together with DRR organisations and community projects. The use of AF8's risk scenarios is one of the types of testing integral to DRR processes for determining future risks and errors and working to reduce the margins of errors and risks where possible.

The town of Waiau has received sound scientific guidance based on its unique characteristics and associated risks. Along with scientific reports and community involvement, different council representatives have attempted to achieve both short- and longer-term DRR goals. However, the town and its inhabitants remain at risk. 'Commercially sensitive' decision-making triumphs over scientifically backed DRR-focused decision-making, and therefore the prioritisation of commercially sensitive decision-making stands in the way

of implementation of DRR measures. Policy and practice are thus not aligned with current scientific knowledge.

While numerous people choose not to participate in ShakeOut campaigns for a variety of reasons, non-participation has seldom been explored in the literature. It would be advantageous to evaluate the effectiveness of advice and guidance offered to assess its usefulness for DRR.

Although Aotearoa is formally bi-cultural, where both Māori and Pakeha contribute to national identity, Māori were disproportionately affected by the earthquakes, with reduced access to basic necessities, sanitation, power, transport and support from responders. Knowledge production that includes scientific, social, and cultural knowledge for DRR is especially challenging when power imbalances, and socio-political and cultural facets are not prioritised as the core factors that they are.

In **Chapter 7**, I examined some of the impacts of epistemic impairments within DRR and argued that these impairments result in epistemic injustices. In particular, they produce participatory injustices because they prevent subjects from engaging in processes of knowledge production, implementation, and dissemination. Denying an epistemic agent recognition denies them any minimal epistemic standing. In a context like Nepal, where marginalisation is already present and practised, continuing to behave in a manner that signals (consciously or unconsciously) to others that one accepts the status quo leads to further marginalisation. Integration and collaboration between unequal power structures is challenging to navigate. Standpoint theories evaluate the extent to which unequal power relations influence the production of knowledge. Standpoint theory is a people-centred approach that considers contextual elements and power dynamics from the very beginning. It is through this lens of standpoint methodology that I offer a hybrid alternative to current DRR approaches to PAMs. Although local people may have epistemic resources like their historical accounts, ontological perspectives and epistemic positions from which to draw on, if this is not considered by experts as knowledge, the marginalised will continue to suffer participatory injustices and epistemic exclusion.

Marginalised perspectives may have an epistemic advantage in that their knowledge of context, including local practices and environmental circumstances, is first-hand and

undistorted by the experiences and perspectives of people from the other social classes. This is important for my argument in favour of co-production of knowledge: since marginalised people can have relevant epistemic advantages, their participation in DRR knowledge processes is beneficial for achieving effective DRR. Furthermore, since they have an advantage, it also makes sense that they should lead these initiatives whenever possible. However, the shaping of education through neo-liberal forces has contributed to epistemic injustice and contributes to further marginalisation, which negatively impacts DRR.

Culture plays a large part in meaning-making, the identity, and social standings of local Nepali people. Since risk is a social construct, cultural considerations should be understood and analysed for more effective, context-sensitive DRR efforts like generation, testing, and implementation of PAMs. Issues with terminology result in epistemic injustice within DRR. Other systems of ontology often fail to be recognised as ontology at all if aspects of alternative ontologies do not fit within the narrow confines of dominant Western ontologies.

Such epistemic injustices are erroneously perceived to be due to historic culture, or a following of religious doctrine; it is a common misperception that the segregation and stratification still prevalent in Nepali society originates from its religious systems and cultural practices. However, after a careful examination of Vedic history, it can be found that a distortion resulted when people in positions of power skewed select sections of the historic text in order to keep themselves in power. The reference to skewed 'culture' serves as a legitimating device, oppressing others into systems of labour that directly maintain the oppressors and their artificially produced and imposed status quo, and as a means to escape accountability.

English-medium instruction policies are endorsed and implemented by the government as part of the neo-liberal governmentality narrative, which maintains unequal power structures and relations. This in turn has impacts on and for DRR in mountainous areas, especially for marginalised communities. These are forms of everyday marginalisations and vulnerabilities that people in such communities face. Hazard events add further complications, as vulnerabilities trigger disaster. Ignoring the impacts of policies that result

in epistemic injustice and further marginalisation will hamper efforts for participatory development and communication of PAMs in these contexts.

8.2. Synthesis

8.2.1. Proposal

The development of an open space to consider what an inclusive and context-sensitive approach for future context-specific research could include, and may assist in future DRR efforts and the development of more effective PAMs. I do not view the production of PAMs as a linear top-down activity but rather as a process that should encompass both top-down and bottom-up initiatives, starting with bottom-up led efforts. Standpoint theory can be used as a methodology in DRR, as it asserts that enquiries are best started from within the marginalised social groups' experience and is therefore a suitable people-centred approach to initiate development of knowledge for use, such as PAMs.

I initially argued in Chapter 2 that for experts to assert, a norm like the **Contextualism for Expert Knowledge Assertion (CEKA)** should be followed:

CEKA: To be positioned to assert that P, experts must know that P according to the standards for knowledge at work in the context, as experts make assertions.

My account hinges on the following points:

1. Epistemic relationship impairment equates to blameworthiness.
2. According to the knowledge norm of assertion (KNA), experts should only assert what they know.
3. If experts assert what they do not know, then they are blameworthy.
4. In high-stakes cases, assertion requires more than knowledge, perhaps certainty.
5. It is vital that experts do not fall short of the normative ideal of epistemic relationships.
6. Epistemic relationship impairment by experts renders experts epistemically blameworthy.

I found that Piovarchy's (2021) agency-cultivation view is complementary to CEKA. The agency-cultivation view can be beneficial in promoting better epistemic conduct as epistemic blame functions to discourage certain kinds of unfavourable epistemic behaviours.

Epistemic blame is justified because the practice of blaming agents for failing to abide by epistemic norms helps them to internalise those norms, fostering a very distinctive and valuable kind of agency. Even if any particular instance of engaging in epistemic blame won't directly cultivate the wrongdoer's agency, the practice of blaming as a whole is justified by this goal (Piovarchy, 2021, 802).

It could be that in some cases, blaming certain agents for their errors is counterproductive. However, the practice of blame is justified by there being a possibility that in some cases blame may in fact promote the agency of those who are blamed. This can therefore assist in the cultivation of better epistemic behaviours and improved epistemic agency wherein agents are willing and open to constructive critique for more enhanced epistemic relationships that attain their epistemic goals.

In Chapter 3, I discussed several models of rationality, and I particularly considered a dual-process (System 1/System 2) framework. I argued that it is preferable for the logic and rigour of System 2 thought to influence and shape the most vital and significantly weighty decisions that are made when stakes are high. This argument corresponds to my views on contextualism about knowledge discussed in Chapter 2, where the change in assertibility is explained by the context-sensitivity of knowledge. In higher-stakes scenarios where one must make significantly weighty decisions, effortful and conscious System 2 thought processes are required. In lower-stakes scenarios, System 1 thought processes might be suitable.

Outline of my argument for this view when applied to multilevel higher-stakes DRR contexts:

1. System 1 thinking can be right by chance even if the margin of error is high,
2. System 1 thinking does not minimise margins of error (from 1),
3. High-stake-scenarios ought not rely on mechanisms that tolerate high margins of error,
4. High-stakes-scenarios ought not to rely on System 1 thinking (from 2 and 3)

The stakes of concern apply not only to decision-makers, but more so to people affected by those decisions. Therefore, this pertains to both individual and collective decision-making; a common feature of connectedness between types of decision-making prevails, as outlined in the relationship view, in the context of DRR, without collapsing their distinctions.

One might infer that in DRR decision-making, at multiple levels, urgency should be the foremost concern that overrides System 2 processes and epistemic concerns. However, in Chapter 2 I argued that in DRR contexts, characterised by duress and urgency, epistemic standards remain strict and warrant more than knowledge, i.e., they warrant epistemic certainty. While there may seem to be a contradiction because urgency warrants fast action, making a fast decision that is erroneous or mistaken in enormously high-stakes DRR contexts can be fatal. Therefore, high-stakes scenarios do not tolerate high margins of error; these margins would in effect be potential fatalities. DRR should not be overruled by the ‘tyranny of the urgent’ (Walker, 1996), which loses sight of the long-term impacts.

My focus on the standard for expert assertion being higher than the standard for mere knowledge, perhaps epistemic certainty, in DRR contexts can be used to improve and enhance DRR knowledge. It encourages researchers to engage in practices that involve any DRR measure proactively going through a series of tests, checks, and balances. Testing assists in ascertaining appropriateness for socio-political, cultural, economic, and environmental contexts, and the potential implementability as the margins for error are reduced. Once these tests, checks, and balances have been conducted, the product (e.g. PAMs) can be implemented for faster action. The simplification of results from System 2 processes (or conversion to heuristics) can take place at later stages of the overall long-term DRR process. I do not recommend bypassing rigorous System 2 processes with urgency as a quasi-justification for unconscious System 1 processes in DRR knowledge generating and disseminating processes.

DRR contexts are examples of cases where the stakes are high, and presumably responsible agents are keen on not making mistakes. Distilling from rigorous processes to the eventual form of heuristics for use in high-stakes DRR contexts could be encouraged after testing for potential implementability, along with associated factors embedded in the broader

decision-making processes. This could minimise issues highlighted (in Chapters 4, 5, and 7) with PAMs.

While this may seem like a huge task for a single researcher to take on, I do not endorse top-down approaches and thus definitely do not endorse the view that a single foreign researcher or foreign research team should lead research and testing of PAMs in 'developing' contexts. Neither do I expect that technical experts undertake social science, but instead allow local social scientists to assist with the research of those aspects. Context-sensitive research and knowledge production does not need to be solely attempted or carried out by foreign experts; rather, local experts should be enabled to lead these initiatives with the support of other agents. This is not a panacea, but it is an attempt to foster more inclusive, context-sensitive knowledge co-generation, dissemination, and use.

Beyond Western localities, Western research roles (as discussed in Chapter 4; and see Table 4.1), should shift from drivers to supporters. There needs to be an explicit acknowledgement that local researchers and local people affected by disasters are “as good and capable as Western scientists” (Gaillard, 2019, 59), and that their perspectives, understandings, uniquely situated knowledge(s) and standpoints could underpin indigenous and context-specific initiatives for DRR efforts such as PAMs.

PAMs do not exist in a vacuum, devoid of situationally influencing factors (discussed especially in Chapters 5-7); at the very least, socio-political and cultural factors should be considered when developing them, in the manner that standpoint theory recommends. I therefore re-assert that it is epistemically irresponsible, criticisable, and blameworthy for any expert or institution to publish and disseminate DRR knowledge that has not been tested in 'drill-like' scenarios with participants, because of the possible consequences and impacts in high-stakes DRR contexts, and high margins of error that remain unaddressed without testing. If the aspects of the scenario might be too difficult to replicate closely, and actions too complicated to perform in drills, then they are probably too difficult to perform in actual disaster contexts (Chapter 4).

8.2.2. The Question of Accountability and Responsibility Within DRR

The analysis I have provided in this thesis has dealt with multilevel decision-making hierarchies within DRR and DRM at international level, the level of national government, and individual decision-making. At the international level, according to the SFDRR's focus, the primary responsibility for DRR lies with national governments and their institutions to reduce disaster risk on their territory; "including primary responsibility of states to prevent and reduce disaster risk, all-of-society and all-of-State institutions engagement" (UNGA, 2015, 4). However, the SFDRR further elaborates on its position to include other stakeholders who share with national governments in the responsibility for DRR. "While States have the overall responsibility for reducing disaster risk, it is a shared responsibility between Governments and relevant stakeholders" (UNGA, 2015, 20). The assumptions that a government has control over its territory and population, and that governments have control over the ways in which disaster risk within their territory is affected by the global economic system, highlight the problematic assumption that all domestic political authorities can achieve DRR.

The ongoing neoliberal governmentality trend tasks various privately run entities with the minimisation of risk and promotion of population stability, a responsibility that once lay solely with the state and other historical forms of sovereignty. The danger of the neoliberal governmentality discourse is that local participation becomes a low-cost means for the government, and elite representatives, to off-load duties of care, costs of social protection, and accountability onto risk bearers (see Table 8.1.).

Academia and experts still exercise power and political influence in DRR through top-down actions. The dominant hazard paradigm reinforces assertions that disasters are results of extreme natural events, and affected people fail to 'adjust' due to insufficiency in their risk perceptions and are thus to blame for DRR failures. Although DRR decision-making could be analysed at the level of the individual alone, I have argued that individual decision-making is actually impacted by a composite of factors, embedded in and inclusive of decision-making actions of scientific experts and others at local, national and international governance levels.

The SFDRR's intended relevance and impact in reducing mortality and influencing decision-making at local and individual levels is at odds with an upward, increasing trend in disaster

losses; the burden of this loss weighs heaviest on marginalised communities. DRM is still considered a domain for experts by way of current operation and action, and DRR governance, although requiring the involvement of citizens and their political representatives, does not in a meaningful and robust manner include or engage with multilevel stakeholders to achieve sustainable DRR. Participation in DRR processes of different stakeholders and people belonging to different age groups allows for some involvement and nurtures a sense of shared responsibility. However, involvement of multilevel stakeholders remains deeply problematic, particularly when the participation is tokenistic and rigidly within the constructs of academia, without genuine representation and shared power. “Conflicting interests and lack of political will to resolve them seems to be at the base of many failures to apply knowledge effectively” (White et al., 2001, 90). The translation of scientifically produced knowledge into practicable action by experts and policymakers for end-users is not free from issues. Failures to contextually generate, disseminate, apply, and implement knowledge are much larger issues that require attention and focus rather than the assumption that generating more expert knowledge is the best way to steer DRR efforts. More inclusive perspectives propose a focus on relationships between components of disasters rather than an emphasis on the search for a singular root cause. The numerous variables involved at different stages of the DRM process are by no means static. In some cases, the slightest changes could drastically alter the results and outcomes, as I discussed in Chapters 5 and 6.

Within disaster studies, it remains unclear who is responsible when lives are lost due to unclear or misleading DRR communication. Such communication indicates that specific PAMs are developed or recommended by experts without taking into account contextual factors that directly impact implementation by laypersons. The point of setting out a novel account of DRR expert assertion, CEKA, is to highlight the consequences that arise from actionable knowledge that is not co-produced and rigorously tested before dissemination, and to argue that experts can be held epistemically blameworthy if these consequences arise directly out of expert assertions. I argue that an account like CEKA should be used by experts in combination with an approach like standpoint theory as a methodology for more inclusive, co-produced DRR knowledge for action. This is a suitable alternative to the still-dominant technocratic methods of generation and dissemination of PAMs in the

'developing' context of Nepal. Standpoint as a methodology can assist in identifying and addressing marginalised epistemic perspectives that result from epistemic injustices in DRR. Without identifying the marginalising terms and language currently used, DRR experts can perpetuate and contribute to the cycle of marginalisation of the already marginalised. This is unacceptable and epistemically criticisable behaviour in the epistemic relationship between experts and laypersons, and experts can thus also be held epistemically blameworthy for perpetuating epistemic marginalisation. Further, it is also epistemically criticisable behaviour if experts do not take into account standpoints that have an epistemic advantage, which marginalised perspectives usually have due to their unique societal situations and political struggles. This shortfall in expert behaviour and action/omission results in participatory injustices that affect both laypersons and local experts in 'developing' contexts and marginalises their epistemic contributions for DRR. More epistemically responsible agency can be cultivated by experts who are willing to identify the problems associated with epistemic marginalisations and injustices and consciously transform their research approach/methodology to address these problems, and at the very least not contribute to or exacerbate them. Without addressing existing marginalisations and without testing PAMs experts send the message that these lives do not matter to them; responsible experts should be more vigilant of this. Reporting bias in the media sends a similar message when more deaths are required in 'developing' contexts to consider a disaster newsworthy.

Table. 8.1. My Summation of Current Assumptions Within DRR and Some Proposals		
	Current assumption	Critique/proposal
1	Generalisation for universal applicability is acceptable for world-wide DRM.	DRM and particularly DRR paradigm perspectives hold assumptions that treat varied DRR contexts indistinctly; they assume a rationalist universal application will function everywhere. A context-sensitive approach is required for more effective DRR.
2	Protective action measures like DCH are automatically assumed to be the best measures to take in all contexts, universally.	Generalisation for universal applicability is antithetical to the awareness of disasters as social constructs. PAMs need to be contextually co-developed and tested for practical use before recommendation for implementation in higher-stakes DRR contexts.
3	International frameworks are assistive and can actuate change.	They are non-binding and tough to implement at national and local levels.

4	Endorsement of neo-liberal governmentality is the best approach to economic progress; only economic data matters in measuring DRR development.	This endorsement results in a hollowing out of the role of the government, a decrease of government's primary DRR responsibilities, and a skewed assessment of DRR development.
5	'Community resilience' is the current trend to 'empower' communities for DRR.	At-risk, marginalised communities are left to fend for themselves under the narrative of 'resilience', without assistance from those in power. Focus should be placed on support for marginalised communities, without superimposing Western concepts.
6	'More science' is exclusively required to improve DRR.	DRR should be a more inclusive process rather than exclusive to a particular domain of experts. Both top-down and bottom-up initiatives are required for improvements.
7	Having science implies automatic implementation or 'science equals implementation'.	There are many gaps between knowledge generation and implementation; knowledge should be implemented where applicable, after testing.
8	The current dominant epistemology of risk and DRR is the only (acceptable) epistemology.	The DRR domain is unable to account for the different epistemologies of risk that are stifled because they exist beyond the dominant Western constructs of ontology. DRR should contextually account for a multitude of epistemologies especially when conducting research outside Western parameters.

8.2.3. Future Research

Future research for co-production, dissemination, and implementation of PAMs in the context of Nepal should also account for the factors that impact the possible performance of PAMs. Five of the main areas to be discussed and analysed are (an example of such an analysis was provided in Chapter 5):

1. Building codes (NBC) and infrastructure
2. DRR governance and governments
3. The use of science
4. Education
5. Culture

These factors are important and should be considered simultaneously as they overlap rather than remain in distinct categories.

Currently, the Nepali NBC offers guidance for buildings that are to be built according to modern construction methods, usually in Kathmandu or other municipal areas. The NBC does not cater for rural contexts and should include an NBC for earthquake-safe rural housing. There are no guidelines or DRR messaging for buildings that may be built according to local or traditional construction methods and using materials that are locally available. Most materials for modern construction methods, in accordance with NBC guidance need to be imported. NBCs should instead be flexible to ensure culturally appropriate and economically affordable homes for affected people, and accommodate existing residential patterns, livelihoods and practices.

The National Reconstruction Authority focuses on building houses compliant with building codes that qualify for the reconstruction grant instalments; this does not consider traditional forms of knowledge in building construction. Houses built with traditional knowledge in mountainous communities are assumed to be vulnerable and thus unsafe, while only government-prescribed houses are deemed to be 'earthquake-resistant' and safer. This has led to the disqualification of numerous houses built or repaired by laypersons for reconstruction grants.

This reinforces the issues with top-down approaches to DRM in building reconstruction, which has a knock-on impact on future DRR efforts as building safety and performing PAMs like DCH are intrinsically linked. Moreover, it diminishes the role of local knowledge in building construction according to people's contexts and available resources. Negating traditional knowledge creates epistemic and participatory injustices whereby local people are not considered epistemic agents of suitable standing or compatible with the NRA's reconstruction criteria and epistemic requirements/qualification. Traditional knowledge therefore is rendered 'unsafe' to use and therefore cannot be integrated in the reconstruction process and excludes local participation in the reconstruction processes. Conversely, traditional knowledge should be valued, and integrated, and local participation is recommended, local people should be respected as participants in reconstruction efforts from the beginning.

For these reasons, DRR decision-making is still a top-down process, with experts, government, NGOs, and other stakeholders who are often situated in Kathmandu (a city context) making decisions with impacts for people within mountainous regions. The perspectives of foreign experts and of local dominant caste elites seems very far removed from the perspectives of Janajati people in the central mountainous regions. Experts and dominant caste elites do not have access to the first-hand knowledge and unique standpoints that Janajati groups have about their immediate environment, and their socio-political situations that are impacted by marginalisation. Therefore, experts and dominant social elites can only conjecture based on imaginings of what being in that socio-politically marginalised and situated position might entail. First-hand knowledge and direct experience give Janajati groups a unique epistemic advantage. There is much that can be learnt from understanding these perspectives rather than conjecturing about them or ignoring them. In the earlier sections, I discussed ways in which marginalised people are caught in a recurring loop of marginalisation because they are often unable to adequately express themselves in foreign languages. Therefore, even though marginalised perspectives may have an epistemic advantage, because of epistemic injustices along with other forms of marginalisation, people may not be able to express, convey and thus be included in formalised 'participatory research efforts'.

In Aotearoa, which has a well-regulated building industry with modern building codes, earthquake casualties and injuries are determined by the behaviour of individuals during and immediately following earthquake shaking (Horspool et al., 2020). Although people's behaviour inside and outside buildings is worth considering for DRR efforts to succeed, this is rarely considered. Future research should consider people's behaviour, especially when designing both structural and non-structural elements of buildings in both 'developed' and 'developing' contexts. Public education campaigns and drills can also be tailored to acknowledge the current types of behaviours exhibited and address the potential reasons for these behaviours.

In Nepal, NSET has gleaned international DRR knowledge and applied it to the country context. However, the extent or limits of international knowledge-contextualisation is an area for further research, especially for DRR because PAMs like DCH can have fatal

consequences when misapplied in 'developing' contexts (Chapters 5 and 7). In this thesis I have begun this endeavour, but this is not an exhaustive undertaking and should be researched further.

Further, the effectiveness of DRR recommendations during the ESD's, and DRR information disseminated at school programmes requires further research, careful examination, and evaluation, especially because outdated and unsafe advice to 'shelter in doorways/frames' even when outside, is currently offered country-wide without testing. Moreover, NSET's advice to never run out of a building during an earthquake event (Figure 5.5.) is an area for future research and evaluation, especially in light of NBC non-implementation levels, which results in building and infrastructure hazards. This advice is contrary to current expert advice for countries where the NBCs are not usually followed/implemented (Rapaport & Ashkenazi, 2019; Goltz et al., 2020), and the earthquake accounts contained in histories, and local earthquake stories in Nepal.

While there may be many knowledges, skills, strengths, and abilities that could be identified and supported in Nepal, this process of support in facing hazards is not an independent endeavour that can be achieved by individuals or communities alone. The very notion of support necessitates reducing people's vulnerabilities, which if they are already at the margins of society is tremendously difficult for people to do by themselves. Reducing vulnerability and marginalisation requires intervention from the top in collaboration with local academics and laypersons to co-produce usable DRR knowledge.

Appendices

Appendix 1. An Overview of the Slow-onset Disaster Literature

Reproduced from Staupe-Delgado (2019, 626-627).

Reference (year)	Term used	Contribution in brief
Barton (1969)	Gradual and chronic stress	Elaborates on forms of collective stress, including slow-onset types
Klinterberg (1979)	Creeping disaster	Outlines the type, including a model of a gradual onset; discusses slow-onset disasters in relation to displacement
Lewis (1988)	Slow-onset disaster	All disasters have a slow-onset
Glantz (1994)	Creeping environmental problem	Points out the neglected nature of phenomena such as desertification, global warming, famine and deforestation, arguing that low-grade processes are often neglected
Jarman and Kouzmin (1994)	Creeping crisis	Adapting sudden-onset frameworks to slow-onset disasters
Rosenthal (1998)	Creeping disaster	Argues for a shift away from event-based definitions to processual definitions of disaster focused on creeping, elusive and non-conventional hazards and their impacts
Glantz (1999)	Creeping environmental problem	Conceptualises the term and contributes with a political analysis of low-grade cumulative environmental change in the Aral Sea Basin
Porfiriev (2000)	Creeping crisis	Slow-onset disaster as phenomenon and political challenge is discussed from a crisis management and environmental policy perspective
Olson (2000)	Slow-onset disaster	Stipulates that disaster phases function somewhat differently in the context of slow-onset disaster impacts
't Hart and Boin (2001)	Slow-burning crisis	Describes slow-onset disasters as one of four types in a typology focused on onset and termination speed; focuses particularly on management and policy challenges

Reference (year)	Term used	Contribution in brief
The Social Learning Group (2001)	Global environmental risk	Analyses the policy challenges posed by ozone depletion, acid rain, and global warming
McConnell (2003)	Creeping crisis	Clarifies the type including unique response and policy challenges
Greer (2003)	Creeping crisis	Broadens the concept to include macro-level societal pressures
Wisner et al. (2004)	Slow-onset disaster	Estimates disaster burden, wider context and societal origin
Twigg (2004)	Slow-onset disaster	Elaborates on the type and argues that while drought is by far the best-known hazard, it remains absent from most disaster studies
Dynes (2004)	Slow-onset events	Argues for the need for more research on slow-onset and permanent disasters
Buckle (2005)	Slow-onset disaster	Compares mandated and ordinary language meanings embedded in the disaster concept, arguing that lay usage includes slow-onset disasters, while mandated definitions for practical purposes focus on disaster impacts (events) concentrated in time and space
Shaluf (2007)	Slow-onset disaster	Breaks down hazards and disasters into a large number of types
Marulanda et al. (2010)	Accumulated impacts	Outlines how the DesInventar disaster database can be put to use to better capture the impacts of smaller and slow-onset hazards
OCHA (2011)	Slow-onset emergency	Identifies unique response and preparedness challenges
Kelman (2011)	Longer-term processes	Elaborates on the type and problematises the concept
Nixon (2011)	Slow violence	Theorises invisible and incremental processes of environmental hazards
Porfiriev (2012)	Creeping crisis	Argues for a broadened research agenda on disasters
UNFCCC (2012)	Slow-onset events	Discusses potential adverse impacts and DRR measures associated with slow-onset disasters attributable to climate change
Matthewman (2015)	Slow-onset disaster	Conceptualises slow-onset phenomena as part of everyday, undramatic yet cumulative processes

Reference (year)	Term used	Contribution in brief
DeLeo (2015)	Emerging problems	Engages with previous work on agenda setting, arguing that emerging crisis often evoke anticipatory action by authorities
Viens and Littmann (2015)	Slowly emerging disaster	Debates whether antimicrobial resistance can be considered a disaster, advances on previous conceptualisations of the terms
Birkland (2016)	Potential focussing event	Explains the dynamics through which some natural hazards generate more dread and receive more attention than others
Rubin (2016)	Slow-onset disaster	Argues that slow-onset disasters are less likely to spark conflict and security problems than sudden-onset disasters due to vague patterns of accountability, attribution, and outrage
Hsu (2017)	Slow moving and recurrent disasters	Expands on previous discussions on 'what is a disaster' and presents a new conceptualisation that addresses previous arguments for limiting the focus to sudden-onset events
Staupe-Delgado et al. (2018)	Slow-onset disaster	Identifies the lack of political will, reactive response systems and lack of inter-agency coordination as barriers for proactive response to slow-onset disasters
Williamson and Courtney (2018)	Slow-onset disaster	This editorial to a special issue on temporal aspects of disasters discuss the various timeframes disasters manifest at
Zaidi (2018)	Slow-onset disaster	Debates how Sendai loss data indicators may be enhanced to better measure the impacts of small and slow-onset hazards

Appendix 2. Consent Form

Project title:

Researcher: Sheena Ramkumar

Department: Philosophy & Geography

Contact details: sheena.ramkumar@durham.ac.uk

Supervisor name: Prof. Alexander Densmore

Supervisor contact details: a.l.densmore@durham.ac.uk

This form is to confirm that you understand what the purposes of the project are, what is involved and that you are happy to take part. Please tick each box to indicate your agreement:

I confirm that I have read and understand the information sheet dated / / and the privacy notice for the above project.	
I have had sufficient time to consider the information and ask any questions I might have, and I am satisfied with the answers I have been given.	
I understand who will have access to personal data provided, how the data will be stored and what will happen to the data at the end of the project.	
I understand that anonymised (i.e. not identifiable) versions of my data may be archived and shared with others for legitimate research purposes.	
I agree to take part in the above project.	
I understand that my participation is voluntary and that I am free to withdraw at any time without giving a reason.	
The project involves audio or video recording or photography, and I consent to being audio recorded / being video recorded / having my photo taken, and understand how recordings / photos will be used in research outputs.	
I understand that my words may be quoted in publications, reports, and other research outputs.	

Please choose one of the following two options:

- EITHER I agree to my real name being used in the above
- OR I do **not** agree to my real name being used in the above

Participant's Signature _____ Date _____ (NAME IN BLOCK LETTERS) _____

Appendix 3. Participant Information Sheet with Privacy Notice

Project title:

Researcher: Sheena Ramkumar

Department: Philosophy & Geography

Contact details: sheena.ramkumar@durham.ac.uk

Supervisor name: Prof. Alexander Densmore

Supervisor contact details: a.l.densmore@durham.ac.uk

You are invited to take part in a study that I am conducting as part of my PhD at Durham University. This study has received ethical approval from the departmental Ethics Committee of Durham University.

Before you decide whether to agree to take part it is important for you to understand the purpose of the research and what is involved as a participant. Please read the following information carefully. Please get in contact if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

The aim of this study is to understand how different frameworks for the management of risks and hazards such as earthquakes and landslides function in contexts like Nepal and New Zealand. I will examine the functioning (or lack thereof) of rules such as protective action measures that govern seismic and co-seismic risks in Nepal. This research is funded by the Institute of Hazard, Risk, and Resilience (IHRR) and the Action on Natural Disasters Project (AND) at Durham University. Studies are expected to be completed by 30 September 2022.

Why have I been invited to take part?

You have been invited because your contribution as an expert/ academic/ experienced personnel within the field(s) related to risk, hazard and resilience is valued and integral to the current fieldwork being undertaken.

Do I have to take part?

Your participation is voluntary and you do not have to agree to take part. If you do agree to take part, you can withdraw at any time, without giving a reason. Your rights in relation to withdrawing any data that is identifiable to you are explained in the accompanying Privacy Notice.

What will happen to me if I take part?

If you agree to take part in the study, you will as a participant be asked to answer a series of questions and share your experiences. Where this will take place will be discussed and decided upon according to the needs of the participants. Participation may require between 30 – 60 minutes of your time. Please answer as many questions as you are able and willing to, as accurately and fully as you are capable. You may also add information not asked of during the interview should you deem it relevant, appropriate and helpful, and omit any questions you do not wish to answer.

Are there any potential risks involved?

No potential risks to the participant but some possible benefits for all in understanding risk, hazard and resilience better. This may in turn be used to inform policy and aid in the development of simple assistive rules that could be utilised by communities in hazardous environments.

Will my data be kept confidential?

All information obtained during the study will be kept confidential. If the data is published it will not be entirely anonymous but will also not be identifiable as yours. Full details are included in the accompanying Privacy Notice. No personal data is collected, and all information is collected anonymously with reference to your role as scientist, academic, administrator etc. We will have no way of linking responses back to an individual, unless it can also be derived from quotable academic resources such as journal articles, publications, or webpages and of course if you do not mind or would like your name to be included, mentioned or words directly attributed to you. Permission will be obtained in order to publish identifiable data and this is reflected in the privacy notice and consent form.

What will happen to the results of the project?

No personal data will be shared, however anonymised (i.e. not identifiable) data may be used in publications, reports, presentations, web pages, *conferences* and other research outputs. At the end of the project, anonymised data may be archived and shared with others for legitimate research purposes.

If you indicate that you prefer your identifiable data to be used in outputs, archived or shared, then they will be used in an ethically sound manner in accordance with details outlined in the privacy notice.

All research data and records needed to validate the research findings will be stored for 10 years after the end of the project.

Durham University is committed to sharing the results of its world-class research for public benefit. As part of this commitment the University has established an online repository for all Durham University Higher Degree theses which provides access to the full text of freely available theses. The study in which you are invited to participate will be written up as a thesis. On successful submission of the thesis, it will be deposited both in print and online in the University archives, to facilitate its use in future research. The thesis will be published open access.

Who do I contact if I have any questions or concerns about this study?

If you have any further questions or concerns about this study, please speak to the researcher or their supervisor. If you remain unhappy or wish to make a formal complaint, please submit a complaint via the University's [Complaints Process](#).

Thank you for reading this information and considering taking part in this study.

Durham University has a responsibility under data protection legislation to provide individuals with information about how we process their personal data. We do this in a number of ways, one of which is the publication of privacy notices. Organisations variously call them a privacy statement, a fair processing notice or a privacy policy.

To ensure that we process your personal data fairly and lawfully we are required to inform you:

- Why we collect your data
- How it will be used
- Who it will be shared with

We will also explain what rights you have to control how we use your information and how to inform us about your wishes. Durham University will make the Privacy Notice available via the website and at the point we request personal data. Our privacy notices comprise two parts – a generic part (ie common to all of our privacy notices) and a part tailored to the specific processing activity being undertaken.

Data Controller

The Data Controller is Durham University. If you would like more information about how the University uses your personal data, please see the University's [Information Governance webpages](#) or contact Information Governance Unit:

Telephone: (0191 33) 46246 or 46103

E-mail: information.governance@durham.ac.uk

Information Governance Unit also coordinate response to individuals asserting their rights under the legislation. Please contact the Unit in the first instance.

Data Protection Officer

The Data Protection Officer is responsible for advising the University on compliance with Data Protection legislation and monitoring its performance against it. If you have any concerns regarding the way in which the University is processing your personal data, please contact the Data Protection Officer:

Jennifer Sewel

University Secretary

Telephone: (0191 33) 46144

E-mail: jennifer.sewel@durham.ac.uk

Your rights in relation to your personal data Privacy notices and/or consent

You have the right to be provided with information about how and why we process your personal data. Where you have the choice to determine how your personal data will be used, we will ask you for consent. Where you do not have a choice (for example, where we have a legal obligation to process the personal data), we will provide you with a privacy notice. A privacy notice is a verbal or written statement that explains how we use personal data.

Whenever you give your consent for the processing of your personal data, you receive the right to withdraw that consent at any time. Where withdrawal of consent will have an impact on the services we are able to provide, this will be explained to you, so that you can determine whether it is the right decision for you.

Accessing your personal data

You have the right to be told whether we are processing your personal data and, if so, to be given a copy of it. This is known as the right of subject access. You can find out more about this right on the University's [Subject Access Requests webpage](#).

Right to rectification

If you believe that personal data we hold about you is inaccurate, please contact us and we will investigate. You can also request that we complete any incomplete data. Once we have determined what we are going to do, we will contact you to let you know.

Right to erasure

You can ask us to erase your personal data in any of the following circumstances:

- We no longer need the personal data for the purpose it was originally collected
- You withdraw your consent and there is no other legal basis for the processing
- You object to the processing and there are no overriding legitimate grounds for the processing
- The personal data have been unlawfully processed
- The personal data have to be erased for compliance with a legal obligation
- The personal data have been collected in relation to the offer of information society services (information society services are online services such as banking or social media sites).

Once we have determined whether we will erase the personal data, we will contact you to let you know.

Right to restriction of processing

You can ask us to restrict the processing of your personal data in the following circumstances:

- You believe that the data is inaccurate and you want us to restrict processing until we determine whether it is indeed inaccurate
- The processing is unlawful and you want us to restrict processing rather than erase it
- We no longer need the data for the purpose we originally collected it but you need it in order to establish, exercise or defend a legal claim and
- You have objected to the processing and you want us to restrict processing until we determine whether our legitimate interests in processing the data override your objection.

Once we have determined how we propose to restrict processing of the data, we will contact you to discuss and, where possible, agree this with you.

Retention

The University keeps personal data for as long as it is needed for the purpose for which it was originally collected. Most of these time periods are set out in the [University Records Retention Schedule](#).

Making a complaint

If you are unsatisfied with the way in which we process your personal data, we ask that you let us know so that we can try and put things right. If we are not able to resolve issues to your satisfaction, you can refer the matter to the Information Commissioner's Office (ICO). The ICO can be contacted at:

Information Commissioner's Office Wycliffe House Water Lane Wilmslow Cheshire SK9 5AF

Telephone: 0303 123 1113. Website: [Information Commissioner's Office](#)

Bibliography

- Abbott, A., & Nosengo, N. (2014) Italian seismologists cleared of manslaughter. *Nature* 515, 171. <https://doi.org/10.1038/515171a>
- Abrahams, Jessica (2019) Is it time to retire the term “developing country”? *Prospect*. Online: <https://www.prospectmagazine.co.uk/world/is-it-time-to-retire-the-term-developing-country-wto-united-nations-global-inequality> (Last accessed: 4/4/2023)
- Absell, C.D. (2015) The lexicon of development: quantitative history of the language of development studies. *Revista Iberoamericana de Estudios de Desarrollo*, 4(1), 4–35.
- Adams, R. M., Karlin, B., Eisenman, D. P., Blakley, J., & Glik, D. (2017). Who participates in the Great ShakeOut? Why audience segmentation is the future of disaster preparedness campaigns. *International journal of environmental research and public health*, 14(11), 1407.
- Adger, W.N. (1997). Sustainability and social resilience in coastal resource use. The Centre for Social and Economic Research on the Global Environment (CSERGE) Working Paper GEC.
- Adger, W.N. (2000a). Institutional adaptation to environmental risk under the transition in Vietnam. *Annals of the Association of American Geographers*, 90(4), 738-758.
- Adger, W.N. (2000b). Social and ecological resilience: are they related?. *Progress in human geography*, 24(3), 347-364. <https://doi.org/10.1191/030913200701540465>
- Adhikari, R. (2020). Bringing an end to deadly “menstrual huts” is proving difficult in Nepal. *BMJ*, m536. doi: 10.1136/bmj.m53610.1136/bmj.m536
- Agnew, J.A. (2014). *Place and politics: The geographical mediation of state and society*. Routledge.
- Agrawal, A. (1995). Dismantling the divide between indigenous and scientific knowledge. *Development and Change* 26: 413–439.
- Albarracín, D. and Handley, I.M., (2011). The time for doing is not the time for change: effects of general action and inaction goals on attitude retrieval and attitude change. *Journal of Personality and Social Psychology*, 100(6), 983.
- Albarracin, D. and Hart, W. (2011). Positive mood + action = negative mood + inaction: effects of general action and inaction concepts on decisions and performance as a function of affect *Emotion*, 11, 951, 10.1037/a0024130
- Albarracin, D., Hepler, J. and Tannenbaum, M., (2011). General action and inaction goals: Their behavioral, cognitive, and affective origins and influences. *Current Directions in Psychological Science*, 20(2), 119-123.
- Albris, K., Lauta, K.C., & Raju, E. (2020). Disaster knowledge gaps: Exploring the interface between science and policy for disaster risk reduction in Europe. *International Journal of Disaster Risk Science*, 11(1), 1-12.
- Alexander, D., & Magni, M. (2013). Mortality in the L'Aquila (Central Italy) earthquake of 6 April 2009. *PLoS Currents*, 5. <https://doi.org/10.1371/50585b8e6efd1>
- Alexander, D., Gaillard, J. C., & Wisner, B. (2012). Disability and disaster. In *The Routledge handbook of hazards and disaster risk reduction*, 413-423. Routledge.

- Alexander, D., Gaillard, J. C., Kelman, I., Marincioni, F., Penning-Rowsell, E., van Niekerk, D., & Vinnell, L. J. (2021). Academic publishing in disaster risk reduction: past, present, and future. *Disasters*, 45(1), 5-18.
- Altbach, P. G. (Ed.). (2013). *The international imperative in higher education*. Springer Science & Business Media.
- Ambraseys, N. (2010). A Note on Transparency and Loss of Life Arising from Earthquakes, *Journal of Seismology & Earthquake Engineering*, 12(3): 83-88.
- Ambraseys, N. and Synolakis, C. (2010). Tsunami catalogs for the Eastern Mediterranean, revisited. *Journal of Earthquake Engineering*, 14(3), 309-330.
- Ambraseys, N., & Bilham, R. (2011). Corruption kills. *Nature* 469, 153–155.
<https://doi.org/10.1038/469153a>
- Amnesty International (2015). Nepal earthquake recovery must safeguard human rights.
- Amnesty International Report, Nepal (2017). Building Inequality,
https://www.amnesty.lu/wp-content/uploads/webmigrationfiles/Building_inequality_Report.PDF
- Anderson, E. (2020). Feminist Epistemology and Philosophy of Science. *The Stanford Encyclopedia of Philosophy*. Edward N. Zalta (ed.), Online:
<https://plato.stanford.edu/archives/spr2020/entries/feminism-epistemology/>
- Anderson, E.W. (1994). Disaster management and the military. *GeoJournal*, 34(2), 201-205.
- Anderson, M. and Elkaim, A.V. (2018). Belo Monte Legacy: harm from Amazon dam didn't end with construction. *Mongabay Series*.
- Andrews, C. (2018). A bridge too far?. *Engineering & Technology*, 13(4), 70-74.
- Aradau, C. & van Munster, R. (2007). Governing terrorism through risk: taking precautions, (un)knowing the future. *European Journal of International Relations* 13 (1), 89–115.
- Aradau, C., & Van Munster, R. (2011). *Politics of catastrophe: genealogies of the unknown*. Routledge.
- Aronsson-Storrier, M. (2020). Sendai Five Years on: Reflections on the Role of International Law in the Creation and Reduction of Disaster Risk. *Int J Disaster Risk Sci* 11: 230–238
<https://doi.org/10.1007/s13753-020-00265-y>
- Aronsson-Storrier, M. (2020). Sendai five years on: Reflections on the role of international law in the creation and reduction of disaster risk. *International Journal of Disaster Risk Science*, 11(2), 230-238.
- Assessment Capacities Project (ACAPS) (2015). *Lessons learnt for Nepal earthquake response*.
- Audi, R. (2002). The sources of knowledge. *The Oxford Handbook of Epistemology*, 71-94. Oxford: Oxford University Press.
- Averhart, H. Jr. (2005). Misuse of Myth: Conscious Adherence or Authoritative Control Mechanism. *McNair Scholars Journal*. 9(1): Article 3.

- Awale, S. (2022). Editorial: Lessons still not learnt. *Nepali Times*, January 14 2022. Online: <https://www.nepalitimes.com/editorial/lessons-still-not-learnt/> (Accessed: 21/08/2022)
- Bach, K. (2008). Applying Pragmatics to Epistemology. *Philosophical Issues*, 18:68–88.
- Baillon, A., Bleichrodt, H., Liu, N., & Wakker, P. (2016). Group decision rules and group rationality under risk. *Journal of Risk and Uncertainty*, 52(2), 99-116.
- Ball, N. (1975). The myth of the natural disaster. *The Ecologist*. 5(10). 368–371
- Bankoff, G., & Hilhorst, D. (2009). The politics of risk in the Philippines: comparing state and NGO perceptions of disaster management. *Disasters*, 33(4), 686-704.
- Banks, Gamblin, D., & Hutchinson, H. (2020). Training Fast and Frugal Heuristics in Military Decision Making. *Applied Cognitive Psychology*.
<https://openresearch.surrey.ac.uk/esploro/outputs/journalArticle/Training-Fast-and-Frugal-Heuristics-in/99512397202346#file-0>
- Barber, R. (2016). *Did the humanitarian response to the Nepal earthquake ensure no one was left behind? A case study on the experience of marginalised groups in humanitarian action*, Save the Children Reports.
- Barnwell, R. (Director). (2022). *Big Oil v the World* [Documentary]. British Broadcasting Corporation (BBC).
- Barton, A. H. (1969). *Communities in Disaster*. New York, NY, USA: Doubleday.
- Basher, R. (2006). Global early warning systems for natural hazards: systematic and people-centred. *Philosophical Transactions of the Royal Society of London A*. 364(1845). 2167-2182
- Bateman, I. and Munro, A. (2005). An experiment on risky choice amongst households. *The Economic Journal*, 115(502), C176-C189.
- Baumann, L. (2020). Rooting out the evil: The stakes of addressing the structural and intersectional dimension of vulnerability in specific disaster laws. IFRC. Online: <https://disasterlaw.ifrc.org/media/1612> (Accessed: 21/08/2021)
- Baumann, P. (2008). Contextualism and the Factivity Problem. *Philosophy and Phenomenological Research* 76 (3), 580-602.
- Baumann, P. (2010). Factivity and contextualism. *Analysis*, 70(1), 82-89.
- Bazerman, M. H. (2018). Judgment and decision making. In R. Biswas-Diener & E. Diener (Eds), *Noba textbook series: Psychology*. Champaign, IL: DEF publishers.
- Bazerman, M.H. and Moore, D.A. (2012). *Judgment in managerial decision making*. John Wiley & Sons.
- BBC News (2012) L'Aquila quake: Italy scientists guilty of manslaughter. BBC News. Online: <https://www.bbc.com/news/world-europe-20025626> (Accessed: 01/08/2020)
- BBC News (2015). RAF Chinooks to return from Nepal having not been used. *BBC News*. Online: <https://www.bbc.co.uk/news/uk-32759136>
- Beaven, S., Wilson, T.M., Johnston, L., Johnston, D.M., & Smith, R. (2017). Role of Boundary Organization after a Disaster: New Zealand's Natural Hazards Research Platform and the 2010–2011 Canterbury Earthquake Sequence. *Natural Hazards Review* 18(05016003)

- Becker, J. S., Paton, D., Johnston, D. M., & Ronan, K. R. (2013). Salient Beliefs About Earthquake Hazards and Household Preparedness. *Risk Analysis*, 33(9): 1710–1727. doi:10.1111/risa.12014
- Becker, J. S., Paton, D., Johnston, D. M., Ronan, K. R., & McClure, J. (2017). The role of prior experience in informing and motivating earthquake preparedness. *International journal of disaster risk reduction*, 22, 179-193.
- Becker, J., Coomer, M. A., McBride, S. K., & Lambie, E. S. (2016). New Zealand ShakeOut 2015: an evaluation based on observer surveys. GNS Science, To Pū Ao.
- Becker, J.S., Potter, S.H., Vinnell, L.J. Nakayachi, K. McBride, S.K., Johnston, D.M. (2020). Earthquake early warning in Aotearoa New Zealand: a survey of public perspectives to guide warning system development. *Humanit Soc Sci Commun* 7(138).
<https://doi.org/10.1057/s41599-020-00613-9>
- Bell, A. (1994). Climate of opinion: public and media discourse on the global environment. *Discourse & Society*, 5(1), 33-64.
- Bell, A. (1994). Media (mis) communication on the science of climate change. *Public understanding of science*, 3(3), 259.
- Benton, M. (2014). Knowledge Norms. *Internet Encyclopedia of Philosophy*. Online at <http://www.iep.utm.edu/kn-norms/> ISSN 2161-0002.
- Berryman, K. R., Cochran, U. A., Clark, K. J., Biasi, G.P., Landridge, R.M., Villamor, P. (2012). Major earthquakes occur regularly on an isolated plate boundary fault. *Science* 336: 1690-1693.
- Bhabha, H. (1994). *The Location of Culture*, London: Routledge.
- Bilham, R., (2013). Societal and observational problems in earthquake risk assessments and their delivery to those most at risk. *Tectonophysics*, 584, 166-173.
- Bird, J.F. & Bommer, J.J. (2004). Earthquake losses due to ground failure. *Engineering Geology*, 75: 147-179.
- Birkland, T. A. (2006). *Lessons of disaster: Policy change after catastrophic events*. Georgetown University Press.
- Bishop, M.A. (2000). In praise of epistemic irresponsibility: How lazy and ignorant can you be? *Synthese*, 122(1), 179-208.
- Bishop, M.A. (2006). Fast and Frugal Heuristics 1. *Philosophy Compass*, 1(2), 201-223.
- Bishop, M.A. & Trout, J.D. (2005). The pathologies of standard analytic epistemology. *Nous*, 39(4), 696-714.
- Bishop, M.A., Bishop, M.A. & Trout, J.D. (2005). *Epistemology and the psychology of human judgment*. Oxford University Press on Demand.
- Bista, D.B. (1994) *Fatalism and Development: Nepal's Struggle for Modernization*. Calcutta: Orient Longman.
- Blackburn, S. (1996). *The Oxford Dictionary of Philosophy*, Oxford: Oxford University Press.

- Blaut, J.M. (1993). *The colonizer's model of the world: Geographical diffusionism and Eurocentric history* (Vol. 1). Guilford Press.
- Boult, C. (2021). Pragmatism, truth, and cognitive agency. *Inquiry*, 1-14.
<https://doi.org/10.1080/0020174X.2021.1970015>
- Boult, C. (2021a). Epistemic blame. *Philosophy Compass*, 16 (8):e12762.
- Boult, C. (2021b). Standing to epistemically blame. *Synthese*, 199(3), 11355-11375.
- Boult, C. (2021b). There is a distinctively epistemic kind of blame. *Philosophy and Phenomenological Research*, 103 (3), 518-534.
- Boult, C. (2021c). Teaching & Learning Guide for: Epistemic blame. *Philosophy Compass*, 16(10), e12776.
- Boult, C. & Köhler, S., (2020). Epistemic judgement and motivation. *The Philosophical Quarterly*, 70(281), 738-758.
- Bowell, T. (2022). Feminist Standpoint Theory. *Internet Encyclopedia of Philosophy*. Online:
<https://iep.utm.edu/fem-stan/>
- Bracken, L., A. Ruszczak, H., & Robinson, T. (2018). *Evolving Narratives of Hazard and Risk: The Gorkha Earthquake, Nepal 2015*. Cham: Palgrave Macmillan US.
- Bradley, B. A., Razafindrakoto, H. N., & Polak, V. (2017). Ground-motion observations from the 14 November 2016 M w 7.8 Kaikoura, New Zealand, earthquake and insights from broadband simulations. *Seismological Research Letters* 88(3), 740-756.
- Brass, P. (1991). *Ethnicity and Nationalism: Theory and Comparison*, New Delhi: Sage.
- Brassett, J. & Vaughan-Williams, N. (2013). The Politics of Resilience from a Practitioner's Perspective: An Interview with Helen Braithwaite OBE. *Politics* 33(4), 229–239.
- Brassett, J., Croft, S., & Vaughan-Williams, N. (2013). Introduction: An Agenda for Resilience Research in Politics and International Relations. *Politics*, 33(4), 221–228. doi:10.1111/1467-9256.12032
- Brendel, Elke. (2005). Why contextualists cannot know they are right: Self-refuting implications of contextualism. *Acta Analytica* 20 (2),38-55.
- Brick, S. (2020). Epistemic Neglect. *Social Epistemology*, 34(5), 490-500.
- Briggs, R. A. (2017). Normative Theories of Rational Choice: Expected Utility, *The Stanford Encyclopedia of Philosophy* (Spring 2017 Edition), Edward N. Zalta (ed.), URL:
<https://plato.stanford.edu/archives/spr2017/entries/rationality-normative-utility/>
(Accessed: 8/01/2018)
- Briggs, R.A. & Forbes, G.A. (2019). The future, and what might have been. *Philosophical Studies*, 176(2), 505-532.
- Brown, J. (2010). Knowledge and Assertion. *Philosophy and Phenomenological Research*, LXXXI(3), 549-566.
- Brown, J. (2017). Blame and wrongdoing. *Episteme*, 14, 275– 296.
- Brown, J. (2020). What is epistemic blame? *Noûs*, 54, 389– 407.

- Brueckner, A. & Buford, C.T. (2009). Contextualism, SSI and the factivity problem. *Analysis* 69 (3), 431-438.
- Buford, C. (2009). Contextualism, Closure, and the Knowledge Account of Assertion. *Journal of philosophical research*, 34, 111-121.
- Bulley, D. (2013). Producing and Governing Community (through) Resilience. *Politics* 33(4), 265–275.
- Burbank, J. (1995). *Nepal Culture Shock! A Survival Guide to Customs and Etiquette*. Singapore: Times Books International.
- Burrows, K. (2016). Rapid detection of earthquake-triggered landslides using satellite radar, Action on Natural Disasters, Doctoral training programme, Durham University. URL: <https://www.dur.ac.uk/directory/profile/?id=15341> (Accessed: 01/08/2017).
- Buwalda, J., Blong, R., Cameron, C., & Comerio, M. (2014). *Hazards platform review report*. Ministry for Business, Innovation and Employment, Wellington, New Zealand
- Canagarajah, A.S. (2002a). *A geopolitics of academic writing*. University of Pittsburgh Press.
- Canagarajah, A.S. (2002b). Reconstructing local knowledge. *Journal of Language, Identity, and Education*, 1(4), 243-259.
- Cannon, T. (2008). *Reducing people's vulnerability to natural hazards communities and resilience*, WIDER Research Paper, No. 2008/34, Helsinki: The United Nations University World Institute for Development Economics Research (UNU-WIDER).
- Cannon, T. (2008). Vulnerability, “innocent” disasters and the imperative of cultural understanding. *Disaster Prevention and Management* 17(3): 350-357.
- Cannon, T. (2014). Why do we pretend there is a ‘community’? Problems of community based-adaptation (CBA) and community based disaster risk reduction (CBDRR). *IDS Povertics – An Institute of Development Studies Blog*. Online: <http://vulnerabilityandpoverty.blogspot.co.uk/2014/04/why-do-we-pretend-there-is-community.html>. (Accessed: 11/08/2018)
- Cannon, T. & Müller-Mahn, D. (2010). Vulnerability, resilience and development discourses in context of climate change. *Natural Hazards*, 55, 621-635.
- Cannon, T., Twigg, J., & Rowell, J. (2003). *Social vulnerability, sustainable livelihoods and disasters. Report to DFID conflict and humanitarian assistance department (CHAD) and sustainable livelihoods support office*, 93. London: Conflict and Humanitarian Assistance Department and Sustainable Livelihoods Support Office, Department for International Development.
- Canyon, D.V., Ryan, B.J. and Burkle, F.M. (2020). Rationale for military involvement in humanitarian assistance and disaster relief. *Prehospital and disaster medicine*, 35(1), 92-97.
- Cappelen, H. (2011). Against Assertion. In J. Brown and J. Cappelen, eds., *Assertion*. Oxford: Oxford University Press., 21-48.
- Carroll, J. (2019) Stay or leave: Flood-prone Franz Josef's residents may be forced out. *Stuff*. <https://www.stuff.co.nz/national/111781710/stay-or-leave-floodprone-franz-josefs-residents-may-be-forced-out> (Accessed: 01/08/2020)

- Carter, A.J & Gordon, E.C. (2011). Norms of Assertion: The Quantity and Quality of Epistemic Support. *Philosophia* 39, 615–635.
- Castree, N. (2005). The epistemology of particulars: human geography, case studies and 'context'. *Geoforum*, 36(5), 541-544.
- Castree, N. (2014). The Anthropocene and Geography. Parts I, II & III. *Geography Compass*, 8(7), 436-476.
- Castree, N., Chatterton, P.A., Heynen, N., Larner, W. and Wright, M.W. eds., (2010). *The Point is to Change it: Geographies of Hope and Survival in an Age of Crisis* (Vol. 12). John Wiley & Sons.
- Castree, N., Kitchin, R. and Rogers, A. (2013). *A dictionary of human geography*. Oxford University Press.
- Chakraborty, R., & Sherpa, P. Y. (2021). From climate adaptation to climate justice: Critical reflections on the IPCC and Himalayan climate knowledges. *Climatic Change* 167, 49 .
<https://doi.org/10.1007/s10584-021-03158-1>
- Chandler, D. (2013). International Statebuilding and the Ideology of Resilience. *Politics*, 33(4): 276-286. <https://doi.org/10.1111/1467-9256.12009>
- Chandler, D. (2014a). Beyond neoliberalism: resilience, the new art of governing complexity. *Resilience*, 2(1), 47-63.
- Chandler, D. (2014b). *Resilience: The Governance of Complexity*. London: Routledge.
- Cherry, K.E., Sampson, L., Galea, S., Marks, L.D., Stanko, K.E., Nezat, P.F. and Baudoin, K.H., (2018). Spirituality, humor, and resilience after natural and technological disasters. *Journal of nursing scholarship*, 50(5), 492-501.
- Chiesa, F., and Galeotti, A. E. (2018). Linguistic Justice and Analytic Philosophy, *Philosophical Papers*, 47(1), 155-182, DOI: 10.1080/05568641.2018.1438443
- Chitrakar, M. (2022). 'Bilampau': A Heritage - Long Forgotten. *Sirjanā: A Journal of Arts and Art Education*, VIII, 55-63.
- Chmutina, K., Von Meding, J, & Boshier, L. (2019). Language matters: Dangers of the “natural disaster” misnomer. Loughborough University. Online resource.
<https://hdl.handle.net/2134/38174> (Accessed: 11/08/2020)
- Chmutina, K., von Meding, J., Gaillard, J.C., & Boshier, L. (2017). Why natural disasters aren't all that natural. *OpenDemocracy*. Online: <https://www.opendemocracy.net/ksenia-chmutina-jason-von-meding-jc-gaillard-lee-boshier/why-natural-disasters-arent-all-that-natural> (Accessed: 21/08/2018)
- Chmutina, K., von Meding, J., Sandoval, V., Boyland, M., Forino, G., Cheek, W., Williams, D.A., Gonzalez-Muzzio, C., Tomassi, I., Páez, H. and Marchezini, V. (2021). What We Measure Matters: The Case of the Missing Development Data in Sendai Framework for Disaster Risk Reduction Monitoring. *International Journal of Disaster Risk Science*, 12(6), 779-789.
- Civil Defence WCEM. (2016). *West Coast Civil Defence Emergency Management Group Plan*. Online: <https://westcoastemergency.govt.nz/wp-content/uploads/2016/08/Group-Plan-Review-2016-Master-Oct-2016.pdf>

- Cochran, U.A., Clark, K.J., Howarth, J.D., Biasi, G.P., Landridge, R.M., Villamor, P., Barryman, K.R., Vandergoes, M.J. (2017). A plate boundary earthquake record from a wetland adjacent to the Alpine fault in New Zealand refines hazard estimates. *Earth and Planetary Science Letters*, 464, 175–188.
- Cohen, A. P. (1982). *Belonging: identity and social organization in British rural cultures*, Manchester: Manchester University Press.
- Cohen, S. (2000). Contextualism and Skepticism, *Philosophical Issues*, 10, 94-107.
- Cohen, S. (2005). Contextualism Defended. In Steup and Sosa, eds. *Contemporary Debates in Epistemology*, 56-61. Oxford: Wiley-Blackwell.
- Coleman, J. (1992). *Foundations of Social Theory*, Harvard: Belknap Press.
- Collins, P.H. (1990). *Black Feminist Thought*, Boston: Unwin Hyman.
- Collins, P.H. & Bilge, S. (2016). *Intersectionality*. Malden: Polity Press.
- Colman, A.M. (2008). *The Oxford Dictionary of Psychology*. Oxford: Oxford University Press.
- Comité d'Information Sahel (1975). *Qui se nourrit de la famine en Afrique?* Paris: F. Maspero.
- Conee, E. (2005). Contextualism Contested. in Steup and Sosa, eds. *Contemporary Debates in Epistemology*, 47-56. Oxford: Wiley-Blackwell.
- Contesi, F. and Terrone, E. (2018). Introduction, *Philosophical Papers*, 47(1), 1-20, DOI: 10.1080/05568641.2018.1464729
- Cook, A. D. B., Shrestha M., & Htet, Z.B. (2016). *The Nepal Earthquake: Implications for Future International Relief Efforts*, RSIS Policy Brief, Singapore: RSIS Centre for Non-traditional Security Studies.
- Cook, A. D. B., Shrestha M., Htet, Z.B. (2018). An assessment of international emergency disaster response to the 2015 Nepal earthquakes. *International Journal of Disaster Risk Reduction*, 31, 535-547
- Copans, J. ed. (1975). *Sécheresses et famines du Sahel*. Paris: F. Maspero.
- Corbett, J. B., & Durfee, J. L. (2004). Testing public (un) certainty of science: Media representations of global warming. *Science Communication*, 26(2), 129-151.
- Crasnow, S. (2009). Is Standpoint Theory a Resource for Feminist Epistemology? An Introduction. *Hypatia*, 24(4), 189 - 192.
- Crow, G. & Allan, G. (1994). *Community Life. An Introduction to Local Social Relations*. Hemel Hempstead: Harvester Wheatsheaf.
- Cutter, S.L. (1996). Vulnerability to Environmental Hazards. *Progress in Human Geography*, 20(4): 529-539.
- Cutter, S.L. (2003). The Vulnerability of Science and the Science of Vulnerability. *Annals of the American Association of Geographers*, 93(1), 1–12.
- Cutter, S.L., Barnes, L., Berry, M., Burton, C., Evans., E., Tate, E., & Webb, J. (2008). A place-based model for understanding community resilience to natural disasters. *Global Environmental Change*, 18, 598–606.

- Cutter, S.L., Burton, C.G. & Emrich, C.T. (2010). Disaster Resilience Indicators for Benchmarking Baseline Conditions. *Journal of Homeland Security and Emergency Management*, 7(1), 1-22.
- Datta, A., Oven, K., Milledge, D., Densmore, A., Jones, H., & Sargenat, S. (2016). *Earthquake Science in DRR policy and practice in Nepal*, Working Paper. ODI/EFW.
- Datta, A., Sigdel, S., Oven, K., Rosser, N., Densmore, A., & Rijal, S. (2018). *The role of scientific evidence during the 2015 Nepal earthquake relief efforts*. In Policy File. London: Overseas Development Institute.
- Davies, L. (2013) L'Aquila quake: Italian judge explains why he jailed scientists over disaster. *The Guardian*. Online: <https://www.theguardian.com/world/2013/jan/18/italian-scientists-jailed-laquila-quake> (Last accessed: 21/08/2020)
- Davies, T.R.H. (2014). Landslide Hazards, Risks, and Disasters: Introduction. In *Landslide Hazards, Risks, and Disasters: Introduction* Edited by T.R.H. Davies, 472. Amsterdam: Elsevier.
- Davis, L., West, J., Peek, L., Hughes, K., Joyce, J., Schulz, W., et al. (2020). *Landslide guide for residents of Puerto Rico*. United States Geologic Survey Guidebook. Online: <https://www.usgs.gov/news/new-landslide-guidebook-puerto-rico-residents>
- Deleuze, G. (1990) *The Logic of Sense*. London: Athlone.
- Deleuze, G. (1994) *Difference and Repetition*. London: Athlone.
- Delica-Willison, Z., & Gaillard, J. C. (2012). Community action and disaster. In *The Routledge handbook of hazards and disaster risk reduction*, 711-722. Routledge.
- DeRose, K. (1992). Contextualism and Knowledge Attributions. *Philosophy and Phenomenological Research*, 52, 912-929.
- DeRose, K. (1998). Contextualism: An Explanation and Defence. In John Greco and Ernest Sosa eds. *The Blackwell Guide to Epistemology*. London: Blackwell.
- DeRose, K. (2002). Assertion, Knowledge, and Context. *The Philosophical Review*, 111 167–203.
- DeRose, K. (2009). *The Case for Contextualism: Knowledge, Skepticism, and Context, Vol. 1*. Oxford University Press.
- DeRose, K. (2011). Contextualism, contrastivism, and X-Phi surveys. *Philosophical studies*, 156(1), 81-110.
- Derrida, J. (1981). *Positions*. London: Athlone.
- Dimock, E., Doniger, W., Gold, A.G., Smith, B.K., Basham, A.L., Narayanan, V., Van Buitenen, J.A.B. et al. (2022). Hinduism. *The Encyclopaedia Britannica*. Online: <https://www.britannica.com/topic/Hinduism> (Accessed: 21/08/2022)
- Dixit, A. M., Yatabe, R., Dahal, R. K., Bhandary, N. P. (2013). Initiatives for earthquake disaster risk management in the Kathmandu Valley. *Nat Hazards*, 69(1):631–54.
- Dixit, A.M., Shrestha, S. N., Guragain, R., Jimjee, G., Dhungel, R., Pradhan, S., Shrestha, N., Acharya, S. P., Adhikari, S. R., Bhattarai, K., & Ruszczyk, H. A. (2018). Earthquake Risk

- Reduction Efforts in Nepal: NSET's Experience. In *Evolving Narratives of Hazard and Risk*, 15–43. Springer International Publishing. https://doi.org/10.1007/978-3-319-65211-5_2
- Dollar, J. (2010) The man who predicted an Earthquake. The Guardian. Online: <https://www.theguardian.com/world/2010/apr/05/laquila-earthquake-prediction-giampaolo-giuliani> (Accessed: 11/08/2020)
- Dominelli, L. (2018). Green Social Work and the Uptake by the Nepal School of Social Work: Building Resilience in Disaster-Stricken Communities. In *Evolving Narratives of Hazard and Risk*, 141–158. Springer International Publishing. https://doi.org/10.1007/978-3-319-65211-5_9
- Domínguez, G. (2015). Aftershocks trigger 'chaos and panic' in Nepal, *Deutsche Welle*, Online: <https://www.dw.com/en/aftershocks-trigger-chaos-and-panic-in-nepal/a-18409421> (Accessed: 21/08/2018)
- Donovan, A. (2017). Geopower: Reflections on the critical geography of disasters. *Progress in Human Geography*, 41(1), 44-67.
- Donovan, A.R. & Oppenheimer, C., (2015). Modelling risk and risking models: The diffusive boundary between science and policy in volcanic risk management. *Geoforum*, 58, 153-165.
- Dorr, C., Goodman, J. & Hawthorne, J. (2014). Knowing against the odds. *Philosophical Studies*, 170(2), 277-287.
- Dotson, K. (2014). Conceptualizing Epistemic Oppression. *Social Epistemology* 28(2) 115-138, DOI: [10.1080/02691728.2013.782585](https://doi.org/10.1080/02691728.2013.782585)
- Douven, I. (2006). Assertion, knowledge, and rational credibility. *Philosophical Review*, 115, 449–485.
- Douven, I. (2009). Assertion, Moore and Bayes. *Philosophical Studies*, 144, 361–375.
- Dowrick, D. J., & Rhoades, D. A. (2011). Spatial Distribution of Ground Shaking in Characteristic Earthquakes on the Wellington and Alpine Faults, New Zealand, Estimated from a Distributed-Source Model. *Bulletin of the New Zealand Society for Earthquake Engineering*, 44(1), 1-18. <https://doi.org/10.5459/bnzsee.44.1.1-18>.
- Doyle, E., McClure, J., Potter, S. Becker, J., Johnston, D. M., Lindell, M., Johal, S., Fraser, S., Coomer, M. (2018). Motivations to prepare after the 2013 Cook Strait Earthquake, N.Z. *International Journal of Disaster Risk Reduction*, 31, 637–649.
- Dretske, F. (1991). Dretske's Replies, In Brian P. McLaughlin, ed., *Dretske and His Critics*. Cambridge, Mass: Basil Blackwell.
- Duckett, J. (2020). Neoliberalism, authoritarian politics and social policy in China. *Development and Change*, 51(2), 523-539.
- Duffield, M. (2016). The resilience of the ruins: towards a critique of digital humanitarianism, *Resilience*, 4(3), 147-165, DOI: [10.1080/21693293.2016.1153772](https://doi.org/10.1080/21693293.2016.1153772)
- Dynes, R.R. (1998). Coming to terms with community disaster. In E. L. Quarantelli (Ed.), *What is a disaster: Perspectives on the question*, 109–126. London: Routledge.

- Edmunds, S. (2021) Govt reveals replacement for Provincial Growth Fund. *Stuff*. Online: <https://www.stuff.co.nz/business/125252557/govt-reveals-replacement-for-provincial-growth-fund> (Accessed: 21/08/2022)
- Eisensee, T. & Strömberg, D. (2007). News droughts, news floods, and US disaster relief. *The Quarterly Journal of Economics*, 122(2), 693–728. <https://doi.org/10.1162/qjec.122.2.693>
- Eiser, J. R., Bostrom, A., Burton, I., Johnston, D. M., McClure, J., Paton, D., & White, M. P. (2012). Risk interpretation and action: A conceptual framework for responses to natural hazards, *International journal of disaster risk reduction*, 1, 5-16.
- Engel, P. (2008). In What Sense Is Knowledge The Norm Of Assertion? *Grazer Philosophische Studien*, 77, 99-113.
- Engqvist, T. (2022). The Bias Paradox: Are Standpoint Epistemologies Self-contradictory? *Episteme*, 19(2), 231-246. doi:10.1017/epi.2020.21
- Toka Tū Ake EQC (2013) *EQC Annual Report 2012-2013*. Wellington.
- Evans, B. and Reid, J. (2013). Dangerously exposed: The life and death of the resilient subject. *Resilience*, 1(2), 83-98.
- Fairclough, N. (1995). *Media Discourse*, London: Arnold.
- Fairclough, N. (2003). *Analysing Discourse. Textual Analysis for Social Research*, London: Routledge.
- Faulkner, P. (2007). A genealogy of trust. *Episteme*, 4(3), 305-321.
- Fiddian-Qasmiyeh, E. (2015). Engendering understandings of faith-based organizations: intersections between religion and gender in development and humanitarian interventions. In *The Routledge Handbook of Gender and Development*, 584-594. London; Routledge.
- Fiddian-Qasmiyeh, E. (2018). Southern-led Responses to Displacement: Modes of South-South cooperation? In: Fiddian-Qasmiyeh, E. & Daley, P. (Eds.) *Handbook of South-South Relations*. Oxford: Routledge.
- Fiddian-Qasmiyeh, E. (2019). Looking forward: Disasters at 40. *Disasters*, 43, S36-S60.
- Fogelin, R.J. (2003). *Walking the Tightrope of Reason: the Precarious Life of a Rational Animal*, New York; Oxford: Oxford University Press.
- Foucault, M. (1970) *The Order of Things: An Archeology of the Human Sciences*. New York: Pantheon Books.
- Foucault, M. (1981). The order of discourse. In: R. Young, eds. *Untying the Text: a Post-Structuralist Reader*, 48-78, London: Routledge.
- Fricker, M. (1998). Rational authority and social power: Towards a truly social epistemology. In *Proceedings of the Aristotelian Society*, 98(2), 159-177.
- Fricker, M. (2007). *Epistemic Injustice: Power and the Ethics of Knowing*. Oxford University Press.
- Friedman, J. (2019) Teleological epistemology. *Philosophical Studies*, 176, 673–691.

- Froude, M., & Petley, D. (2018). Global fatal landslide occurrence from 2004 to 2016. *Natural Hazards and Earth System Sciences*, 18(8), 2161– 2181.
<https://doi.org/10.5194/nhess-18-2161-2018>
- Gaillard, J.C. (2010). Vulnerability, capacity and resilience: Perspectives for climate and development policy. *Journal of International Development*, 22, 218-232.
<https://doi.org/10.1002/jid.1675>
- Gaillard, J.C. (2019). Disaster studies inside out. *Disasters*, 43, S7-S17.
- Gaillard, J.C. (2021). *The Invention of Disaster: Power and Knowledge in Discourses on Hazard and Vulnerability*. London: Routledge.
- Gaillard, J.C. (2022). The epistemological non-sense of disaster studies and some more sensible prospects. *Australian Journal of Emergency Management*, 37(1), 14-15.
- Gaillard, J.C. & Kelman, I. (2018). The first mile of warning systems: who's sharing what with whom? *Humanitarian Practice Network*. Online: <https://odihpn.org/publication/first-mile-warning-systems-whos-sharing/> (Accessed: 21/08/2020)
- Gaillard, J.C. & Mercer, J. (2013). From Knowledge to Action: Bridging Gaps in Disaster Risk Reduction. *Progress in Human Geography* 37: 93-114.
- Gaillard, J.C. & Peek, L. (2019). Disaster-zone research needs a code of conduct. *Nature*, 575, 440-442.
- Gaillard, J.C. & Raju, E. (2022). On priorities, values and relationships in practice: a new road for disaster scholarly publishing. *Disaster Prevention and Management*, 31(4), 333-334.
- Gaillard, J.C., Cadag, J.R.D. & Rampengan, M.M. (2019a). People's capacities in facing hazards and disasters: an overview. *Natural Hazards*, 95(3), 863-876.
- Gaillard, J.C., Walters, V., Rickerby, M. & Shi, Y. (2019b). Persistent precarity and the disaster of everyday life: homeless people's experiences of natural and other hazards. *International Journal of Disaster Risk Science*, 10(3), 332-342.
- Gallen, S. F., Clark, M. K., Godt, J. W., Roback, K., & Niemi, N.A. (2016). *Application and evaluation of a rapid response earthquake-triggered landslide model to the 25 April 2015 Mw 7.8 Gorkha earthquake*, Nepal, Tectonophysics.
- Gallopín, G. (2006). Linkages Between Vulnerability, Resilience, and Adaptive Capacity. *Global Environmental Change*, 16, 293-303. doi:10.1016/j.gloenvcha.2006.02.004.
- Gartrell, A., Calgaro, E., Goddard, G., & Saorath, N. (2020). Disaster experiences of women with disabilities: Barriers and opportunities for disability inclusive disaster risk reduction in Cambodia. *Global Environmental Change*, 64, 102134.
- GEOCE (2016). Environmental Impact Assessment (EIA) of Second International Airport Project. GEOCE Consultants Pvt (Ltd), Kathmandu, Nepal
- GeoNet (2016). Landslides and Landslide dams caused by the Kaikōura Earthquake. Online: <https://www.geonet.org.nz/landslide/dam> (Accessed: 21/08/2020)
- Gerken, M. (2011). Warrant and Action, *Synthese*, CLXXVIII, 3, 529–47.
- Gerken, M. (2012). Discursive Justification and Skepticism. *Synthese*, 189, 373-394.

- Gibson, T. (2019). *Making aid agencies work: reconnecting INGOs with the people they serve*. Emerald Group Publishing.
- Gibson, T. & Wisner, B. (2019). Global overview of the role of non-governmental organizations in natural hazard governance. *Oxford Research Encyclopedia of Natural Hazard Science*.
- Gigerenzer G, & Brighton H. (2009). Homo Heuristicus: Why biased minds make better inferences. *Topics in Cognitive Science* 1: 107–143.
- Gigerenzer, G. (2008). *Rationality for Mortals: How People Cope with Uncertainty*. Oxford University Press.
- Gigerenzer, G. (2008). Why heuristics work. *Perspectives on Psychological Science*, 3(1), 20-29.
- Gigerenzer, G. & Gaissmaier, W. (2011). Heuristic decision making. *Annual review of psychology*, 62(1), 451-482.
- Gigerenzer, G., Hertwig, R. & Pachur, T. (2011). *Heuristics: The Foundations of Adaptive Behavior*. Oxford: Oxford University Press.
- Gigerenzer, G., Hoffrage, U. & Goldstein, D.G. (2008). Fast and frugal heuristics are plausible models of cognition: Reply to Dougherty, Franco-Watkins, and Thomas (2008). *Psychological Review*, 115(1), 230-239.
- Gigerenzer, G., Todd, P. M., & the ABC Research Group. (2000). *Simple Heuristics That Make Us Smart*. Oxford: Oxford University Press.
- Glade, T. (2003). Vulnerability Assessment in Landslide Risk Analysis. *Beitrag zur Erdsystemforschung*, 134(2), 123–146.
- Glantz, M.H. (1994). Creeping environmental problems, *The World & I*, 218-225.
- Glantz, M.H. (1999). *Creeping Environmental Problems and Sustainable Development in the Aral Sea Basin*, Oxford: Cambridge University Press.
- Glock, H. J. (2018). The Awful English Language, *Philosophical Papers*, 47(1), 123-154, DOI: 10.1080/05568641.2018.1429737
- GNS Science (2011a). The hidden fault that caused the February 2011 Christchurch earthquake. Online: <https://www.gns.cri.nz/Home/Our-Science/Natural-Hazards-and-Risks/Recent-Events/Canterbury-quake/Hidden-fault> (Accessed: 21/08/2020)
- GNS Science. (2011b). *Canterbury Earthquake Sequence and Implications for Seismic Design Levels*. Technical Report compiled by Dr Terry Webb of GNS Science. Online: <https://canterbury.royalcommission.govt.nz/documents-by-key/2011-09-2349> (Accessed: 21/08/2020)
- Goldberg, S. C. (2009). The Knowledge Account of Assertion and the Nature of Testimonial Knowledge. In Patrick Greenough and Duncan Pritchard (eds.). *Williamson on Knowledge*. Oxford: Oxford University Press.
- Goldberg, S. C. (2011). Putting the Norm of Assertion to Work: The Case of Testimony. In Jessica Brown and Herman Cappelen (eds.), *Assertion: New Philosophical Essays*. Oxford: Oxford University Press.

- Goldberg, S. C. (2015). *Assertion: On The Philosophical Significance of Assertoric Speech*. Oxford: Oxford University Press.
- Goldberg, S. C. (2015). Recent work on assertion. *American Philosophical Quarterly*, 365-380.
- Goldman, A. I., & Olsson, E. J. (2009). Reliabilism and the Value of Knowledge. In Adrian Haddock, Alan Millar & Duncan Pritchard (eds.), *Epistemic Value*, 19-41, Oxford: Oxford University Press.
- Goldman, D. (2019). The Misuse of the Word 'Myth'. *Medium*. Online: <https://medium.com/the-spiritual-anthropologist/the-misuse-of-the-word-myth-aa45968b79c4> (Accessed: 21/08/2021)
- Goltz, J.D., Park, H., Nakano, G. & Yamori, K. (2020). Earthquake ground motion and human behaviour: Using DYFI data to assess behavioral response to earthquakes. *Earthquake Spectra*. 36(3): 1231–1253.
- Gombrich, R. (2009). *What the Buddha Thought*. London: Equinox Publishing.
- Gorman, P., Guildford, J. & Kitchin, T. (2019). Torrential rain causes chaos on the West Coast. *Stuff*. Online: <https://www.stuff.co.nz/national/111543576/exceptional-amount-of-rain-moves-across-the-south-island> (Accessed: 21/08/2022)
- Government of Nepal, Ministry of Home Affairs and Disaster Preparedness Network-Nepal. (2015). *Nepal Disaster Report 2015*. Ministry of Home Affairs (MoHA), Government of Nepal; and Disaster Preparedness Network-Nepal (DPNet-Nepal). Online: <http://www.drrportal.gov.np/uploads/document/329.pdf> (Accessed: 01/08/2017)
- Government of Nepal. (1994). Ministry of Physical Planning and Works, Department of Urban Development and Building Construction, NBC 102. Online: http://www.iibh.org/kijun/pdf/Nepal_07_NBC_102_1994_Unit_Weight.pdf (Accessed 11/08/2020)
- Government of Nepal. (2014). *Population Monograph of Nepal: Volume II - Social Demography*. Kathmandu: Central Bureau of Statistics.
- Government of Nepal. (2015). *Nepal Earthquake 2015: Post Disaster Needs Assessment. Vol. A: Key findings*, Kathmandu: National Planning Commission.
- Government of Nepal. (2016). *School Sector Development Plan 2016/17-2022/23*. Kathmandu: Ministry of Education.
- Government of Nepal. (2018). *The Act Relating to Compulsory and Free Education*. Kathmandu: Government of Nepal.
- Green, A. & Troup, K. (2020). Postcolonial perspectives. In (Green & Troup, eds.) *The Houses of History: A Critical Reader in History and Theory*, 2nd edition, 277-296, Manchester: Manchester University Press.
- Grice, H. P. (1975). Logic and Conversation. In Cole, P., and J.L. Morgan, eds. *Speech Acts*, 41-58. New York: Academic Press.

- Grimm, S.R. (2008) Epistemic goals and epistemic values. *Philosophy and Phenomenological Research*, 77(3), 725-744.
- Griswold Jr., C.L. (1999). *Adam Smith and the Virtues of Enlightenment*. Cambridge: Cambridge University Press.
- Grunow-Hårsta, K.A. (2008). *A Descriptive Grammar of Two Magar Dialects of Nepal: Tanahi and Syangja Magar. Vol. I*. Thesis: The University of Wisconsin-Milwaukee.
- Gurung, H. (2003). *Trident and Thunderbolt: Cultural Dynamics in Nepalese Politics: The Mahesh Chandra Regmi Lecture 2003*, Kathmandu: Social Science Baha.
- Gustafsson, K.M. & Lidskog, R. (2018). Boundary organizations and environmental governance: Performance, institutional design, and conceptual development. *Climate Risk Management*, 19, 1-11.
- Guston, D. H. (1999). Stabilizing the Boundary between US Politics and Science:: The Rôle of the Office of Technology Transfer as a Boundary Organization. *Social Studies of Science*, 29(1), 87–111. <https://doi.org/10.1177/030631299029001004>
- Haddock, A. Millar, A. & Pritchard D. (eds.). (2009). *Epistemic Value*. Oxford University Press.
- Hagen, T. (1998). *Nepal: the Kingdom in the Himalaya*. Lalitpur, Nepal: Himal Books.
- Hacking, I. (1999) *The Social Construction of What?* Cambridge, MA: Harvard University Press.
- Harding, S. (1991). *Whose Science/ Whose Knowledge?* Milton Keynes: Open University Press.
- Harding, S. (2009). Standpoint Theories: Productively Controversial. *Hypatia* 24(4), 192-200.
- Harmsworth, G. & Raynor, B. (2004). Cultural consideration in landslide risk perception. In T. Glade, M. Anderson and M.J. Crozier (Eds), *Landslide hazard and risk*. John Wiley and Sons, Chichester: 219-249.
- Harrison, P. (2006). Poststructuralist theories. In S. Aitken, & G. Valentine (Eds.), *Approaches to human geography*, 122-135. SAGE Publications Ltd, <https://dx.doi.org/10.4135/9781446215432.n10>
- Hartman C., & Squires, G.D. (2006). *There is no such thing as a natural disaster: race, class, and Hurricane Katrina*. New York: Routledge.
- Hartsock, N. (2003). The Feminist Standpoint: Developing the Ground for a Specifically Feminist Historical Materialism. In *The Feminist Standpoint Theory Reader: Intellectual and Political controversies* (ed. By Sandra Harding). New York and London: Routledge, 35–54.
- Haslanger, S. (2022). How to Change a Social Structure, manuscript.
- Hawthorne, J. (2004). *Knowledge and Lotteries*, Oxford: Oxford University Press
- Hawthorne, J. & Stanley, J. (2008). Knowledge and Action. *Journal of Philosophy* 105 (10):571-590.
- Hawthorne, J., French, S. & Saatsi, J. (2014). Bayesian confirmation theory. *The Bloomsbury Companion to the Philosophy of Science*, 197.
- Hazlett, Allan (2016). What does “epistemic” mean? *Episteme* 13 (4):539-547.

- Hewitt, K. (1983). The idea of calamity in a technocratic age. In K. Hewitt (ed) *Interpretation of calamities*, The risks and hazards series No 1, 3-32. Boston: Allen & Unwin Inc.
- Hewitt, K. (1995). Sustainable disasters? Perspectives and powers in the discourse of calamity. in J. Crush (ed.) *Power of development*, 115-128. London: Routledge.
- Hewitt, K. (2007). Preventable disasters: addressing social vulnerability, institutional risk, and civil ethics. *Geographische Rundschau International Edition*, 3(1), 43-52.
- Hieronymi, P. (2008). Responsibility for Believing. *Synthese* 161 (3), 357-373.
- Hieronymi, P. (2014). Reflection and Responsibility. *Philosophy & Public Affairs*. 42. 10.1111/papa.12024.
- Hindman, H. (2009). Cosmopolitan Codifications: Elites, Expatriates, and Difference in Kathmandu, Nepal. *Global Studies in Culture and Power*, 16:3, 249-270, DOI: 10.1080/10702890902861255.
- Hindriks, F. (2007). The Status of the Knowledge Account of Assertion. *Linguistics and Philosophy*, 30, 393–406.
- Hirsch Hadorn, G., Hoffmann-Riem, H., Biber-Klemm, S., et al. (Eds.) (2008). *Handbook of Transdisciplinary Research*. Cham: Springer Science.
- Hoggart, K., Lees, L. & Davies, A. (2002) *Researching Human Geography*, London: Arnold.
- Hookway, C. (2010). Some Varieties of Epistemic Injustice: Reflections on Fricker. *Episteme* 7(2), 151-163.
- Hooper, John. (2012). Italian scientists convicted for 'false assurances' before earthquake. *The Guardian*. Online: <https://www.theguardian.com/world/2012/oct/22/italian-scientists-jailed-earthquake-aquila> (Accessed: 01/08/2019)
- Hore, K., Kelman, I., Mercer, J., & Gaillard, J. C. (2018). Climate change and disasters. In *Handbook of Disaster Research*, 145-159. Cham: Springer.
- Horspool, N., Elwood, E., Johnston, D., Deely, J., Ardagh, M. (2020). Factors influencing casualty risk in the 14th November 2016 MW7.8 Kaikōura, New Zealand earthquake. *International Journal of Disaster Risk Reduction*, 51, 1–8.
- Hyndman, J. (2011). *Dual Disasters: Humanitarian Aid after the 2004 Tsunami*. Sterling: Kumarian Press.
- Ichikawa, J. J. (2015). The Certainty Norm of Assertion. *There is Some Truth in That*. Online: <http://blog.jichikawa.net/2015/08/the-certainty-norm-of-assertion.html> (Accessed: 11/08/2019)
- Internal Displacement Monitoring Centre (IDMC) (2018). *Synthesizing the state of knowledge to better understand displacement related to slow onset events*. Online: <https://unfccc.int/sites/default/files/resource/WIM%20TFD%20I.2%20Output.pdf> (Accessed: 21/08/2020)
- International Federation of Red Cross and Red Crescent Societies (IFRC) (2002). *World disasters report 2002: focus on reducing risk*. Geneva: International Federation of Red Cross and Red Crescent Societies.

- International Federation of Red Cross and Red Crescent Societies (IFRC) (2014). *World Disasters Report: Focus on Culture and Risk*. Geneva: International Federation of Red Cross and Red Crescent Societies. ISBN: 978-92-9139-214-8.
- Jäger, C. (2012). Contextualism and the knowledge norm of assertion. *Analysis*, 72(3), 491-498.
- Jahn, T., Bergmann, M., & Keil, F. (2012). Transdisciplinarity: Between mainstreaming and marginalization. *Ecological Economics*, 79, 1–10. doi:10.1016/j.ecolecon.2012.04.017
- Jalali, R. (2002). Civil society and the state: Turkey after the Earthquake. *Disasters*, 26(2), 120-139.
- Jasanoff, S. (2007). Technologies of humility. *Nature* 450, 33.
- Jessop, B. (1994). Towards a Schumpeterian Workfare State? Preliminary Remarks on Post-Fordist Political Economy. *Studies in Political Economy*, 40, 7-39.
- Jessop, B. (2000). The crisis of the national spatio-temporal fix and the tendential ecological dominance of globalizing capitalism. *International Journal of Urban and Regional Research*, 24(2), 323-360.
- Jessop, B. (2011). Imagined recoveries, recovered imaginaries: a cultural political economy perspective. *Economy and Society*, 319-246.
- Jha, H.B. (2019). *The Janajati of Nepal*, New Delhi: Vivekananda International Foundation.
- Johnston, D., Standring, S., Ronan, K., Lindell, M., Wilson, T., Cousins, J. Aldridge, E. Warne Ardagh, m. Deely, J.M., Jensen, S., Kirsch, T. & Bissell, R. (2014). The 2010/2011 Canterbury earthquakes: context and cause of injury. *Natural Hazards* 73(2): 627–637.
<https://doi.org/10.1007/s11069-014-1094-7>
- Jones, S. and Oven, K.J. & Wisner, B. (2016). A comparison of the governance landscape of earthquake risk reduction in Nepal and the Indian State of Bihar. *International journal of disaster risk reduction*, 15, 29-42. <http://dx.doi.org/10.1016/j.ijdrr.2015.10.011>
- Jones, S., Oven, K. J., Manyena, B., & Aryal, K. (2014). Governance struggles and policy processes in disaster risk reduction: A case study from Nepal. *Geoforum*, 57, 78–90.
<https://doi.org/10.1016/j.geoforum.2014.07.011>
- Joseph, J. (2013). Resilience as embedded neoliberalism: a governmentality approach. *Resilience*, 1(1), 38-52.
- K. Forbes, J. Broadhead, G. B. Bischetti, F. Brardinoni, A. Dykes, D.Gray, F. Imaizumi, S. L. Kuriakose, N. Osman, D. Petley, A. Stokes, B. Verbist, & T.H. Wu. (2013). *Forests and landslides: The role of trees and forests in the prevention of landslides and rehabilitation of landslide-affected areas in Asia*. Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific.
- Kahneman, D. (2011). Don't Blink! The Hazards of Confidence. *New York Times*. Online: <https://www.nytimes.com/2011/10/23/magazine/dont-blink-the-hazards-of-confidence.html> (Accessed: 9/09/2022)
- Kahneman, D. (2011). *Thinking, Fast and Slow*. New York, NY: Farrar, Straus and Giroux.

- Kahneman, D. & Frederick, S. (2004). Attribute substitution in intuitive judgment. *Models of a man: Essays in memory of Herbert A. Simon*, 411-432.
- Kahneman, D. & Tversky, A. (1972). Subjective probability: A judgment of representativeness. *Cognitive psychology*, 3(3), 430-454.
- Kahneman, D. & Tversky, A. (1974). Judgment under Uncertainty: Heuristics and Biases. *Science*, 185(4157), 1124–1131.
- Kano, M., Wood, M. M., Kelley, M. M., & Bourque, L. B. (2009). *The study of household preparedness: Preparing California for earthquakes*. University of California, Los Angeles: Los Angeles, CA, USA.
- Keller, E.F. (1985) *Reflections on Gender and Science*. New Haven: Yale University Press.
- Kelly, P.M. & Adger, W.N. (2000). Theory and practice in assessing vulnerability to climate change and Facilitating adaptation. *Climatic change*, 47(4), 325-352.
- Kelly, T. (2003). Epistemic rationality as instrumental rationality: A critique. *Philosophy and Phenomenological Research*, 66(3), 612–640.
- Kelly, T. (2004). Review: Walking the Tightrope of Reason: The Precarious Life of a Rational Animal. *Mind* 113 (452), 750-753.
- Kelman, I. (2011). *Disaster Diplomacy: How Disasters Affect Peace and Conflict*. Abingdon: Routledge.
- Kelman, I. (2018). Lost for words amongst disaster risk science vocabulary? *International Journal of Disaster Risk Science*, 9(3), 281-291.
- Kelman, I. (2020). COVID-19: What is the disaster? *Soc Anthropol*, 28: 296-297.
<https://doi.org/10.1111/1469-8676.12890>
- Kelman, I. & Gaillard, J.C. (2008). Placing climate change within disaster risk reduction., *Disaster Advances*, 1(3): 3-5.
- Kelman, I., Gaillard, J.C., Lewis, J. & Mercer, J. (2016). Learning from the history of disaster vulnerability and resilience research and practice for climate change. *Natural Hazards*, 82 (Suppl 1), 129–143.
- Kelp, C. (2014). Two for the Knowledge Goal of Inquiry. *American Philosophical Quarterly*, 51(3), 227-232.
- Kelp, C. (2018). Assertion: A Function First Account. *Noûs*, 52(2), 411-442.
- Kelp, C. & Simion, M. (2017). Criticism and blame in action and assertion. *The Journal of Philosophy*, 114(2), 76-93.
- Kelp, C. & Simion, M. (2021) *Sharing Knowledge: A Functionalist Account of Assertion*. Cambridge University Press.
- Kenney, C., Phibbs, S., paton, D., Reid, J. & Johnston, D.M. (2015). Community-led disaster risk management: a Maori response to Otautahi (Christchurch) earthquakes. *Australasian Journal of Disaster and Trauma Studies*, 19(1), 9–20.

- Khalifa, K. (2020). Understanding, Truth, and Epistemic Goals. *Philosophy of Science*, 87 (5), 944-956.
- Khalifa, K. & Millson, J. (2020). Perspectives, Questions, and Epistemic Value. In *Knowledge from a Human Point of View*, 87-106. Cham: Springer.
- Khan, M., Ruszczuk, H.A., Rahman, F. and Huq, S. (2022). Epistemological Freedom: Activating co-learning and co-production to decolonise knowledge production. *Disaster Prevention and Management*, 31(3), 182-192.
- Khatiwoda, R., Cubelic, S. & Michaels, A. (2021). *The Mulukī Ain of 1854: Nepal's First Legal Code*. Heidelberg: Heidelberg University Publishing.
- Khokhar, T. & Serajudin, U. (2015). Should we continue to use the term “developing world”? Data Blog - World Bank Blogs. Online: <https://blogs.worldbank.org/opendata/should-we-continue-use-term-developing-world> (Last accessed: 3/4/2023).
- Kincey, Rosser, N. J., Robinson, T. R., Densmore, A. L., Shrestha, R., Pujara, D. S., Oven, K. J., Williams, J. G., & Swirad, Z. M. (2021). Evolution of Coseismic and Post-seismic Landsliding After the 2015 Mw 7.8 Gorkha Earthquake, Nepal. *Journal of Geophysical Research. Earth Surface*, 126(3). <https://doi.org/10.1029/2020JF005803>
- Klein, G. (2008). Naturalistic decision making. *Human factors*, 50(3), 456-460.
- Klein, R., Nichols, R. & Thomalla, F. (2004). Resilience to Natural Hazards: How Useful is this Concept? EVA Working Paper No. 9, DINAS-COAST Working Paper No. 14. Potsdam: Potsdam Institute for Climate Impact Research.
- Knowles, S. G. (2014). Learning from disaster? The history of technology and the future of disaster research. *Technology and Culture*, 55(4), 773-784.
- Kritikos, T., Robinson, T.R. & Davies, T.R.H. (2015). Regional coseismic landslide hazard assessment without historical landslide inventories: a new approach. *Journal of geophysical research. Earth surface.*, 120(4), 711-729.
- Krüger, F., Bankoff, G., Cannon, T. , Orłowski, B., Schipper, E.L.F. (2015). *Cultures and Disasters: Understanding Cultural Framings in Disaster Risk Reduction*. London: Routledge.
- Kvanvig, J. (2009). Assertion, knowledge, and lotteries. In Duncan Pritchard & Patrick Greenough (eds.) *Williamson on Knowledge*, 140-160. Oxford: Oxford University Press.
- Kvanvig, J. (2010). Norms of Assertion. In Brown, J. and Cappelen, H., editors, *Assertion*. Oxford: Oxford University Press.
- Lackey, J. (2007). Norms of Assertion. *Noûs* 41, 594-626.
- Lackey, J. (2008). *Learning from Words: Testimony as a Source of Knowledge*. Oxford: Oxford University Press.
- Lackey, J. (2011). Acquiring knowledge from others. *Social epistemology: Essential readings*, 71.
- Lackey, J. (2020). The duty to object. *Philosophy and Phenomenological Research*, 101(1), 35-60.

- Lama, T. N. (2019). Come for the temple, stay for everything else, Kathmandu Post, <https://tkpo.st/2KguhIXhttps://kathmandupost.com/22/2019/11/15/come-for-the-temple-stay-for-everything-else>
- Lambie, E. S., Wilson, T. M., Brogt, E., Johnston, D. M., Ardagh, M., Deely, J. & Feldmann-Jensen, S. (2017). Closed circuit television (CCTV) earthquake behaviour coding methodology: Analysis of Christchurch Public Hospital video data from the 22 February Christchurch earthquake event. *Natural Hazards*, 86(3), 1175-1192.
- Landridge, R. & Beban, J. (2011). Planning for a safer Franz Josef-Waiiau community, Westland District: considering rupture of the Alpine Fault. *GNS Science Consultancy Report 2011/217*.
- Latus, A. (2000). Moral and epistemic luck. *Journal of Philosophical Research*, 25, 149-172. https://doi.org/10.5840/jpr_2000_21
- Latus, A. (2000). Our epistemic goal. *Australasian Journal of Philosophy* 78 (1):28 – 39.
- Laws, J.L. (1975). The psychology of tokenism: An analysis. *Sex Roles* 1, 51–67. <https://doi.org/10.1007/BF00287213>
- Le Dé, L., & Gaillard, J. C. (2022). Whose views matter? For a pluralistic approach to understanding disasters. In *Defining Disaster*, Aronsson-Storrier, M. & Dahlberg, R. (eds.), 123-139. Edward Elgar Publishing.
- Lehrer, J., (2010). The Allais Paradox, *Wired*. Online: <https://www.wired.com/2010/10/the-allais-paradox/> (Accessed: 01/08/2018)
- Levine, S., Pain, A., Bailey, S. and Fan, L. (2012). The relevance of resilience? In H.P. Group. (Ed.), *HPG Policy Brief 49*, London: Overseas Development Institute.
- Levy, N. & Mandelbaum, E. (2014). The Powers that bind: doxastic voluntarism and epistemic obligation. In Jonathan Matheson (ed.), *The Ethics of Belief*. 12-33, New York: Oxford University Press.
- Lewis, D. (1973). *Counterfactuals*. Oxford: Blackwell Publishers.
- Lewis, D. (1996). Elusive Knowledge. *Australasian Journal of Philosophy*, 74(4), 549-567.
- Lewis, D. (1999). *Papers in Metaphysics and Epistemology: Volume 2*. Cambridge University Press.
- Lewis, D., Rodgers, D. & Woolcock, M. (2008). The fiction of development: Literary representation as a source of authoritative knowledge. *The Journal of Development Studies*, 44(2), 198-216.
- Lewis, J. (1976). The precautionary planning for natural disaster. *Foresight*, 2(2), 7– 10.
- Lewis, J. (1979). The vulnerable state: An alternative view. In *Disaster Assistance*, 104-129. London: Palgrave Macmillan.
- Lewis, J. (1984). Environmental interpretations of natural disaster mitigation: the crucial need. *The Environmentalist* 4(3), 177-180.
- Lewis, J. (1988). On the line: An open letter in response to ‘Confronting Natural Disasters, An International Decade for Natural Hazard Reduction’. *Natural Hazards Observer*, 12(4).

- Lewis, J. & Kelman, I. (2010). Places, People and Perpetuity: Community Capacities in Ecologies of Catastrophe. *ACME: An International E-Journal for Critical Geographies*, 9(2), 191-220.
- Liechty, M. (2003). *Suitably Modern: Making Middle Class Culture in a new Consumer Society*. Princeton, NJ: Princeton University Press.
- Limbu, B., Suji, M., Baniya, J., Subedi, P.C., Rawal, N. (2022). *Reconstructing Nepal: Sindhupalchowk - Hybrid Construction and Financial Flows*, Kathmandu: Social Science Baha.
- Lin, Q., Wang, Y., Liu, T., Zhu, Y., & Sui, Q. (2017). The vulnerability of people to landslides: A case study on the relationship between casualties and volume of landslides in China. *International Journal of Environmental Research and Public Health*, 14(2), 212. <https://doi.org/10.3390/ijerph14020212>
- Lindell, M. K., & Perry, R. W. (2000). Household Adjustment to Earthquake Hazard: A Review of Research. *Environment and Behavior*, 32(4), 461–501. <https://doi.org/10.1177/00139160021972621>
- Lindell, M.K., Prater, C.S., Wu, H.C., Huang, S.-K., Johnston, D.M., Becker, J.S. and Shiroshita, H. (2016). Immediate behavioural responses to earthquakes in Christchurch, New Zealand, and Hitachi, Japan. *Disasters*, 40: 85-111. <https://doi.org/10.1111/disa.12133>
- Littlejohn, C. & Carter, J.A. (2021). *This is Epistemology: An Introduction*. Hoboken, NJ: Wiley Blackwell.
- Long, N. & Long, A. (eds.) (1992). *Battlefields of Knowledge*, London: Routledge.
- Luce, R.D. (1956). Semiorders and a theory of utility discrimination. *Econometrica, Journal of the Econometric Society*, 178-191.
- Luckács, G. (1968). *History and Class Consciousness*. MIT Press, Massachusetts.
- Lycan, W.G. (2002). Explanation and epistemology. *The Oxford handbook of epistemology*, 408-433.
- Lyons, G., Ford, M., & Arthur-Kelly, M. (2006). *Classroom Management: Creating Positive Learning Environments* (3rd ed.). Australia: Thomson Learning.
- Lyotard, J.F. (1979) *La Condition Postmoderne: Rapport sur le Savoir*. Paris: Les Éditions de Minuit.
- MacFarlane, J. (2005). Making sense of relative truth. In *Proceedings of the aristotelian society*, 105(1), 305-323.
- MacFarlane, J. (2014). *Assessment sensitivity: Relative truth and its applications*. Oxford: Oxford University Press.
- MacKinnon, D., & Derickson, K. D. (2013). From resilience to resourcefulness: A critique of resilience policy and activism. *Progress in Human Geography*, 37(2), 253–270. <https://doi.org/10.1177/0309132512454775>
- MacManus, J. (2019). Provincial Growth Fund rejects Franz Josef township move. *Stuff*. Online: <https://www.stuff.co.nz/environment/climate-news/112588139/provincial-growth-fund-rejects-franz-josef-township-move> (Accessed: 2/05/2022)

- Maharjan, R. (2022). Nepal pays too little attention to fire hazards. *D+C: Development and Cooperation*. Online: <https://www.dandc.eu/en/article/poor-enforcement-building-codes-inadequate-zoning-controls-and-deficient-infrastructure-add> (Accessed: 01/08/2022)
- Maitra, I. (2011). Assertion, Norms, and Games. In, J. Brown and J. Cappelen, eds. *Assertion*, Oxford: Oxford University Press, 277-296.
- Mambrol, N. (2016). Homi Bhabha's concept of hybridity. *Literary Theory and criticism*, Online: <https://literariness.org/2016/04/08/homi-bhabhas-concept-of-hybridity/> (Accessed: 7/09/2022)
- Manzo, G. (2013). Is Rational Choice Theory *still* a Rational Choice of Theory? A response to Opp. *Social Science Information*, 52(3), 361-382.
- Marchezini, V. and Wisner, B. (2017). Challenges for vulnerability reduction in Brazil: Insights from the PAR framework. *Reduction of vulnerability to disasters: from knowledge to action*. São Carlos: Rima, 57-96.
- Marewski, J. N., & Gigerenzer, G. (2012). Heuristic decision making in medicine. *Dialogues in clinical neuroscience*, 14(1), 77–89. <https://doi.org/10.31887/DCNS.2012.14.1/jmarewski>
- Marshall, J. D., Jaiswal, K., Gould, N., Turner, F., Lizundia, B., & Barnes, J. C. (2013). Post-earthquake building safety inspection: lessons from the Canterbury, New Zealand, earthquakes. *Earthquake Spectra*, 29(3), 1091-1107.
- Marsili, N. (2021). Truth: the rule or the aim of assertion? *Episteme*, First View, 1-7.
- Mason, R. (2011). Two Kinds of Unknowing. *Hypatia*, 26(2): 294–307. doi:10.1111/j.1527-2001.2011.0
- Massey, C., Townsend, D., Rathje, E., Allstadt, K.E., Lukovic, B., Kaneko, Y., Bradley, B.; Wartman, J., Jibson, R.W., Petley, D.N., Horspool, N., Hamling, I., Carey, J., Cox, S., Davidson, J., Dellow, S., God, J.W., Holden, C., Jones, K., Kaiser, A., Little, M., Lyndsell, B., McColl, S., Morgenstern, R., Rengers, F.K., Rhoades, D., Rosser, B., Strong, D., Singeisen, C., & Villeneuve, M. (2018). Landslides Triggered by the MW 7.8 14 November 2016 Kaikoura Earthquake, New Zealand. *Bulletin of the Seismological Society of America*, 108 (3B).
- Massey, C., Thomas, K-L., King, A., Singeisen, C., Taig, T., & Horspool, N. (2019). Vulnerability of dwellings to landslides (Project No. 16/SP740). GNS Science report; 2018/17.
- Matyas, D. & Pelling, M. (2012). *Disaster Vulnerability and Resilience: Theory, Modelling and Prospective*. 10.13140/RG.2.1.4684.2409. London: Government Office for Science.
- McBride, S. K., Becker, J. S., & Johnston, D. M. (2019). Exploring the barriers for people taking protective actions during the 2012 and 2015 New Zealand ShakeOut drills. *International journal of disaster risk reduction*, 37, 101150.
- McCammon, C. (2014). Representing yourself as knowing. *American Philosophical Quarterly*, 51(2), 133-144.
- McClure, J. (2017). Fatalism, causal reasoning, and natural hazards. In *Oxford Research Encyclopedia of Natural Hazard Science*.
- McClure, J., Doyle, E. E., & Velluppillai, J. M. (2015). A tale of two cities: Judgments about earthquake and aftershock probabilities across time windows. *International journal of disaster risk reduction*, 14, 15-26.

- McCraw, B. W. (2015). The nature of epistemic trust. *Social epistemology*, 29(4), 413-430.
- McHugh, C. (2012). Epistemic deontology and voluntariness. *Erkenntnis*, 77(1), 65-94.
- McKinnon, R. (2015). *The Norms of Assertion: Truth, Lies and Warrant*. Palgrave Macmillan.
- McMyler, B. (2011). *Testimony, Trust, and Authority*. Oxford: OUP.
- Menges, L. (2017). Grounding responsibility in appropriate blame. *American Philosophical Quarterly*, 54(1), 15-24.
- Menges, L. (2017). The emotion account of blame. *Philosophical Studies*, 174(1), 257-273.
- Mercer, J. (2010). Disaster risk reduction or climate change adaptation: Are we reinventing the wheel? *J. Int. Dev.*, 22: 247-264. <https://doi.org/10.1002/jid.1677>
- Mercer, J. (2012). Knowledge and disaster risk reduction. In: Wisner, B, Gaillard, JC, Kelman, I (eds) *Handbook of Hazards and Disaster Risk Reduction*, 89–100. Abingdon: Routledge.
- Mercer, J., (2012). Knowledge and disaster risk reduction. In *The Routledge handbook of hazards and disaster risk reduction*, 97-108. London: Routledge.
- Mercer, J., Gaillard, J. C., Crowley, K., Shannon, R., Alexander, B., Day, S., & Becker, J. (2012). Culture and disaster risk reduction: lessons and opportunities. *Environmental Hazards*, 11(2), 74-95.
- Mercer, J., Kelman, I., Alfthan, B. and Kurvits, T. (2012). Ecosystem-based adaptation to climate change in Caribbean small island developing states: integrating local and external knowledge. *Sustainability*, 4(8), 1908-1932.
- Mercer, J., Kelman, I., Suchet-Pearson, S. and Lloyd, K. (2009). Integrating indigenous and scientific knowledge bases for disaster risk reduction in Papua New Guinea. *Geografiska Annaler: Series B, Human Geography*, 91(2), 157-183.
- Meriläinen, E., Joseph, J. , Jauhola, M., Yadav, P., Romo-Murphy, E., Marin, J. & Gadhavi, S. (2021). Examining relational social ontologies of disaster resilience: lived experiences from India, Indonesia, Nepal, Chile and Andean territories. *Disaster Prevention and Management*. Doi: 10.1108/DPM-02-2021-0057
- Merin, O., Yitzhak, A., & Bader, T. (2015). Medicine in a Disaster Area: Lessons From the 2015 Earthquake in Nepal. *JAMA Internal Medicine*, 175(9), 1437–1438. <https://doi.org/10.1001/jamainternmed.2015.3985>
- Millar, B. (2021). Shared Epistemic Responsibility, *Episteme* 18 (4), 493-506.
- Milledge, D.G., Densmore, A. L., Bellugi, D., Rosser, N. J., Watt, J., Li, G., & Oven, K. J. (2019). Simple rules to minimise exposure to coseismic landslide hazard. *Natural Hazards and Earth System Sciences*, 19(4), 837–856. doi:10.5194/nhess-19-837-2019.
- Milledge, D.G., Rosser, N., Oven, K., Dixit, A.M., Dhungel, R., Basyal, G.K., Adhikari, S.R. & Densmore, A. (2018) Simple guidelines to minimise exposure to earthquake-triggered landslides. *Earthquake Without Frontiers - Briefing note*.
- Miller, C. (2001). Hybrid management: boundary organizations, science policy, and environmental governance in the climate regime. *Science, Technology, & Human Values*, 26(4), 478-500.

- Ministry of Business, Innovation and Employment (2021). *Building Code update 2021*. Online: <https://www.mbie.govt.nz/have-your-say/building-code-update-2021/> (Accessed: 21/08/2022)
- Ministry of Business, Innovation and Employment (2022). *Building Act 2004*. <https://www.legislation.govt.nz/act/public/2004/0072/latest/096be8ed81c041b8.pdf>
- Mitchell, C. (2016). Quick retreat of New Zealand's glaciers an issue for tourism. *Stuff*. Online: <https://www.stuff.co.nz/business/industries/82972910/quick-retreat-of-new-zealands-glaciers-an-issue-for-tourism> (Accessed: 11/08/2018)
- Mitchell, T. & Harris, K. (2012). *Resilience: A risk management approach*. ODI Background Note. Overseas Development Institute: London 2012.
- Mobjörk, M. (2010). Consulting versus participatory transdisciplinarity: a refined classification of transdisciplinary research. *Futures*, 42(8), 866–873.
- MoHA (Ministry of Home Affairs) (2003). *Disaster Report of Nepal*. Kathmandu: Government of Nepal, Ministry of Home Affairs.
- MoHA (Ministry of Home Affairs) (2009). Nepal Disaster Report. In: *The hardship and vulnerability*. Ministry of Home Affairs, Government of Nepal and Disaster Preparedness Network-Nepal. Nepal: Jagadamba Press
- MoHA (Ministry of Home Affairs), UNDP (United Nations Development Programme), EC (European Commission), NSET (National Society for Earthquake Technology-Nepal), (2008). National Strategy for Disaster Risk Management in Nepal. Kathmandu: MoHA, UNDP, EC, NSET. Online: http://www.rccdm.net/index.php?option=com_docman&task=doc_view&Itemid=215&gid=17 (Accessed: 11/08/2022)
- Moore, G.E. (1962). Certainty. In *Philosophical Papers*, 226–51.
- Moran, R. (2018). *The Exchange of Words: Speech, Testimony, and Intersubjectivity*. Oxford: Oxford University Press.
- Moran, R. A. (2005). Getting Told and Being Believed. *Philosophers' Imprint*, 5, 1–29.
- Müller-Mahn, D. (ed.) (2013). *The Spatial Dimension of Risk: How Geography Shapes the Emergence of Riskscapes*, London: Routledge.
- Müller-Mahn, D. & Everts, J. (2013). Riskscapes: the spatial dimensions of risk. In: Müller-Mahn, D. (ed.): *The spatial dimension of risk. How geography shapes the emergence of riskscapes*, 22-36. London: Routledge.
- Munafò, M.R. & Smith G., D. (2018). Robust research needs many lines of evidence. *Nature* 553, 399–401.
- National Dalit Watch-NCDHR (2011). *Addressing Caste Discrimination in Humanitarian Response*. NCDHR, New Delhi. https://idsn.org/wp-content/uploads/user_folder/pdf/New_files/India/2012/IDSN-EU_study_on_CBD_in_humanitarian_response_by_NDW.pdf

- National Emergency Management Agency/Te Rakau Whakamarumaruru (2022). Declared States of emergency. Online: <https://www.civildefence.govt.nz/resources/previous-emergencies/declared-states-of-emergency/> (Accessed: 21/08/2022)
- National Research Council (1989). *Improving Risk Communication*. Washington, DC: The National Academies Press. <https://doi.org/10.17226/1189>.
- National Society for Earthquake Technology [NSET] Nepal and Geo-Hazards International [GHI] USA (1998). *The Kathmandu Valley Earthquake Management Action Plan* URL: http://www.preventionweb.net/files/1496_ActionPlan.pdf (Accessed: 19/09/2018)
- Nature (2012) Shock and law. *Nature* 490, 446. <https://doi.org/10.1038/490446b>
- Nepalese Army (2015). *The Nepalese Army in the aftermath of the Gorkha earthquake of 2015: Experiences and lessons learned*. Kathmandu: Nepalese Army.
- Neta, R. (2009). Treating something as a reason for action. *Noûs*, 43(4), 684-699.
- Neta, R. & Pritchard, D. (eds.) (2009). *Arguing about Knowledge*. London: Routledge.
- New Scientist (2011). The unknown fault that caught out Christchurch. Online: <https://www.newscientist.com/article/mg20928012-500-the-unknown-fault-that-caught-out-christchurch/> (Accessed: 21/08/2022)
- Nielsen, L. (2013). How to Classify Countries Based on Their Level of Development. *Social Indicators Research*, 114, 1087–1107.
- Norris, R.J. & Cooper, A.F. (2001). Late Quaternary slip rates and slip partitioning on the Alpine Fault, New Zealand. *J. Struct. Geol.*, 23, 507–520.
- Nottelmann, N. (2007). *Blameworthy Belief: A Study in Epistemic Deontology*. Dordrecht: Springer.
- Nozick, R. (1993). *The Nature of Rationality*, Princeton: Princeton University Press.
- NSSP (2018). Learning Brief: Retrofitting and Earthquake Safe Construction for Schools. Online: https://www.crownagents.com/wp-content/uploads/2018/07/Learning-briefs_2_retrofit.pdf (Accessed: 12/12/2021)
- NZ Herald (2019). Wild weather chaos: Up to 1000 people stranded on West Coast. *NZ Herald*. Online: <https://www.nzherald.co.nz/nz/wild-weather-chaos-up-to-1000-people-stranded-on-west-coast/RRCE2PKOEZITITLLOHJKR4R3ZU/> (Last accessed: 21/08/2022)
- O’Keefe, P., Westgate, K., & Wisner, B. (1976). Taking the naturalness out of natural disasters. *Nature*, 260(5552), 566–567.
- Oels, A. (2013). Rendering climate change governable by risk: From probability to contingency. *Geoforum*, 45, 17-29.
- Ojha, H.R., Ghimire, S., Pain, A., Nightingale, A., Khatri, D. B., & Dhungana, H. (2016). Policy without politics: technocratic control of climate change adaptation policy making in Nepal. *Climate Policy*, 16(4), 415–433. <https://doi.org/10.1080/14693062.2014.1003775>
- Olson, R.S. (2000). Toward a politics of disaster: Losses, values, agendas, and blame. *Crisis Management*, 18(2), 154.

- Opp, K.D. (2019). *The rationality of political protest: A comparative analysis of rational choice theory*. Routledge.
- Orchiston, C. (2018). Seismic risk scenario planning and sustainable tourism management: Christchurch and the Alpine Fault zone, South Island, New Zealand. *Journal of Sustainable Tourism* 20(1), 59–79.
- Orchiston, C., Mitchell, J., Wilson, T., Langridge, R., Davies, T., Bradley, B., Johnston, D., Davies, A., Becker, J. & McKay, A. (2018). Project AF8: developing a coordinated, multi-agency response plan for a future great Alpine Fault earthquake. *New Zealand Journal of Geology and Geophysics*, 61(3), 389-402, DOI: <http://dx.doi.org/10.1080/00288306.2018.1455716>
- Origgi, G. (2004). Is trust an epistemological notion? *Episteme*, 1(1), 61-72.
- Ortiz, R. (2000). From Incomplete Modernity to World Modernity, *Daedalus* 129(1): 249–259.
- Osorio-Piñeros, J.D. (2020). Technocracy, disaster risk reduction and development: A critique of the Sendai Framework 2015-2030. *Revista Derecho del Estado*, 47, 319-342.
- Oven, K. J. (2009). *Landscape, Livelihoods and Risk: Community Vulnerability to Landslides in Nepal*. Durham theses, Durham University. Online: <http://etheses.dur.ac.uk/183/>
- Oven, K.J., Sigdel, S., Rana, S., Wisner, B., Datta, A., Jones, S. & Densmore, A. (2017). *Review of the Nine Minimum Characteristics of a Disaster Resilient Community in Nepal*. Research Report. Durham University, UK.
- Oxley, M. (2015). Critique to SFDRR. *Gndr.Org*. Online: <http://gndr.org/news/item/1490-critique-to-sfdr.html>
- Paasi, A. (2015). Academic capitalism and the geopolitics of knowledge. In *The Wiley Blackwell Companion to Political Geography*, 509-523.
- Pagin, P. (2011). Information and Assertoric Force. In J. Brown and J. Cappelen, eds., *Assertion*, 97-136. Oxford: Oxford University Press.
- Pagin, P. & Marsili, N. (2021). Assertion. *Stanford Encyclopedia of Philosophy*.
- Pain, R., Whitman, G., Milledge, D. & Lune Rivers Trust (2011). *Participatory Action Research Toolkit*. Durham, UK: Durham University & Lune Rivers Trust.
- Palmer, J. (2022). The devastating mudslides that follow forest fires. *Nature*, 601, 184-186.
- Parker, J., & Crona, B. (2012). On being all things to all people: Boundary organizations and the contemporary research university. *Social Studies of Science*, 42(2), 262-289.
- Parpola, A. (2015). *The Roots of Hinduism: The Early Aryans and the Indus Civilization*. Oxford: Oxford University Press.
- Paternoster, R., Jaynes, C.M. & Wilson, T., (2017). Rational choice theory and interest in the “fortune of others”. *Journal of research in crime and delinquency*, 54(6), 847-868.
- Paton, D. (2007). *Measuring and monitoring resilience in Auckland*, GNS Science Report 2007/18.

- Paton, D. & Johnston, D. (2001). Disasters and communities: vulnerability, resilience and preparedness. *Disaster Prevention and Management*, 10(4), 270-277.
- Paton, D. & Johnston, D. (2015). The Christchurch earthquake: Integrating perspectives from diverse disciplines. *International Journal of Disaster Risk Reduction*, 14, 1–5.
doi:10.1016/j.ijdrr.2015.02.00
- Paton, D. & Johnston, D. (2017). *Disaster Resilience: An Integrated Approach*, 2nd. Ed., Charles C. Thomas.
- Paton, D., Okada, N., & Sagala, S. (2013). Understanding Preparedness for Natural Hazards: A cross cultural comparison. *Journal of Integrated Disaster Risk Management*, 3, 18-35.
- Payne, J.W., Bettman, J.R. & Johnson, E.J. (1993). *The adaptive decision maker*. Oxford: Cambridge University Press.
- Pelling, M. (1998). Participation, social capital and vulnerability to urban flooding in Guyana. *Journal of International Development: The Journal of the Development Studies Association*, 10(4), 469-486.
- Pelling, M. (2011). The vulnerability of cities to disasters and climate change: A conceptual framework. In *Coping with global environmental change, disasters and security*, 549-558. Springer, Berlin, Heidelberg.
- Pelling, M. (2011). Urban governance and disaster risk reduction in the Caribbean: the experiences of Oxfam GB. *Environment and Urbanization*, 23(2), 383-400.
- Pelling, M. & Dill, K. (2006). Natural disasters as catalysts of political action. *Media Development*, 53(4), 7.
- Pelling, M. & Dill, K. (2008). Disaster politics: from social control to human security. *Environment, Politics and Development Working Paper Series*, 1-24.
- Pelling, M. & Dill, K. (2010). Disaster politics: tipping points for change in the adaptation of sociopolitical regimes. *Progress in human geography*, 34(1), 21-37.
- Pelling, M. & Manuel-Navarrete, D. (2011). From resilience to transformation: the adaptive cycle in two Mexican urban centers. *Ecology and Society*, 16(2).
- Pérez, D. I. (2018). Languages for the Analytic Tradition. *Philosophical Papers*, 47:1, 49-69, DOI: 10.1080/05568641.2018.1429738
- Perry, R.W. (2007). What is a disaster? In: Rodríguez H., Quarantelli E.L., Dynes R., editors. *Handbook of Disaster Research*, 1-15. New York: Springer.
- Petley, D. (2010). Landslide hazards. In I. Alcantara-Ayala & A. Goudie (Eds.), *Geomorphological hazards and disaster prevention*, chapter 6, 63– 73. Cambridge: Cambridge U. Press. <https://doi.org/10.1017/CBO9780511807527.006>
- Petley, D. (2012). Global patterns of loss of life from landslides. *Geology*, 40(10), 927-930.
- Petley, D. N., Hearn, G. J., & Hart, A. (2005). Towards the development of a landslide risk assessment for rural roads in Nepal. In: Glade T, Anderson M, Crozier MJ (eds) *Landslide hazard and risk*, 597–620. Chichester: Wiley.
- Petley, D.N., Hearn, G.J., Hart, A., Rosser, N.J., Dunnind, S., Oven, K., & Mitchell, W. (2007). Trends in landslide occurrence in Nepal. *Natural Hazards* 43, 23–44 (2007).
<https://doi.org/10.1007/s11069-006-9100-3>

- Phillipson, R. (2017). Myths and Realities of “Global” English. *LanguagePolicy*, 16, 313–331.
- Phipps, C. (2016). Up to 100,000 landslides amid aftershocks in New Zealand – as it happened. *The Guardian*. Online: <https://www.theguardian.com/world/live/2016/nov/15/new-zealand-earthquake-floods-wellington-kaikoura?page=with:block-582a9018e4b05c05c52f5182> [Last accessed: 21/08/2022]
- Piovarchy, A. (2021). What do We Want from a Theory of Epistemic Blame? *Australasian Journal of Philosophy*, 99(4), 791-805.
- Piper, R. (2013). A perfect storm of earthquake and poor governance could cripple Nepal. *The Guardian*. Online: <https://www.theguardian.com/commentisfree/2013/jan/12/perfect-storm-earthquake-cripple-nepal> (Accessed: 10/09/2022)
- Pitsoe, V. and Letseka, M. (2013). Foucault’s discourse and power: Implications for instructionist classroom management. *Open Journal of philosophy*, 3(01), 23.
- Pollock, W., & Wartman, J. (2020). Human vulnerability to landslides: Fatality dataset. DesignSafe-CI. <https://doi.org/10.17603/ds2-hv13-ra52>
- Pollock, W., & Wartman, J. (2020). Human vulnerability to landslides. *GeoHealth*, Vol. 4, e2020GH000287. <https://doi.org/10.1029/2020GH000287>
- Popa, F., Guillermin, M., & Dedeurwaerdere, T. (2015). A pragmatist approach to transdisciplinarity in sustainability research: From complex systems theory to reflexive science. *Futures*, 65, 45-56.
- Porter, K.A. & Jones, J.L. (2018). How many injuries can be avoided in the HayWired scenario through earthquake early warning and drop, cover, and hold on? In S.T. Detweiler, A.M. Wein (Eds.), *The HayWired Earthquake Scenario—Earthquake Implications: U.S. Geological Survey Scientific Investigations Report*, Menlo Park, CA: U.S. Geological Survey Scientific Investigations Report.
- Poteete, A.R. & Ribot, J.C. (2011). Repertoires of domination: decentralization as process in Botswana and Senegal. *World Development*, 39(3), 439-449.
- Potter, J. (1997). Discourse analysis as a way of analysing naturally occurring talk. In: D. Silverman, eds. *Qualitative Research*, 200-222. London: Sage.
- Potter, S.H., Becker, J.S., Johnston, D.M., & Rossiter, K.P. (2015). An overview of the impacts of the 2010-2011 Canterbury earthquakes. *International Journal of Disaster Risk Reduction* 14(1), 6–14.
- Prabhupāda, A.C. Bhaktivedanta Swami (1972). *Bhagavad-gītā As It Is*. London: Collier MacMillan Publishers.
- Pritchard, D. (2002). Two Forms of Epistemological Contextualism, *Grazer Philosophische Studien*, 64, 19–55.
- Pritchard, D. (2014). Epistemic Luck, Safety and Assertion. In *Epistemic Norms: New Essays on Action, Belief and Assertion* (Littlejohn & Turri eds.), 155-172. Oxford: OUP.
- Pronskikh, V. (2018). Linguistic Privilege and Justice: What Can We Learn from STEM? *Philosophical Papers*, 47:1, 71-92, DOI: 10.1080/05568641.2018.1429739

- Pugh, J. (2014). Resilience, complexity and post-liberalism. *Area*, 46(3), 313-319.
- Puttick, S., Boshier, L., & Chmutina, K. (2018). Disasters are not natural. *Teaching Geography*, 43(3), 118–120.
- QuakeCoRE (2022). *About us*. Online: <http://www.quakecore.nz/about/> [Last accessed: 21/08/2022]
- QuakeCoRE (2022). *Newsletter 1 July 2022*. Online: <https://us10.campaign-archive.com/?u=c65a2a0813835c484fde76107&id=5ecbea9879> (Accessed: 21/08/2022)
- Quarantelli, E. L. (2000). Disaster research. In E. Borgatta & R. Montgomery (Eds.), *Encyclopedia of Sociology*, 682–688. New York, NY, USA: Macmillan.
- Quarantelli, E.L. & Dynes, R.R. (1972). When disaster strikes: it isn't much like what you've heard & read about. *Psychology Today*, 5(9), 66-70.
- RADIX (2019). Power, Prestige & Forgotten Values: A Disaster Studies Manifesto. Online: <https://www.radixonline.org/manifesto-accord> (Accessed: 29/9/2022)
- Raṅjitakāra, J.B. (2022). The Practice of Maṅḍala Art during Tihāra by Newars. *Sirjanā: the Journal of Arts and Art Education*. VIII 43-53.
- Rapaport, C., & Ashkenazi, I. (2019). Drop down or flee out? *International Journal of Disaster Resilience in the Built Environment*, 10(1), 52–64. doi:10.1108/ijdrbe-09-2018-0040
- Reed, Baron (2016). Having to Do with Knowledge. *Episteme*, 13(4), 549–554.
- Reghezza-Zitt, M., Rufat, S., Djament-Tran, G., Le Blanc, A. & Lhomme, S. (2012). What Resilience is Not: Uses and Abuses. *Cybergeog: European Journal of Geography*, 621.
- Rettler, L. (2018). In defense of doxastic blame. *Synthese*, 195(5), 2205-2226.
- Reyes, G.E. (2001). Four main theories of development: modernization, dependency, world-system, and globalization. *Nómadas. Revista Crítica de Ciencias Sociales y Jurídicas*, 4(2), 109-124.
- Reyners, M., Eberhart-Phillips, D. & Martin, S. (2014). Prolonged Canterbury earthquake sequence linked to widespread weakening of strong crust. *Nature Geoscience*, 7, 34–37.
- Rigg, J., Oven, K.J., Basyal, G.K. & Lamichhane, R. (2016). Between a Rock and a Hard Place: Vulnerability and Precarity in Rural Nepal. *Geoforum*, 76, 63–74. <https://doi.org/10.1016/j.geoforum.2016.08.014>
- Riggs, W. D. (2003). Balancing Our Epistemic Goals. *Noûs*, 37(2), 342–52.
- Riggs, W. D. (2003). Intellectual Virtue: Perspectives From Ethics and Epistemology, In DePaul M. & Zagzebski L. (eds.), *Intellectual Virtue: Perspectives From Ethics and Epistemology*, 203-226. Oxford: Oxford University Press.
- Ritchie, H., & Roser, M. (2014). Natural disasters. *Our World in Data*. Online: <https://ourworldindata.org/natural-disasters> (Accessed: 10/08/2022)
- Robertson, T. (2021). Mukta Singh Tamang: Writing to power requires reading against the grain. *The Record*. Online: <https://www.recordnepal.com/mukta-singh-tamang-writing-to-power-requires-reading-against-the-grain> (Accessed: 01/08/2022)

- Robeyns, I. (2022). Redistributing attention and authority in political philosophy. Crooked Timber. Online: <https://crookedtimber.org/2022/04/06/redistributing-attention-and-authority-in-political-philosophy/> (Accessed: 01/08/2022)
- Robinson, T. R., Rosser, N. J., Densmore, A. L., Williams, J. G., Kinsey, M. E., Benjamin, J., & Bell, H. J. A. (2017). Rapid post-earthquake modelling of coseismic landslide intensity and distribution for emergency response decision support, *Nat. Hazards Earth Syst. Sci.*, 17, 1521-1540.
- Robinson, T.R. & Davies, T.R.H. (2013). Review article: Potential geomorphic consequences of a future great (Mw = 8.0+) Alpine Fault earthquake, South Island, New Zealand, *Natural hazards and earth system sciences.*, 13 (9). 2279-2299.
- Robinson, T.R., Davies, T.R.H., Wilson, T.M. & Orchiston, C. (2016a). Coseismic landsliding estimates for an Alpine Fault earthquake and the consequences for erosion of the Southern Alps, New Zealand, *Geomorphology*, 263. 71-86.
- Robinson, T.R., Davies, T.R.H., Wilson, T.M. & Orchiston, C. and Barth, N. (2016b). Evaluation of coseismic landslide hazard on the proposed Haast-Hollyford Highway, South Island, New Zealand, *Georisk*, 10 (2). 146-163.
- Robson, S. (2022). The warning you might get before the next big quake. *The Detail, RNZ*. Online: <https://www.rnz.co.nz/programmes/the-detail/story/2018846258/the-warning-you-might-get-before-the-next-big-quake> (Accessed: 21/08/2022)
- Rockenbach, B., Sadrieh, A. & Mathauschek, B. (2007). Teams take the better risks. *Journal of Economic Behavior & Organization*, 63(3), 412-422.
- Rolin, K. (2009). Standpoint Theory as a Methodology for the Study of Power Relations. *Hypatia*, 24(4), 218-226.
- Rosser, Kinsey, M., Oven, K., Densmore, A., Robinson, T., Pujara, D. S., Shrestha, R., Smutny, J., Gurung, K., Lama, S., & Dhital, M. R. (2021). Changing significance of landslide Hazard and risk after the 2015 M-w 7.8 Gorkha, Nepal Earthquake. *Progress in Disaster Science*, 10. <https://doi.org/10.1016/j.pdisas.2021.100159>
- Roux, D.J., Rogers, K.H., Biggs, H.C., Biggs, Ashton, P. J. & Sergeant, A. (2006). Bridging the science–management divide: moving from unidirectional knowledge transfer to knowledge interfacing and sharing. *Ecology and Society*, 11(1): 4. [online] URL: <http://www.ecologyandsociety.org/vol11/iss1/art4/>
- Russell, A.W., Wickson, F., Care, A.L. (2008). Transdisciplinarity: context, contradictions and capacity. *Futures* 40 (5), 460–472.
- Ruszczuk, H.A. (2018) The earthquake and ideas lying around. In *Evolving narratives of hazard and risk : the Gorkha earthquake, Nepal, 2015*, 125-139. Cham: Palgrave Macmillan.
- Ruszczuk, H.A. (2019). Ambivalence towards discourse of disaster resilience. *Disasters*, 43(4), 818–839. <https://doi.org/10.1111/disa.12385>
- Sah, P. K., & Li, G. (2020). Translanguaging or unequal languaging? Unfolding the plurilingual discourse of English medium instruction policy in Nepal’s public schools. *International Journal of Bilingual Education and Bilingualism*, doi:10.1080/13670050.2020.18490

- Sah, P.K. (2022). English medium instruction in South Asia's multilingual schools: unpacking the dynamics of ideological orientations, policy/practices, and democratic questions, *International Journal of Bilingual Education and Bilingualism*, 25:2, 742-755
- Sah, P.K. & Karki, J. (2020). Elite appropriation of English as a medium of instruction policy and epistemic inequalities in Himalayan schools, *Journal of Multilingual and Multicultural Development*, DOI: [10.1080/01434632.2020.1789154](https://doi.org/10.1080/01434632.2020.1789154)
- Said, E. (1978). *Orientalism*. Pantheon Books.
- Sarup, M. (1993). *An Introductory Guide to Post-Structuralism and Postmodernism*. Athens: University of Georgia Press.
- Scanlon, T.M. (2008). A contractualist reply. *Theoria*, 66 (3), 237-245
- Scanlon, T.M. (2013). Interpreting blame. In Coates, D. Justin, and Neal A. Tognazzini (eds), *Blame: Its Nature and Norms*, 84-99. New York: Oxford University Press.
- Schiltz, M. (2018). Science without publication paywalls: Coalitions for the realisation of full and immediate open access. *PLoS medicine*, 15(9), e1002663.
- Schliesser, E. (2018). On Philosophical Translator-Advocates and Linguistic Injustice, *Philosophical Papers*, 47:1, 93-121, DOI: 10.1080/05568641.2018.1429740
- Schmidt, K.C.S. (2019). *Epistemic Justice and Epistemic Participation*. Thesis. Saint Louis, Missouri: Washington University.
- Schmidt, S. (2021). Epistemic Blame and the Normativity of Evidence. *Erkenntnis*, 1-24. doi:10.1007/s10670-021-00430-9
- Schulz, A.W. (2011). Gigerenzer's evolutionary arguments against Rational Choice Theory: An assessment. *Philosophy of Science*, 78 (5), 1272.
- Schwitzgebel, E., Huang, L. T., Higgins, A., & Gonzalez-Cabrera, I. (2018). The Insularity of Anglophone Philosophy: Quantitative Analyses, *Philosophical Papers*, 47:1, 21-48, DOI: 10.1080/05568641.2018.1429741
- Sewell, W. (2005). The concept(s) of culture, *Practicing History: New Directions in Historical Writing After the Linguistic Turn* (Spiegel, G. ed.), 76-95, London: Routledge.
- Sgaravatti, D. (2013). In Conversation with the Skeptic: Contextualism and the Raising of Standards. *International Journal for the Study of Skepticism* 3 (2):97-118.
- Shakya, M. (2018). *Death of an Industry: The Cultural Politics of Garment Manufacturing During the Maoist Revolution in Nepal*, New Delhi: Cambridge University Press.
- Shastri, H.P. (1952-1959). *The Ramayana of Valmiki*. In 3 volumes. London: Shanti Sadan.
- Sibley, C. G., & Liu, J. H. (2007). New Zealand= bicultural? Implicit and explicit associations between ethnicity and nationhood in the New Zealand context. *European Journal of Social Psychology*, 37(6), 1222-1243.
- Sidik, S. M. (2022). Weaving the Lore of the Land into the Scientific Method. *Nature* 601: 285–288.
- Simion, M. (2015). Assertion: Knowledge Is Enough. *Synthese*, preprint. Doi: 10.1007/s11229-015-0914-y

- Simion, M. (2019). Assertion: The context shiftiness dilemma. *Mind & Language*, 34(4), 503-517.
- Simon-Kumar, R. (2019). The Multicultural Dilemma: Amid Rising Diversity and Unsettled Equity issues, New Zealand seeks to Address its Past and Present. *Migration Information Source: The Online Journal of the Migration Policy Institute*. Online: <https://www.migrationpolicy.org/article/rising-diversity-and-unsettled-equity-issues-new-zealand> (Accessed: 21/08/2022)
- Simon, H. A. (1982). *Models of Bounded Rationality*. 2 vols. Cambridge, Mass.: MIT Press
- Simon, H.A. (1957). *Models of man; social and rational*. New York; Wiley
- Simon, H.A. (1986). Rationality in psychology and economics. *Journal of Business*. S209-S224.
- Simon, H.A. (1990). Bounded rationality. In *Utility and probability*, 15-18. Palgrave Macmillan, London.
- Slote, M. (1979). Assertion and Belief. In Dancy, J., editor, *Papers on Language and Logic*. Keele University Press, Keele.
- Smart, J. & Wehrheim, J. (1977). Dolpo, Nepal. *The Tibet Journal*. 2(1), 50– 59.
- Smith, A. (1776/2015). *The Wealth of Nations*, Industrial Systems Research.
- Smith, K. (2013). *Environmental hazards: assessing risk and reducing disaster*, London: Routledge.
- Social Science Baha (SSB) (2022a). *Policy Brief #3: Construction*. Kathmandu: Social Science Baha. Online: <https://soscbaha.org/wp-content/uploads/2022/07/policy-brief-construction.pdf> (Accessed: 11/08/2022)
- Social Science Baha (SSB) (2022b). *Policy Brief #4: Heritage*. Kathmandu: Social Science Baha. Online: <https://soscbaha.org/wp-content/uploads/2022/07/policy-brief-4-heritage.pdf> (Accessed: 11/08/2022)
- Solberg, C., Rosetto, T. & Joffe, H. (2010). The social psychology of seismic hazard adjustment: re-evaluating the international literature. *Natural Hazards and Earth System Sciences*. 10: 1663-1677. doi:10.5194/nhess-10-1663-2010
- Sosa, E. (2000). For the Love of Truth? In Linda Zagzebski & Abrol Fairweather (eds.), *Virtue Epistemology: Essays on Epistemic Virtue and Responsibility*. Oxford: Oxford University Press. 49-62.
- Stanciugelu, I., Bilanici, A., Cameron, I. and Stal, M. (2017). Last mile communication. *Science for disaster risk management*.
- Stanley, J. (2005). *Knowledge and practical interests*. Clarendon Press.
- Stanley, J. (2008). Knowledge and certainty. *Philosophical Issues* 18 (1):35-57.
- Staupe-Delgado, R. (2019). Progress, traditions and future directions in research on disasters involving slow-onset hazards. *Disaster Prevention and Management*, 28(5), 623-635.

- Staupe-Delgado, R. (2020). Can community resettlement be considered a resilient move? Insights from a slow-onset disaster in the Colombian Andes. *The Journal of Development Studies*, 56(5), 1017-1029.
- Steele, K., and Orri, S. (2020). Decision Theory, The Stanford Encyclopedia of Philosophy, Edward N. Zalta (ed.), Online: <https://plato.stanford.edu/archives/win2020/entries/decision-theory>.
- Stember, M. (1991). Advancing the social sciences through the interdisciplinary enterprise, *The Social Science Journal*, 28(1), 1–14.
- Stirling, M. W., Wesnousky, S. G., and Berryman, K. R. (1998). Probabilistic seismic hazard analysis of New Zealand, *N. Z. J. Geol. Geophys.* 41: 355–375.
- Strauss, J.A., Wein, A.M., Jones, J.L. & Given, D.D. (2017). *The HayWired Scenario—Earthquake Early Warning Forecast and Potential Hazard Mitigation Actions*. Scientific Investigations Report 2017–5013–R–W. U.S. Department of the Interior/U.S. Geological Survey.
- Strawson, P.F. (1962). Freedom and Resentment. *Proceedings of the British Academy* 48:187-211.
- Strömberg, D. (2007). Natural Disasters, Economic Development, and Humanitarian Aid. *Journal of Economic Perspectives*, 21(3), 199–222. <https://doi.org/10.1257/jep.21.3.199>
- Strong, S. (2017). Future of earthquake, flood-prone town of Franz Josef up in air. *Stuff*. Online: <https://www.stuff.co.nz/the-press/news/west-coast/97304541/future-of-earthquake-floodprone-town-of-franz-josef-up-in-air> (Accessed: 21/08/2022)
- Subedi, M. (2011). Caste system: theories and practices in Nepal. *Himalayan Journal of Sociology and Anthropology*, 4: 134–159.
- Subedi, S. (2021). Hindu texts help scientists communicate earthquake hazards in Nepal. *Prevention Web*. Online: <https://www.preventionweb.net/news/hindu-texts-help-scientists-communicate-earthquake-hazards-nepal> (Accessed: 01/08/2022)
- Subedi, S. & Hetényi, G. (2021). The representation of earthquakes in Hindu religion: a literature review to improve educational communications in Nepal. *Frontiers in Communication*. 6:668086. doi: 10.3389/fcomm.2021.668086.
- Subedi, S., & Hetényi, G. (2021). The representation of earthquakes in Hindu religion: a literature review to improve educational communications in Nepal. *Front. Commun.* 6: 668086. doi: 10.3389/fcomm.
- Subedi, S., Hetényi, G., Denton, P., & Sauron, A. (2020). Seismology at School in Nepal: A Program for Educational and Citizen Seismology Through a Low-Cost Seismic Network. *Front. Earth Sci.*, 8,73. doi: 10.3389/feart.2020.00073
- Susman, P., O'Keefe, P. & Wisner, B. (1983). Global disasters, a radical interpretation, In K. Hewitt (ed.), *Interpretations of Calamity*: 263-283. Boston, London, and Sydney: Allen and Unwin.
- Sutherland, R., Eberhart-Phillips, D., Harris, R.A., Stern, T., Beavan, J., Ellis, S., Henrys, S., Cox, S., Norris, R.J., Berryman, K.R., Townend, J., Bannister, S., Pettinga, J., Leitner, B., Wallace, L., Little, T.A., Cooper, A.F., Yetton M., & Stirling, M. (2007). Do great earthquakes

occur on the Alpine Fault in central South Island, New Zealand?, in *A Continental Plate Boundary: Tectonics at South Island, New Zealand*, Geophys. Monogr. Ser., vol. 175, edited by D. Okaya, T. Stern, and F. Davey, 235–251, AGU, Washington, D. C., doi:10.1029/175GM12

Sylvan, K. (2013). Truth Monism Without Teleology. *Thought, Journal of Philosophy*. (1)161–169. Wiley Periodicals, Inc and the Northern Institute of Philosophy.

Talbot, B. (2014). Truth promoting non-evidential reasons for belief. *Philosophical Studies*, 168(3), 599–618.

Te Kawanatanga o Aotearoa/New Zealand Government (2021). Provincial Growth Fund (PGF). Online: <https://www.govt.nz/organisations/provincial-growth-fund/> (Accessed: 1/08/2022)

Thapa, S. B. (2013). Relationship Between Education and Poverty in Nepal. *Economic Journal of Development Issues* 15(1-2): 148–161.

The Asia Foundation (2015). Aid and recovery in post-earthquake Nepal: Independent impacts and recovery monitoring Nepal phase 1. *Qualitative field monitoring*, June 2015, 39-45, http://learningfromearthquakes.org/2015-04-25-nepal/images/2015_04_25_25_nepal/pdfs/AWSynthesisreportinteractivePDF.pdf

The Center for High Impact Philanthropy (CHIP) UPenn. (2022) Society for Education, Action, and Research in Community Health (SEARCH). <https://www.impact.upenn.edu/search/> (Accessed: 11/08/2022)

Thomalla, F., Metusela, C., Naruchaikusol, S., Larsen, R.K. & Tapa, C. (2009). *Disaster risk reduction and tsunami early warning systems in Thailand: A case study on Krabi Province*. Stockholm Environment Institute.

Tiernan, A., Drennan, L., Nalau, J., Onyango, E., Morrissey, L., & Mackey, B. (2019). A review of themes in disaster resilience literature and international practice since 2012. *Policy Design and Practice*, 2(1), 53-74.

Tierney, K. & Bruneau, M. (2007). Conceptualizing and Measuring Resilience: A Key to Disaster Loss Reduction, *TR News*, 14-17.

Tipler, K. S., Tarrant, R. A., Johnston, D. M., & Tuffin, K. F. (2016). New Zealand ShakeOut exercise: lessons learned by schools. *Disaster Prevention and Management*.

Titz, A., Cannon, T. & Krüger, F. (2018). Uncovering ‘Community’: Challenging an Elusive Concept in Development and Disaster Related Work, *Societies*, 8(71), doi: 10.3390/soc8030071

Tobin, G. A. (1999). Sustainability and community resilience: the holy grail of hazards planning?, *Global Environmental Change Part B: Environmental Hazards*, 1(1), 13-25.

Ton, K. T., Gaillard, J. C., Adamson, C., Akgungor, C., & Ho, H. T. (2020). An empirical exploration of the capabilities of people with disabilities in coping with disasters. *International Journal of Disaster Risk Science*, 11(5), 602-614.

Tonkin+Taylor (2017). Franz Josef Township Natural Hazards Options Assessment and CBA. Online: https://www.tonkintaylor.co.nz/projects/all-projects/franz-josef-township-natural-hazards-options-assessment-and-cba/?sec_id=1203 (Accessed: 11/08/2022)

- Toole, B. (2022). Demarginalizing Standpoint Epistemology. *Episteme* 19 (1):47-65.
- Torcello, L. (2014) L'Aquila earthquake scientists freed but political lessons remain. *The Conversation*. Online: <https://theconversation.com/laquila-earthquake-scientists-freed-but-political-lessons-remain-34506> [Last accessed: 21/08/2022]
- Truebridge, N., Carroll, J. & Ensor, B. (2016). Drone footage shows extent of flooding after West Coast overnight deluge. *Stuff*. Online: <https://www.stuff.co.nz/national/78223436/tourists-evacuated-state-of-emergency-after-west-coast-river-breaks-banks> (Accessed: 11/08/2018)
- Trumble, B.C., Stieglitz, J., Jaeggi, A.V., Beheim, B., Schwartz, M., Seabright, E., Cummings, D., Kaplan, H. & Gurven, M. (2018). Parental hormones are associated with crop loss and family sickness following catastrophic flooding in lowland Bolivia. *Physiology & behavior*, 193, 101-107.
- Trumble, R. (2019). A proposal for unpacking the politics of knowledge production in disaster reduction education. *Geography compass*, 13(1), p.e12411. <https://doi.org/10.1111/gec3.12411>
- Tuckett, J. (2013). The Problem with Myth. *The Religious Studies Project*. Online: <https://www.religiousstudiesproject.com/response/the-problem-with-myth-by-jonathan-tuckett/> (Accessed: 21/08/2022)
- Tuladhar, G., Yatabe, R., Dahal, R. K., & Bhandary, N. P. (2014). Knowledge of disaster risk reduction among school students in Nepal. *Geomatics*, 5(3), 190–207. <https://doi.org/10.1080/19475705.2013.809556>
- Turri, J. (2011). The Express Knowledge Account of Assertion. *Australasian Journal of Philosophy*, 89:37–45.
- Turri, J. (2014). Knowledge and Suberogatory Assertion. *Philosophical Studies*, 167(3):557–67.
- Turri, J. (2016). Knowledge, certainty, and assertion. *Philosophical Psychology*, 29(2), 293-299.
- Tversky, A. (1972). Elimination by aspects: A theory of choice. *Psychological review*, 79(4), 281.
- Tversky, A. & Kahneman, D. (1974). Judgement under Uncertainty: Heuristics and Biases: Biases in judgments reveal some heuristics of thinking under uncertainty. *Science*, 185(4157), 1124-1131.
- Twigg J. (1998). Understanding Vulnerability – an introduction. In Twigg J, Bhatt MR eds *Understanding Vulnerability: South Asian Perspectives*. London: Intermediate Technology Publications/Duryog Nivaran.
- Twigg, J. (2009). Characteristics of a Disaster-Resilient Community. A Guidance Note. Version 2. DFID Disaster Risk Reduction Interagency Coordination Group, UK Department for International Development, London.
- Twigg, J. (2015). *Disaster Risk Reduction*, Good Practice Review 9, London: Overseas Development Institute.

UN Global Assessment Report on Disaster Risk Reduction (GAR) (2022). *Our World at Risk: Transforming Governance for a Resilient Future*. Online: <https://www.undrr.org/gar2022-our-world-risk>

UN/ISDR (2015). *Sendai Framework for Disaster Risk Reduction 2015-2030*. Geneva: UN/ISDR (UNGA). Available from: <https://www.undrr.org/publication/sendai-framework-disaster-risk-reduction-2015-2030>

UNDRR, (2022). Disaster Risk Reduction, Online: <https://www.undrr.org/terminology/disaster-risk-reduction> (Accessed: 11/08/2021)

Unger, P. (1975). *Ignorance: A Case for Scepticism*. Clarendon, Oxford.

United Nations Development Program (UNDP), (2007). *Human Development Report 2007/2008. Fighting Climate Change: Human Solidarity in a Divided World*, UNDP, New York, NY.

United Nations International Strategy for Disaster Reduction [UN/ISDR] (2007). *Building Disaster Resilient Communities: Good Practices and Lessons Learned*, A Publication of the 'Global Network of NGOs' for Disaster Risk Reduction.

United Nations Office for Disaster Risk Reduction (UNDRR) (2022). *Global Assessment Report on Disaster Risk Reduction 2022: Our World at Risk: Transforming Governance for a Resilient Future*. Geneva.

United Nations Office for the Coordination of Humanitarian Affairs (UN/OCHA) *Annual Report* (2016), Geneva.

United Nations Population Fund (2015). *Nepal earthquake 100 days into the humanitarian response*. Online: <https://reliefweb.int/report/nepal/nepal-earthquake-100-days-humanitarian-response> (Accessed: 11/08/2022)

USGS (2009). Earthquake facts and Earthquake Fantasy. Online archive version: https://web.archive.org/web/20091120103835/http://earthquake.usgs.gov/learn/topics/megaqk_facts_fantasy.php (Accessed: 01/08/2022).

Vahid, H. (2006). Aiming at Truth: Doxastic vs. Epistemic Goals. *Philosophical Studies* 131 (2):303-335.

Van Belle, D. A. (2004). *Media, bureaucracies, and foreign aid: A comparative analysis of the United States, the United Kingdom, Canada, France and Japan*. Springer.

van der Geest, K., & Schindler, M. (2016). Brief communication: Loss and damage from a catastrophic landslide in Nepal. *Natural Hazards and Earth System Sciences*, 16(11), 2347-2350.

Vanhoutte, Kristoff P. (2023) *There is No Such Thing as 'Continental' Philosophy*. Paris: PICT Books.

Veblen, T. (1898). Why is Economics not an evolutionary Science?, *The Quarterly Journal of Economics*, 12(4), 373–397.

Vedabase. (2022). *Bhagavad-gītā As It Is*. Online: <https://vedabase.io/en/library/bg/>

Vedabase. (2022). *Bhāgavata Purāṇa*. Online: <https://vedabase.io/en/library/sb/>

- Vedabase. (2022). *Mahābhārata. Retold by Krishna Dharma*. Online: <https://vedabase.io/en/library/mbk/>
- Villeneuve, M. (2018). Emergency preparedness pathways to disability inclusive disaster risk reduction. *Australian Journal of Emergency Management, Diversity in Disaster*, 44-47.
- Vinnell, L. (2020). Why do people prepare for natural hazards? An application of the Theory of Planned Behaviour to household preparation. <http://researcharchive.vuw.ac.nz/handle/10063/9157>
- Vinnell, L.J., Inch, P., Johnston, D.M., Eeri, M., Hosrpool, N. (2022). Behavioral responses to earthquake shaking: Video footage analysis of the 2016 Kaikōura earthquake in Wellington, Aotearoa New Zealand. *Earthquake Spectra*. 38(3), 1636-1660.
- Vinnell, L. J., Milfont, T. L., & McClure, J. (2021). Why do people prepare for natural hazards? Developing and testing a Theory of Planned Behaviour approach. *Current Research in Ecological and Social Psychology*, 2, 100011.
- Vinnell, L. J., Wallis, A., Becker, J. S., & Johnston, D. M. (2020). Evaluating the ShakeOut drill in Aotearoa/New Zealand: Effects on knowledge, attitudes, and behaviour. *International Journal of Disaster Risk Reduction*, 48, 101721.
- Waddell, E. (1977). The Hazards of Scientism: A Review Article, Review of Natural Hazards: Local, National, Global, by G. F. White. *Human Ecology*, 5(1), 69–76. <http://www.jstor.org/stable/4602392>
- Walker, J., & Cooper, M. (2011). Genealogies of resilience: From systems ecology to the political economy of crisis adaptation, *Security Dialogue*, 42(2), 143–160. <https://doi.org/10.1177/0967010611399616>
- Wallace, R.J. (1994). *Responsibility and the moral sentiments*. Harvard University Press.
- Wallace, R.J. (2011). Dispassionate opprobrium: On blame and the reactive sentiments. In R. J. Wallace, R. Kumar, and S. Freeman (Eds.), *Reasons and Recognition: Essays on the philosophy of T. M. Scanlon*. 348– 372. Oxford: Oxford University Press.
- Walters, P. (2015). The problem of community resilience in two flooded cities: Dhaka 1998 and Brisbane 2011. *Habitat International*, 50: 51-56.
- Washington Geological Survey (WGS) and Oregon Department of Geology and Mineral Industries (DOGAMI). (2015). A homeowner's guide to landslides for Washington and Oregon. https://www.dnr.wa.gov/publications/ger_homeowners_guide_landslides.pdf
- Washington Geological Survey (WGS). (2017). Landslide hazards in Washington State. Washington Geological Survey Fact Sheet. https://www.dnr.wa.gov/publications/ger_fs_landslide_hazards.pdf
- Watts, S. (2011) Scientists in the dock over L'Aquila earthquake. BBC Newsnight. Online: <http://news.bbc.co.uk/2/hi/programmes/newsnight/9593123.stm> (Last accessed: 01/08/2020).
- Weichselgartner, J. and Pigeon, P. (2015). The Role of Knowledge in Disaster Risk Reduction. *International Journal of Disaster Risk Science*, 6(2), 107-116. <https://doi.org/10.1007/s13753-015-0052-7>

- Weichselgartner, J., & Kelman, I. (2015). Geographies of Resilience: Challenges and opportunities of a descriptive concept. *Progress in Human Geography*, 39(3), 249-267.
- Weiner, M. (2005). Must We Know What We Say? *Philosophical Review*, 114:227–251.
- Wendelbo, M., China, F.L., Dekeyser, H., Taccetti, L., Mori, S., Aggarwal, V., Alam, O., Savoldi, A., & Zielonk, R. (2016). *The Crisis Response to the Nepal Earthquake: Lessons Learned*. EIAS, Research Paper. Brussels: European Institute for Asian Studies. Online: <https://www.alnap.org/system/files/content/resource/files/main/The-Crisis-Response-to-the-Nepal-Earthquake--Lessons-Learned-colour-1.pdf> (Last accessed: 11/08/2020)
- West Coast Regional Council (2017). *Agenda and Supporting Papers for Council's March Meetings 15 March 2017*. Online: <https://www.wcrc.govt.nz/repository/libraries/id:2459ikxj617q9ser65rr/hierarchy/Documents/Council/Meetings%2C%20Agendas%20and%20Minutes/Council%20Meetings/2017/Agendas/Agenda%2015%20March%202017.pdf> (Accessed: 21/08/2022).
- Westland District Council (2013). *Places to Visit: Franz Josef*. Online: <https://www.westlanddc.govt.nz/recreation/places-to-visit/franz-josef-glacier/> (Accessed: 21/08/2022).
- Westland District Council (2013). *Proposed Plan Change 7: managing Fault Rupture Risk in Westland: summary of submissions*. Online: <https://www.westlanddc.govt.nz/sites/default/files/proposed-plan-change-7-summary-of-submissions.pdf> (Accessed: 1/08/2022).
- Westland District Council (2017). *Ordinary Council Meeting 27 April 2017*. Online: <https://www.westlanddc.govt.nz/sites/default/files/27.04.17%20-%20Ordinary%20Council%20Agenda.pdf> (Accessed: 1/08/2022).
- White, G. F., Kates, R. W., & Burton, I. (2001). Knowing Better and Losing Even More: the Use of Knowledge in Hazards Management. *Environmental Hazards*, Vol. 3, 81-92.
- Whiting, D. (2013). Stick to the Facts: on the Norms of Assertion. *Erkenntnis*, 78: 847–67.
- Whitney, D., Lindell, M.K., & Nguyen, H.D. (2004). Earthquake Beliefs and Adoption of Seismic Hazard Adjustments. *Risk Analysis*, 24(1): 87–102.
- Wible, P. (2016). Her story went viral. But she is not the only black doctor ignored in an airplane emergency. *The Washington Post*. Online: https://www.washingtonpost.com/national/health-science/tamika-cross-is-not-the-only-black-doctor-ignored-in-an-airplane-emergency/2016/10/20/3f59ac08-9544-11e6-bc79-af1cd3d2984b_story.html (Accessed: 01/08/2022).
- Williams, J. G., Rosser, N. J., Kinsey, M. E., Benjamin, J., Oven, K. J., Densmore, A. L., Milledge, D. G., Robinson, T. R., Jordan, C. J., & Dijkstra, T. (2018). *Satellite-based emergency mapping using optical imagery: experience and reflections from the 2015 Nepal earthquakes*. Loughborough University. <https://hdl.handle.net/2134/28405>
- Williamson, T. (1996). Knowing and Asserting, *The Philosophical Review* 105, 489 - 523.
- Williamson, T. (2000). *Knowledge and its Limits*. Oxford University Press.

- Williamson, T. (2016). Knowledge through Imagination, in Amy Kind (ed.), Oxford: Oxford University Press.
- Willmott, P. (1986). *Social Networks, Informal Care and Public Policy*, London: Policy Studies Institute.
- Wisner, B. (1993). Disaster Vulnerability: Scale, Power and Daily Life. *GeoJournal*, 30(2), 127-140.
- Wisner, B. (1995). Bridging 'expert' and 'local' knowledge for counter-disaster planning in urban South Africa. *GeoJournal* 37: 335–348.
- Wisner, B. (2000). Disasters: what the United Nations and its world can do. *United Nations Chronicle*. 37(4): 6-9.
- Wisner, B. (2001). Changes in capitalism and global shifts in the distribution of hazard and vulnerability', in M. Pelling (ed) *Natural disasters and development in a globalizing world*. 43-56. London: Routledge.
- Wisner, B. (2004a). Assessment of capability and vulnerability, in Bankoff, G.F., Frerks, G. and Hilhorst, D. (Eds), *Mapping Vulnerability: Disasters, Development and People*, 183-193. London: Earthscan.
- Wisner, B. (2004b). Swords, plowshares, earthquakes, floods, and storms in an unstable, globalizing world, *Journal of Natural Disaster Science* 26(2): 63-72.
- Wisner, B. (2006). Let our children teach us: a review of the role of education and knowledge in disaster risk reduction. *United Nations International Strategy for Disaster Reduction*. Geneva.
- Wisner, B. (2020). Five years beyond Sendai—Can we get beyond frameworks?. *International Journal of Disaster Risk Science*, 11(2), 239-249.
- Wisner, B., Blaikie, P., Cannon, T., & Davis, I. (2014). *At Risk: Natural Hazards, People's Vulnerabilities and Disasters*, 2nd edition, London: Routledge.
- Wisner, B., Gaillard, J.C. & Kelman, I. (2012a). *The Routledge Handbook of hazards and disaster risk reduction*. Routledge.
- Wisner, B., Gaillard, J.C., & Kelman, I. (2012b). Framing disaster: Theories and stories seeking to understand hazards, vulnerability and risk. *In The Routledge handbook of hazards and disaster risk reduction*. 18-33. Routledge.
- Wisner, B., Kelman, I., Monk, T., Bothara, J.K., Alexander, D., Dixit, A.M., Benouar, D., Cardona, O.D., Kandel, R.C. & Petal, M. (2004). School seismic safety: Falling between the cracks. *Earthquakes*. London, 1-56.
- Wisner, B., O'Keefe, P. & Westgate, K. (1976). Taking the Naturalness out of Natural Disaster. *Nature*, 260 (5552) 566-567.
- Wisner, B., O'Keefe, P. & Westgate, K. (1977). Global systems and local disasters: the untapped power of peoples' science, *Disasters* 1(1): 47-57.
- Wolf, S. (2011). Blame, Italian style. In R. J. Wallace, R. Kumar, & S. Freeman (Eds.), *Reasons and recognition: Essays on the philosophy of T. M. Scanlon*, 332– 347. Oxford: OUP.

- Working Party on World Landslide Inventory (WPWLI). (1990). A Suggested Method for Reporting a Landslide, *Bulletin International Association for Engineering Geology*, 41, 5-12.
- World Health Organization: Nepal Earthquake: Country Update and Funding Request. (2015). <http://www.who.int/emergencies/nepal/nepal-donor-may.pdf?ua=1>.
- Wright, C. (2005). Contextualism and scepticism: Even-handedness, factivity and surreptitiously raising standards. *Philosophical Quarterly* 55 (219):236–262.
- Wylie, J. (2006). Poststructuralist theories, critical methods and experimentation. In S. Aitken, & G. Valentine (Eds.), *Approaches to human geography*, 298-310. SAGE Publications Ltd, <https://dx.doi.org/10.4135/9781446215432.n28>
- Yadav, P., Lassa, J.A., Marchezini, & Van Niekerk, D. (2022). Guest editorial: Introduction to calling for change in disaster studies - rethinking disaster studies. *Disaster Prevention and Management* 31(3): 177–181. Doi:<http://dx.doi.org/10.1108/DPM-06-2022-418>
- Yarnal, B. (2007). Vulnerability and all that jazz: Addressing vulnerability in New Orleans after Hurricane Katrina, *Technology in Society*, 29, 249-255.
- Young, R.J.C. (1995). *Colonial Desire: Hybridity in Theory, Culture, and Race*. London: Routledge.
- Zaidi, R.Z. (2018). Beyond the Sendai indicators: application of a cascading risk lens for the improvement of loss data indicators for slow-onset hazards and small-scale disasters.