Understanding island-wide intersectional disaster risk governance: the place of social networks in the Commonwealth of Dominica

by

Lowine Hill

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Examining Committee Membership

External Examiner	Dr. Amber Fletcher Professor University of Regina
Supervisor	Dr. Derek Armitage Professor, School of Environment, Resources and Sustainability, University of Waterloo
Co-supervisor	Dr. Jeremy Pittman Associate Professor, School of Planning, University of Waterloo
Internal Member	Dr. Johanna Wandel Associate Professor & Associate Dean, Undergraduate Studies University of Waterloo
Internal Member	Dr. Andrea M. Collins Associate Professor, School of Environment, Resources and Sustainability, University of Waterloo
Internal/External Member	Dr. Simron Singh Professor, School of Environment, Enterprise and Development, University of Waterloo

Author's declaration

This thesis consists of material all of which I authored or co-authored: see Statement of Contributions included in the thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners. I understand that my thesis may be made electronically available to the public.

Statement of contributions

This thesis was prepared in line with the School of Environment, Resources and Sustainability manuscript-based dissertation format.

Lowine Hill is the sole author of the Chapters 1 and 5, written under the guidance of Dr. Derek Armitage and Dr. Jeremy Pittman. Both chapters were not written for publication in peer-reviewed journals. Chapters 2, 3 and 4 were written as standalone manuscripts for publication in peer reviewed journals and books. Hill was the lead author for these chapters, and was responsible for conceptualizing study design, carrying out data collection and analysis, and writing/drafting manuscripts. Co-authors provided guidance during each step of the research and feedback on draft manuscripts:

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Abstract

The Sendai Framework for Disaster Risk Reduction promotes deliberative, inclusive and bottom-up processes to disaster risk reduction. Further, the growing focus on stakeholder engagement within disaster risk governance approaches provides greater voice to the "governed" within disaster risk policy making process. However, the "governed" are often grouped in generic categories such as "women", "youth" and "persons with disabilities", without taking in consideration the intersecting identities and related vulnerabilities of these groups. Further, current policy and practice within disaster risk reduction provides limited situational specificity to governance processes, and specifically the diversity of the actors involved, beyond their essentialized identities. This research sought to generate an intersectional, place-based disaster risk governance framework, develop insights on intersectional governance opportunities (or barriers) through the understanding of trust and social networks, and to foster transferable lessons for similar small islands. Intersectionality theory provides a comprehensive way of understanding and analysing social-ecological characteristics, inequalities and power dynamics within disaster risk governance settings beyond the emphasis on gender and entitlements.

This thesis proposes a pivot in disaster risk governance research and practice and aims to understand how social networks influence the development and effectiveness of island-wide, intersectional disaster risk governance in Dominica and Caribbean small islands. The research was framed through three interdependent specific objectives:

1. To develop an integrated framework for the consideration of intersectionality in place-based disaster risk governance in islands (theoretical objective).
2. To reposition disaster risk governance within an island-wide, intersectional approach through the analysis of actor identities within their social networks (empirical objective).
3. To identify intersectional opportunities to strengthen existing governance processes and achieve better disaster risk reduction outcomes (applied objective).

Using a mixed methods approach, a number of key insights emerged. First, this research expanded the Disaster Risk Governance theory to highlight the place- and context-based nature of human identities by incorporating elements of intersectionality and place-based thinking (chapter 2). This framework proposed six (6) key principles support inclusive and contextualised actions. These principles were based upon a synthesis of the literature and examples from small islands. This manuscript examined how an intersectional perspective can generate pathways to address the root causes of vulnerabilities to disasters beyond the "one size fits all" approaches promoted globally. Second, using an in-depth case study situated on the island of Dominica and focusing on the experience of gender and sexual minorities, this research presented some insights on intersectional disaster governance opportunities (or barriers) through the understanding of trust and marginalisation within social networks (chapter 3). This manuscript undertook a practical reflection formulated through four main themes: (i) navigating identities (ii) victimisation and vulnerability; (iii) the importance of place and scale and (iv) how power defines access and agency. Finally, this research had a wider look at the governance networks and actors, as well as their

formal and informal characteristics occurring in Dominica (chapter 4). This manuscript explored the structural and functional elements of disaster risk governance (DRG) networks in Dominica and examined the impact of actors' identities on information sharing dynamics. Through this analysis, this research reflected on the value of identities in enabling and/or hindering intersectional risk reduction opportunities on the island. The insights emerging from this research have the potential to highlight information sharing patterns, network structural gaps, clusters and key information brokers present within DRG networks. This research marks an initial step toward comprehending how actors' identities involved in networks can shape social relationships across scales and can further support the examination of disparities within these DRG networks. Here, intersectionality can help in uncovering structural barriers, identifying information bottlenecks, and highlighting disparities in information access, all of which can impact individuals with specific combinations of identities, but more widely whose values and knowledge are represented and shared as well as the scope and scale of their power and agency in supporting risk reduction outcomes.

French translation of the abstract

Le Cadre de Sendai pour la réduction des risques de catastrophe met en avant des processus délibératifs, inclusifs et ascendants pour la réduction des risques. L'accent est particulièrement mis sur l'engagement des parties prenantes dans les approches de gouvernance. Ces approches sont extrêmement pertinentes car elles permettent aux « gouvernés » de s'exprimer dans le cadre d'un processus d'élaboration de politiques. Cependant, les « gouvernés » sont souvent regroupés dans des catégories génériques telles que les « femmes », les « jeunes » et les « personnes en situation d'handicap », sans tenir compte de leurs identités multiples, ainsi que des vulnérabilités spécifiques liées à ces identités. En outre, les politiques et les pratiques actuelles en matière de réduction des risques ne fournissent qu'une spécificité situationnelle limitée aux processus de gouvernance, notamment en ce qui concerne la diversité des acteurs impliqués dans ces processus, au-delà de leurs identités essentialisées. Cette recherche vise donc à créer un cadre de gouvernance des risques de catastrophe intersectionnel basé sur un contexte situationnel. Cette recherche permet aussi d'offrir des perspectives sur les opportunités (ou les obstacles) de gouvernance intersectionnelle grâce à la compréhension des relations sociales et à favoriser des leçons transférables pour des petites îles dans les situations similaires. La théorie de l'intersectionnalité permet de comprendre et d'analyser les caractéristiques socio-écologiques, les inégalités et les dynamiques de pouvoir au-delà de l'accent mis sur le genre et les droits.

Cette thèse propose donc un pivot dans la recherche et la pratique de la gouvernance des risques de catastrophe. Elle vise à comprendre comment les réseaux de relations sociales influencent le développement et l'efficacité d'une gouvernance intersectionnelle des risques de catastrophe à l'échelle insulaire, en Dominique et les autres petites îles de la Caraïbe. La recherche a été encadrée par le biais de trois objectifs spécifiques interdépendants :

1. Développer un cadre intégré pour la prise en compte de l'intersectionnalité dans la gouvernance des risques (objectif théorique).
2. Repositionner cette gouvernance dans une approche intersectionnelle à l'échelle insulaire par l'analyse de l'identité des acteurs au sein de leurs réseaux de relations sociales (objectif empirique).
3. Identifier les opportunités intersectionnelles pour renforcer les processus de gouvernance existants et obtenir de meilleurs résultats en matière de réduction des risques de catastrophe (objectif appliqué).

L'utilisation de méthodes mixtes a permis de dégager un certain nombre de perspectives essentielles. Tout d'abord, cette recherche a élargi la théorie de la gouvernance des risques de catastrophe pour mettre en avant le caractère local et contextuel des identités humaines en incorporant des éléments d'intersectionnalité et de réflexion axée sur le lieu (chapitre 2). De cette analyse découle six (6) principes clés pour soutenir des actions inclusives et contextualisées. Ces principes sont basés sur une synthèse de la littérature et sur des exemples tirés de petites îles de la Caraïbe et du Pacifique principalement. Ce manuscrit a examiné comment une perspective intersectionnelle peut générer des pistes pour s'attaquer aux causes profondes des vulnérabilités

aux catastrophes au-delà des approches uniformes promues à l'échelle mondiale. Deuxièmement, en utilisant une étude de cas approfondie menée sur l'île de la Dominique se focalisant sur l'expérience des minorités sexuelles et de genre, cette recherche a présenté quelques perspectives sur les opportunités (ou barrières) de la gouvernance intersectionnelle des risques à travers la compréhension de la notion de confiance et de marginalisation au sein des réseaux de relations sociales (chapitre 3). Ce manuscrit a entrepris une réflexion pratique formulée à travers quatre thèmes principaux : (i) naviguer l'expression identitaire (ii) victimisation et vulnérabilité ; (iii) l'importance du lieu et de l'échelle d'analyse ; et finalement (iv) l'importance du pouvoir dans l'accès à l'information et la capacité d'action. En dernier lieu, cette recherche a porté un regard plus large sur les réseaux d'acteurs présents dans les systèmes de gouvernance en Dominique, ainsi que sur leurs caractéristiques formelles et informelles (chapitre 4). En particulier, ce chapitre a exploré les éléments structurels et fonctionnels des réseaux de gouvernance des risques de catastrophe en Dominique et a examiné l'impact des identités des acteurs sur la dynamique du partage d'informations. Cette analyse a permis d'examiner la valeur des identités dans les possibilités de réduction des risques sur l'île, qu'elles soient positives ou négatives.

Les enseignements tirés de cette recherche ont permis de mettre en évidence les modèles de partage d'informations, les regroupements, les principaux courtiers en informations et, dans une certaine mesure, les lacunes structurelles présentes au sein des réseaux de gouvernance des risques de catastrophe. Cette recherche marque une première étape dans la compréhension de la manière dont l'identité des acteurs impliqués dans les réseaux de gouvernance peuvent façonner les relations sociales à différentes échelles (institutionnelles, géographiques, etc.) et contribuer à une exploration approfondie des disparités au sein des réseaux de gouvernance des risques de catastrophe. Ici, l'intersectionnalité a aidé à mettre en lumière les barrières structurelles, à identifier les obstacles à la diffusion de l'information et à mettre en évidence les disparités dans l'accès à l'information. Ces éléments peuvent avoir un impact sur les individus présentant des combinaisons spécifiques d'identités, mais plus largement sur les valeurs et les connaissances représentées au sein de ces réseaux. Finalement, ces éléments mettent en lumière la portée et l'ampleur du pouvoir de certains acteurs, ainsi que leur capacité d'action en matière de réduction des risques.

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I am also grateful for my parents, sisters and brother, for their love, understanding and unwavering support during this PhD journey. In a sense, I am also thankful for my extended family, who did not believe in me, which in turn, gave me the strength and determination to reach the highest level of academic excellence.

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Last not the least, a special acknowledgment for me, for being able to complete this research relatively on time, while working almost full time, and despite numerous calls from of the God of Procrastination, the God of Quitting and the God of Burnout.

Completing a PhD is a collaborative effort, and it is impossible to acknowledge everyone who has contributed to this work. To all those who have supported me in various ways, whether mentioned explicitly or not, please accept my heartfelt gratitude. Your contributions, no matter how small, have played an integral part in shaping this research and my academic journey as a whole.

Thank you all!

Dedication

To the communities in Dominica: the Kalinago Territory; Saint David (Castle Bruce and around); Saint Joseph (St Joseph, Mero and around) and Saint Peter,

To my parents, Jackline and Georges and to my siblings, Flaholan, Kathleen and Leeroy.

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List of Abbreviations and Acronyms

CCA	Climate Change Adaptation
CDEMA	Caribbean Disaster Emergency Management Agency
CREAD	Climate Resilience Execution Agency for Dominica
DRR	Disaster Risk Reduction
DRG	Disaster Risk Governance
IPCC	Intergovernmental Panel on Climate Change
GDP	Gross domestic product
GSM	Gender and Sexual minorities
OECS	Organisation of Eastern Caribbean States
UNDP	United Nations Development Programme
UNDRR (formerly UNISDR)	United Nations Office for Disaster Risk Reduction (formerly United Nations International Strategy for Disaster Reduction)

Positionality statement

"There is no such thing as a single-issue struggle, because we do not live single-issue lives."
Audre Lorde, 1984

As a researcher undertaking this doctoral study, it is essential to acknowledge my own positionality and the potential influences it may have on the research process and outcomes.

Firstly, I acknowledge that my position as a researcher is inherently shaped by my own cultural, educational, and social background. I have a mixed Guadeloupe/Dominica heritage and my visible identity is that of a woman – depending on where I am located in the world, I and people around me tend to add a racial qualifier (i.e., woman of color, black woman). My decolonised vision of research and scholarly work is from the view of the colonised: it is about respect, accountability, identity, and emancipation of bodies and minds. My identities have undoubtedly influenced my worldview, assumptions, and biases as well as the proximity that I have in this research. These factors may affect the way I approached research questions, selected methodologies, and interpreted the data.

Additionally, I recognize that my personal experiences and prior knowledge related to the topic disaster risk governance may have influenced my interpretations and analysis. While I strive for objectivity and impartiality, it is crucial to acknowledge that my subjective experiences may have inadvertently shaped the research process and findings. To address these potential biases and limitations, I have taken a reflexive stance throughout the research process. I critically reflected on my own positionality, biases, and assumptions, and continually questioned how these may impact the research. By doing, I tried to minimize the influence of my positionality on the research process and findings, while acknowledging its potential effects and building on the strength that these identities gave me.

Ultimately, I acknowledge that while it is impossible to completely eliminate the influence of my positionality, I am committed to approaching this research with humility, self-awareness, and a critical lens. By transparently acknowledging and reflexively engaging with my positionality, I aim to enhance the rigor, validity, and ethical integrity of this doctoral research.

Lowine

Chapter 1: Introduction

1.1. Research context and justification

Weather and climate-related natural hazards have important environmental, social, economic, and political consequences in the Caribbean islands. Hurricanes, in particular, are the most frequent and damaging natural hazards economically (Houston et al., 2012; CDEMA, 2014). Contrary to their continental counterparts, when a hazard hits a small island, 100% of the population, infrastructure and livelihoods are affected (Kelman & Khan, 2013) to varying degrees. The annual economic cost of natural hazards in the region is about two percent of GDP (in USD) which is more than four times that for larger continental countries (IMF, 2016). For instance, in the aftermath of hurricanes Irma and Mara in 2017, the damages and losses suffered by the island of Dominica accounted for about 226% of the GDP (PDNA, 2017), mostly impacting the farming and fishing sectors.

Often, these hazards are viewed as a single, discrete event when in fact, they can have major long-term systemic impacts (Maskrey et al., 2022). Further, the concept of "disaster circle" has been heavily criticized by disaster scientists as it depicts disaster as a temporary interruption of a linear development process within static governance arrangements (Hewitt, 1983; Wilkinson, 2015). The severity of hazards is predicted to increase in small islands over the years due to climate change; current projections predict a likely increase in wind speed, rainfall and storm surge occurrence (IPCC, 2018; Barclay et al., 2019). In order to create a sustainable pathway for risk reduction in islands in general, and in the Caribbean region in particular, it is important to investigate not only the biophysical nature of hazards, but also the underlying social-cultural factors influencing disaster risks.

Disasters are at the convergence of a natural hazard and a social, cultural, political, environmental, and economic context (Blaikie et al., 2004; Collier et al., 2009; Kelman et al., 2015; Sjöstedt & Povitkina, 2017) and are predominantly conditioned by societal perceptions, priorities, needs, decisions, and practices (Oliver-Smith et al., 2017). Oliver-Smith and Hoffman (2019, Chap 1) posited that there are two main dimensions in the definition of disasters, which are: (1) external variability and (2) internal complexity. The external variability refers to the biophysical phenomena that generate a wide range of physical impacts such as destruction or death. The strength, exposure and scale of each phenomenon varies; for instance, the hurricane season in the Caribbean changes from year to year and it is impossible to know whether a major earthquake will happen at the same time. The extent to which each hazard will cause destruction is related to internal complexity. It relates to the various intersecting social, cultural, political, historical and economic factors that form the socially constructed realities and the way these realities will shift in the aftermath of the hazard.

The main guiding framework for the design and implementation of actions aiming at addressing disaster risks globally is the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR). The SFDRR replaced the Hyogo Framework for Action 2005-2015 (HFA) and the Yokohama

Strategy and Plan of Action for a Safer World (UNSDR, 2015). The SFDRR came into play as global priorities for vulnerability reduction and sustainable development shifted and were redefined, explicitly linking inequalities and poverty as a direct driver of disasters (Tozier de la Poterie & Baudoin, 2015; Chmutina et al., 2021). The Framework does this through its four priorities for action: (i) understanding of disaster risk in all its dimensions; (ii) strengthening disaster risk governance to manage disaster risk; (iii) investing in DRR for resilience; and (iv) enhancing disaster preparedness for effective response, and to «Build Back Better» in recovery, rehabilitation and reconstruction (UNISDR 2015).

Disaster Risk Reduction (DRR) is defined by the UNISDR as "the systematic development and application of policies, strategies and practices to minimise vulnerabilities, hazards and the unfolding of disaster impacts throughout a society, in the broad context of sustainable development" (UNISDR, 2009). However, the term DRR inherently suggests a focus on addressing existing risk conditions. The priority is often on reducing the impact of current disturbances and minimising losses rather than proactively identifying and transforming the underlying drivers of risks (Lavell & Maskrey, 2014). As a result, in-depth available studies on disasters often provide only a partial assessment of the drivers of vulnerability that result in mostly short-term, project driven actions and benefits. In parallel, this situation leads to the creation of homogenous, "one-size-fits-all" risk reduction strategies. Consequently, efforts are concentrated on designing corrective and compensatory measures to address these issues. Yet, today's and tomorrow's "wicked" challenges, including climate change, make these measures insufficient in light of their high uncertainty, non-linearity, ambiguity, complexity, and global connectivity of today's world (Lavell & Maskrey, 2014; Triyanti et al., 2022), and is particularly relevant for small Caribbean islands.

There is an opportunity for both empirical and conceptual research on natural hazards and disasters to adopt an "all-hazards" systematic approach (Adini et al., 2012), not only for disaster emergency response (as it is currently advocated), but as a guiding principle to risk reduction activities. The SFDRR highlight the need for systematic approaches to reduce disaster risks (UNISDR, 2015). Further, there is a need to move away from conventional risk reduction approaches (i.e. considering disaster risks as isolated) to a "systemic risk" framework, that not only recognise the interconnectedness and cascading impacts of disasters (Schweizer and Renn, 2019; Aven and Renn, 2021; Triyanti et al., 2022)) but can also guide the design of relevant governance systems. In the context of islands, this means internalising the various sources of natural hazards, the root causes of vulnerabilities (as well has historical factors) and uncertainty within "fit-for-purpose", context-dependant, place-based, multiscale disaster risk governance structures in order to effectively address systemic disaster risks.

1.2. Problem rationale

In order to create these place-based, context-dependant, multiscale governance structures, it is important to identify the actors involved within governance processes as well as the potential factors hampering the governability of systemic risks. The concept of disaster risk is highly subjective. However, there is a disconnect in understanding between the populations who live in

hazards-prone areas and those who attempt to manage these hazards (Thomalla et al., 2015). In small Caribbean islands, governance strategies and decision-making processes stemmed from colonial times and are often unsuitable to address disaster risks from a local perspective (Hinds, 2019). A review conducted in Jamaica showed that disaster institutions operate within a top-down management systems that privilege the day-today operation and maintenance activities rather than a governance-based, strategic vison of addressing disaster risks (Blackburn, 2014; Cashman, 2017; Grove, 2013). A similar observation can be done for Puerto Rico (Rivera, 2020). Further, as disasters are treated as singular events, any opportunities to rethink current institutional structures inherited by colonisation are not necessarily welcomed or even disallowed (Grove, 2013; Rivera, 2020). The Caribbean Region is one of the most politically and culturally diverse regions of the world. It includes 16 independent island states and 14 dependent island territories of France, the United Kingdom, the United States, and the Netherlands (Fanning et al., 2009, 2011) that influence institutional and governance arrangements as well as decision-making processes. Further, for the non-independent islands, the governing structures are located geographically and culturally away from where the hazards take place.

Emerging scholarship and a review of available literature has highlighted three key issues with reference to disaster risk reduction activities. The first challenge is a lack of understanding regarding how individuals and groups of actors at various vertical (from local, national and regional in the case of the Caribbean) and horizontal (such as within government or communities) scales interact and collaborate with each other, how information flows and how these interactions affect disaster risk reduction activities. The Sendai framework provides policy guidance to countries and linearity is implied in its implementation. However, authors have noted that there is often a discrepancy between policy intentions and policy practice that is particularly apparent in the Caribbean (Biholar, 2014). Policy implementation is not a linear process; it depends on relationships, entrenched interests, networks, priorities, “convenience”, and “negotiations” (Mohammed, 2014 in Biholar, 2014).

The second issue is related to the lack of contextualisation of risk reduction discussion and actions. Contrary to their continental counterpart, when a hazard hits a small island, usually 100% of the population, infrastructure and livelihoods are affected (Kelman & Khan, 2013) in varying degrees. In addition, the vast majority of studies pertaining to island governance and risk reduction practices currently implemented in the Caribbean have emerged from experiences in Pacific Islands or from continental nations (i.e. Dunn, 2016; Kelman, 2015). However, while there are definite parallels to be made, the stark differences in history, traditions, socio-economic characteristics, institutional arrangements, languages, cultures, and ethnicities between and within the two regions impact the way island-wide governance processes emerge and are operationalised in one given island. In this context, it is important to have place-based, island-wide understanding, at various levels and scales, of governance processes involved addressing disaster risks.

Different actors are at the center of disaster risk governance processes. Yet, most programming and policies emerging from these processes focus on these actors as collective categories or single

identity groups, under the umbrella of vulnerable and marginalised people with the assumption that their vulnerabilities are homogenous and static (Haworth, et al., 2022). These groups include women, youths, people with disabilities, Indigenous Peoples as well as gender and sexual minorities. Hence, the third gap involves the intersectional understanding of disasters and disaster risks. The intersectionality theory (Crenshaw, 1989, 1990) critiques the unidimensional, essentialised, and fragmented representation of identity and provide an understanding of the interlinkages and interconnection between the social factors or characteristics that shape identities, oppression, and lived experiences such as race/ethnicity, Indigeneity, gender, class, sexuality, geography, age, disability/ability, migration status/nationality, religion, etc. (Hankivsky, 2014; Collins, 2015) in a given context. When applied to disaster risk governance processes, intersectionality recognises that vulnerability and marginality are contextual and that people who are at the margins have different identities, power, needs and priorities. The theory potentially provides a starting point for the understanding of the differentiated and dynamic nature of vulnerability, resilience and capacities to address disaster risks and depict a more nuanced picture of identities and their importance within governance processes.

Addressing these knowledge gaps are relevant to theoretically and empirically advance disaster risk governance processes. Further, they promote a paradigm shift towards systematic, risk-driven, and integrated institutions that deconstruct the place-based nature of risk and disasters. Finally, they are consistent with other international policy agreements and agendas/initiatives such as climate change adaptation and sustainable development. “Leave no one behind” is a core tenet of the Sustainable Development Goals (SDGs). Specifically answering these gaps will contribute to SDG 5 on gender equality, SDG 10 on reducing inequalities, SDGs 13 on climate change and SDG 16 on inclusive institutions.

1.3. Research objectives and contributions

While the topic of disaster risk governance is not new, empirical investigations of the influence of social networks on disaster risk governance (DRG) within an island-wide intersectional perspective have not been given attention in the Caribbean Region, and in small islands states in general. More so, DRG rarely focuses on the diverse and distinct identities of individuals which potentially undermines efforts to alleviate their vulnerabilities. The purpose of this research is to **understand how social networks influence the development and effectiveness of island-wide, intersectional disaster risk governance in Dominica and Caribbean small islands.** By integrating the theoretical foundations of disasters, intersectionality, governance, and social networks, this research addresses three main, interdependent specific objectives:

a. **Theoretical objective: to develop an integrated framework for the consideration of intersectionality in place-based disaster risk governance in islands.**

The first specific objective aims to answer the following research question: What does an intersectional perspective reveal about disasters and governance the context of small islands? Framing disaster risk governance within broader island-wide, intersectional perspective highlights

the context-specific nature of human identities and their relevance in understanding of disaster risks, the social networks that mediate that risk, and the manner in which these insights can improve governance outcomes. This integrated framework is guiding the conceptual and methodological directions of this research.

b. Empirical objective: To reposition disaster risk governance within an island-wide, intersectional approach through the analysis of actor identities within their social networks.

The second specific objective aims to answer the following research question: What role do local and institutional actors' social identities play in defining their involvement and power in shaping risk reduction processes and networks? Social networks are an important part of addressing disaster risks and the present research has helped characterise the governance processes and collaborative forums involved in reducing risks and communicating disaster information. Specifically, this research investigated the experience of gender and sexual minorities within island-wide disaster risk governance networks. Within this objective, this research looked at the importance of identities within DRG processes through the analysis of trust in information and marginalisation as well as the formal or informal pathways within which they operate to achieve their goals.

c. Applied objective: To identify opportunities to strengthen existing governance processes and achieve better disaster risk reduction outcomes through an intersectional lens.

The third specific objective aims to answer the following research questions: What are the structural and functional characteristics of formal and informal governance networks that act as barriers and enablers of risk reduction opportunities in small island states? And how can these networks be harnessed for the co-creation of intersectional, island-specific governance arrangements for better risk reduction outcomes? Both the theoretical and empirical objectives have guided the development of an applied understanding of intersectional, island-wide disaster risk governance and have proposed some perspectives to reframe existing governance systems and approaches analysing actors' identities.

Each manuscript aims to address each one of these objectives through original complementary contributions to the areas of scholarship listed above. The findings of this research are organised around the three objectives and four research questions outlined in this research. Each chapter (chapters 2-4) addressed each of the objectives through interdependent but distinct manuscripts. A general literature review methodology is presented below. However, each manuscript has its own theoretical foundation, methods, analysis and conclusion.

1.4. Theoretical foundations and literature review

The research questions that are analysed in this research project arose from current national and international discussions regarding the need for more inclusive and relevant actions on disaster

risk reduction and governance. Although the literature covers a wide range of theories and contexts around the topic of disaster risk governance, this research draws specifically from four core bodies of literature: (i) theoretical foundation of disaster risk reduction and governance research; (ii) intersectionality; (iii) polycentric and network governance and (iv) social networks, all within a social and ecological sustainability perspective.

Table 1.1: Core areas of literature for each manuscript

Chapter	Thematic focus	Body of literature
2	Principles for the consideration of intersectionality in place-based disaster risk governance in islands	Disaster risk governance Political Feminist Ecology Intersectionality Social networks (to a lesser extent)
3	Identities in disasters: experiences of gender and sexual minorities within disaster risks governance networks in Dominica	Polycentric and network governance Intersectionality Social networks
4	Towards multi-stakeholder, multilevel DRG in the Caribbean: opportunities and barriers.	Disaster risk governance Social networks Intersectionality

1.4.1. Theoretical foundations of disaster risks research

Since the 1970s, the academic literature on natural hazards and disasters was dominated by the view of disasters as single, discrete events that create "exogenous and unforeseen shocks that affect supposedly normally functioning economic systems and societies" and disrupt the societal "normal" (Lavell & Maskrey, 2014). A paper published by Berren et al., (1980) advanced a disaster typology that classified catastrophic events as originating from nature: natural hazards create "natural disasters or acts of God" that "regularly occur within specific geographic regions", specifically in "remote, primitive areas" (Berren et al., 1980). This conceptualisation cemented the vison of disasters as synonymous with people living in these "remote, primitive areas" and are usually described as low income, marginal, implied laziness, helplessness, powerlessness, living in hazard- and disease-prone areas, and even, some will argue, who suffer from "tropicality" - i.e. living in tropical parts of the world (Bankoff, 2001). These views have since then been refuted (see (O'Keefe et al., 1976); with the reconceptualization of disasters providing arguments to remove the "naturalness" out of disasters to create new perspective that appropriately internalise human factors as contributors to the making of disasters. Particularly in islands, research predominantly recognises disasters as endogenous result of colonial and post-colonial development policies (Lewis, 2009; Barclay et al., 2019), failed and unsustainable social and economic development (Lavell and Maskrey, 2014; Thomalla et al., 2015) and damaged ecosystems (Adger, Hughes, et al., 2005).

1.4.1.1. Feminist Political Ecology

The aforementioned shift regarding the conceptualisation of disasters came in the 1970s with the theory of political ecology and the politicization of human-environment interactions (O'Keefe et al., 1976; Hewitt, 1983; Bryant, 1998). This shift first occurred within the field of "Third World Studies" and occurred because of the perceived apolitical nature of existing environmental degradation and subsequent research (Bryant, 1998). A review conducted on the work of Forsyth (2002) on Critical Political Ecology discussed how alternative framings and discussions about disasters and environmental change have evolved to attempt to reflect the perspectives of different social groups, going against the perceived universality of environmental science (Frontani & Forsyth, 2005). More recently, the seemingly apolitical nature of the science presented by the Intergovernmental Panel on Climate Change (IPCC) has also been criticized for being based on Western, positivist science that seldom mentions of other ways of knowing (Kothari, 2006; Ford et al., 2016).

Political ecology draws from the concepts of ecology and political economy and recognises that environmental knowledge and politics are co-produced (Frontani & Forsyth, 2005). The field considers the interactions and struggles between social systems and ecological systems (Sultana, 2021). Further, scholars used theories of neo-Marxism to contextualise their research and incorporate place-based element into research linked to social oppression and environmental degradation (Bryant, 1998). From this perspective, scholars discredited the deterministic nature of disasters and provided arguments to remove the "naturalness" of disasters to create a new perspective that more appropriately internalise human factors as contributors to the making of disasters, beyond the existence of natural hazards. However, the term "natural disasters" is still widely used today, despite multiple social media campaigns advocating for #NoNaturalDisasters[1].

Further, this research applies a feminist political ecology lens regarding power differentials and the experience of gender and sexual minorities, as well as other marginalised groups. The difference is that while political ecology acknowledges the struggles linked to human-environment relations, it remains intertwined with colonial epistemologies, thus perpetuating uneven and unfair knowledge production practices (Sultana, 2021). Instead, feminist political ecology theory draws from post-colonial and decolonial studies, ecofeminism and feminist environmentalism to create a holistic and grounded perspective that incorporates the effect of gender, power differentials and complexities related to scale (temporal, spatial, institutional, etc.) on environmental movements and struggles (Sultana, 2021). These perspectives are a central epistemological tenet to understanding people's "everyday, embodied, and emotional" experience (Sultana, 2021) within disaster governance networks in the Commonwealth of Dominica and more widely in the Caribbean.

1.4.1.2. Climate Change Adaptation

[1] See the #NoNaturalDisaster twitter accounts (in multiple languages)

Addressing disaster risks have traditionally operated under the assumption that climate variables are constant and stable. Climate change has the capacity to exacerbate disaster occurrence by increasing the uncertainty and the variability associated with environmental factors. This, in turn, affects the vulnerability of social-ecological systems to environmental change (Mercer, 2010; IPCC, 2018). Climate change poses a significant concern for small islands social-ecological systems, impacting in various ways such as sea-level rise, increased coastal erosion, elevated air and sea temperature, shift in rainfall patterns and the intensification of tropical cyclones, among other effects (IPCC, 2007; Nurse et al., 2014). More importantly, the impact of climate change is not uniform across all islands (Nurse et al., 2014). The degree to which each island is affected depends on a complex interplay of social, cultural, political, economic, and environmental factors (Mercer, 2010; Kelman et al., 2015).

Climate change is recognized as a major driver of environmental risks, however, research related to the adaptation to its effects is usually part of different communities of research and practice from those of other disaster risks (Forino et al., 2015; Mercer, 2010). Climate change adaptation (CCA) is defined by the IPCC (2007) as "an adjustment in natural or human systems in response to actual or expected climate stimuli or their effects, which moderates harm or exploits benefit opportunities". While DRR encompasses an "all hazards" approach that deals with existing risks, CCA adopts more a "future" perspective focussing solely on climate-related risks, and with typically strong policy roots (Mercer, 2010). Further, CCA actions are usually designed under different conceptual frameworks, and are managed, funded, and implemented by different organizations and ministries (Forino et al., 2015).

In Caribbean islands, similarities between activities to reduce disaster risk and adapt to climate change impacts have highlighted the possible synergies between both adaptation and disaster risk reduction strategies. Co-benefits, including reducing stakeholder vulnerability, political recognition, convergent tools, and integration within wider development planning, have been identified (Mercer, 2010; Fanning et al., 2011). In practice, both DRR and CCA recognize the complex relationships between the various drivers of risks and promote a more holistic, integrated, transdisciplinary approach to risk (Thomalla et al., 2006; Mercer, 2010; IPCC, 2012; Forino et al., 2015;). Both concepts require dealing with uncertainty and surprise in a coherent and context-relevant way that include learning, flexibility and participation (Mercer, 2010; Djalante et al., 2011). Individuals and communities in small islands possess a wealth of knowledge based upon centuries of experience devising coping strategies and adapting to uncertainty, surprise and extremes events that benefit both climate action and can overall reduce disaster risks (Mercer, 2010; Hiwasaki et al., 2014; Kelman, 2018b). In the context of this research, CCA is considered as an integral part of DRR; with institutional arrangements and governance adopting a more forward-looking perspective that integrate both DRR and CCA within a sustainable development pathway.

1.4.1.3. Social-ecological system theory

Social-ecological systems (SES) theory is also an important tenet of this research. Similar to the human-in-nature principles embodied by Indigenous knowledge, the emergence of the social-ecological system lens provides an integrated perspective of humans-in-nature relations (Folke, 2006; Holling 1976, Folke, 2016), has changed the way social and ecological systems and their interactions are perceived, and it has also fostered an integrative and transdisciplinary way of analysing these interactions (Binder et al., 2013; Folke, 2006; Ostrom, 2009; Turner et al., 2003; Young et al., 2006). SES theory is not at the forefront of the present research; however, it is at the core of the transdisciplinary thinking of this thesis. The concept of SES is grounded in sustainability science and involves understanding the dynamic relationship between the bio-physical, socio-political, economic, and cultural components of the location-specific system at play, as well as various spatial and temporal scales along with the possible disturbances of the system (Folke, 2006; Lebel et al., 2006); Folke 2016; Folke et al. 2016). The concept of SES has been used as an integrated approach to emphasize that people, communities, economies, societies and cultures are embedded and shape ecosystems on multiple scales but are extremely dependent on the capacity of these ecosystems to sustain human development (Berkes and Folke, 1998; Folke 2016). When applied to small islands, SES theory integrates both the ecological characteristics of islands – clearly demarcated landmasses, relative remoteness to their continental counterparts, and strong interconnectedness between and land and sea ecosystems (or littorality) – and their social-cultural realities to create an island-wide holistic approach (Encontre, 1999; Jupiter et al., 2014; Kelman, 2018b, 2018a; Reuter et al., 2016). In this context, understanding disaster risk within a social-ecological system thinking involves examining the actors, their interactions, decision-making tools, and the legitimacy of their actions (Renn, 2008; Lemos and Agrawal, 2006; Forino et al., 2015). This understanding also involves exploring these interactions within the specific island context through the creation of multi-level governance systems geared toward addressing disaster risks.

As a result of its ontological and epistemological positions, this research adopts an intersectional and decolonial perspective drawn from feminist political ecology. It integrates insights from human-in-nature interactions drawn from Indigenous Knowledge perspectives and SES thinking that is particularly relevant for the study of islands. This emphasis on the interconnectedness of humans with nature aims to enhance understanding and generate new knowledge related to disasters in island contexts. However, one of the main critiques of both feminist political ecology theory and SES framework is that their descriptions and inclusion of inequalities and marginality are generic (Matyas et al., 2012). Further, they tend to downplay or erase actors' capacities and agency to act and address their vulnerabilities. This is where intersectionality can provide a more nuanced approach to vulnerability and agency.

1.4.2. Intersectionality

1.4.2.1. Gender as a starting point of intersectionality

Disasters are not neutral. Gender is increasingly taken into account in most multilateral environmental agreements: for instance, the Sendai Framework promotes gender equitable and

universally accessible DRR approaches and support activities that increase inclusion, cohesion, equity, learning and knowledge sharing (Mitchell et al., 2012; UNISDR 2015). In fact, Priority 4 reads "[…] Women and persons with disabilities should publicly lead and promote gender-equitable and universally accessible approaches during the response and reconstruction phases". In general, risk reduction policies and frameworks are designed based on addressing the greater majority and on "common sense" i.e. what is "natural" and a societally acceptable truth. These policies are based on assumptions about the characteristics of this majority. Consequently, they largely fail to recognise and cater to the needs of minorities and already marginalised groups (Gaillard et al., 2017; Gaillard et al., 2017; Yamashita et al., 2017).

Gender is a social category that is defined as a set of social relations, roles, and practices that change across time and space and that are based on biological sex (MacGregor, 2017, Chapter 1; Fletcher, 2018). More broadly, gender refers to the collection of socio-cultural characteristics used for categorising people with reference to dominant understandings of biological sex and its translation into masculinity and femininity (MacGregor, 2017, Chapter 1). Because gender is used as a means to impose social expectations and roles upon people, it has material, ideological, and discursive dimensions that affect people's experience before, during and after environmental crises (Agarwal, 2000; MacGregor, 2017, Chapter 1; Fletcher, 2018). Gender strongly influences access to material resources, privileges, and responsibilities; and more widely, who is affected by a disaster and how (Arora-Jonsson, 2011; Fletcher, 2018; Oliver-Smith & Hoffman, 2019). Even in societies where there has been a diversion from traditional gender roles cultural division on labor, in the aftermath of a hazard, there is a resurgence and reinforcement of "old gender roles" i.e. childcare and maintenance of the household, with a stricter division of labor based exclusively on gender (Agarwal, 2000; Oliver-Smith & Hoffman, 2019). In summary, gender greatly affects people's capacity to cope with current hazards and adapt to future ones.

Research has shown that gender is most commonly synonymous with "women" as a universal and homogenous category (Arora-Jonsson, 2011; Crenshaw, 1990; Fletcher, 2018; Gaillard et al., 2017). In this context, intersectionality provides the approach to widen the scope of gender studies toward a holistic construction of identities, and includes women, men, queer and trans, as well as wider definitions of masculinity and femininity.

1.4.2.2. Gender and vulnerability

The "women-centric, single-axis approach" to gender (MacGregor, 2017, Chapter 1) within climate change and disaster research has been criticized by several authors for its essentializing and oversimplification of gender, and in particular, women. While these discussions have brought to light the important inequalities that women are subjected to in their everyday lives and their impact on the making of disasters, it has also created a narrative where women's agency and capacity to act have been reduced. Specifically, the notion of vulnerability relies on oversimplified notions of gender based upon a "men/less vulnerable, women/more vulnerable" binary and focuses on cis-women and their vulnerabilities or their "virtuosity" in the face of hazards (Arora-Jonsson,

2011; Fletcher, 2018). Here, vulnerability is understood as the characteristics and circumstances of a person, community, system or asset that make it susceptible to the damaging effects of environmental (hazards or hazardous conditions) and social change (Adger, 2006; Blaikie et al., 2004; Smit & Wandel, 2006). More commonly, vulnerability is "the extent to which individuals and communities are susceptible to conditions and situations that indirectly or directly affect their well-being and prospects for sustainability" (Armitage & Plummer, 2010).

The discourse on gender in DRR, climate change and more widely development discussions shows a 'feminization of vulnerability' that reinforce a 'victimisation' rhetoric within climate change and disaster studies (Djoudi et al., 2016; Gaillard et al., 2017). In this context, vulnerability is not treated as a complex concept relying on intersecting set of social factors but as a binary phenomenon with a starting point that (cis-gendered) women are inherently helpless and vulnerable in nature (Arora-Jonsson, 2011). Thinking about women as vulnerable homogenises the experiences of people and doesn't take into consideration the various experiences and identities – or intersecting factors that influence their agency and power. More so, people's social position within a society is not the result of a single factor but the consequence of the intersections of various social characteristics and structure of oppressions such as race, age, sexuality, nationality, etc. Research suggests that using an inclusive framework that take in consideration all these factors is key to understand the differential effects of disasters and environmental change on people.

1.4.2.3. Fundamental of intersectionality

Intersectionality is grounded in Black feminist theories (Collins, 2015; Crenshaw, 1989, 1990; Jacobs, 2019) and is an analytical perspective that provides an understanding of power dynamics and interactions within a given society. The theory emerged as a critique of then feminist scholars for their unidimensional and fragmented representation of identities. These identities were reified and essentialized by creating boundaries around social constructs for by presenting unidimensional versions of black women identity (Crenshaw, 1989, 1990). Intersectionality theory helps in framing conceptualisation of identities, power and their interlinkages. Rather than one clean framework, intersectionality represents the "critical insight that race, class, gender, sexuality, ethnicity, nation, ability, and age operate not as unitary, mutually exclusive entities, but as reciprocally constructing phenomena that, in turn, shape complex social inequalities" (Collins, 2015). Intersectionality provides an understanding of the interlinkages and interconnections between the social factors, positionings and/or characteristics that shape identities, oppression and lived experiences such as race/ethnicity, Indigeneity, gender, class, sexuality, geography, age, disability/ability, migration status/nationality, religion, etc. (Hankivsky, 2014; Collins, 2015) in a given context. These interactions take place within interconnected context-specific systems and structures of power (government/religious laws and regulations) to create various systems of oppression and privileges that affect vulnerability (Osborne, 2013; Hankivsky, 2014; Collins, 2015). In simple terms, intersectionality recognises that inequalities, oppression and their associated vulnerabilities are not the result of a single factor but instead, are the consequence of

the interconnection between social factors, power relations and experiences (Crenshaw, 1989, 1990; Hankivsky, 2014).

Within disaster research, using an intersectional approach can help identify who does what, when, how, and why; and most importantly, how identities can shift depending on the social context, the scale at which this context operates and the associated roles and responsibilities this context mobilises (Fletcher, 2018; Thompson-Hall et al., 2016). Further, designing and conducting intersectionality research means recognising that social identities and inequalities are interdependent and mutually constitutive rather than independent and unidimensional (Bowleg, 2008a).

1.4.2.4. The concept of power

Power is a core feature of intersectionality: social differences in power shape both vulnerability and capacity to act, specifically in the face of environmental change (Wisner and Luce, 1993; Kaijser and Kronsell, 2014; Dunn, 2016; Fletcher, 2018). Further, feminist political ecology offers a conceptual framework to understand how social inequalities reflect the power relations that organise social spaces and societies (Osborne, 2013; MacGregor, 2017, Chapter 9). In fact, multiple forms of power structures and social positioning shape understandings and responses to environmental change and manifest along the lines of race, gender, sexuality, class and other identity characteristics (Osborne, 2013; MacGregor, 2017, Chapter 1, 2017, Chapter 9).

Power – defined in this context as the ownership of resources and the uneven capacity of different actors to control the goals, processes, information and outcomes within polycentric environmental governance processes (Wisner & Luce, 1993; Morrison et al., 2019)– is often seen as a negative, exogenous factor that limits the effectiveness of DRR actions due to established social and economic inequities, cultural biases and political injustice (Blaikie et al., 2004). Most of the discourse revolves around "power over", the negative way power is used to maintain inequities and status quos. However, power can also be used as a process for empowerment (of individuals and groups) through the co-creation of new epistemologies (Gaventa & Cornwall, 2006; Raik et al., 2008; Morrison et al., 2019; Vallet et al., 2020). These types of power, i.e. "power within" and "power with", create the conditions for reflection or actions, or "power to" (i.e. Gaventa & Cornwall, 2006). These types of power apply through different modes of exercise (i.e. coercion, constraints, financial reward, institutional authority, ideological influence) and through various relationships patterns (i.e. dependence, competition, antagonism) (Raik et al., 2008; Morrison et al., 2019).

Power is an inherent characteristic of social-ecological systems and a key focus of feminist political ecology scholarship that goes beyond single social identities (MacGregor, 2017, Chapter 9; Vallet et al., 2020). Power dynamics originate from complex social systems and connections among individuals that influence epistemologies, determine access to information and resources, and shape the availability of options and choices (Djoudi et al., 2016; Vallet et al., 2020). With the design and application of adaptation and risk reductions pathways highly dependent on power

relations and power asymmetries – the uneven distribution of the multiple nodes of exercising power among actors (Morrison et al., 2017; Vallet et al., 2020), these connections can be examined and visually depicted using Social Network Analysis (see section 1.4.4. et 1.5.3). Further, looking at power relations through an intersectional lens implies looking at the societal structures of constraint – structures that are in place to create asymmetries regarding access and control of resources to part the society. These structures are often hidden within local customs, laws and culture (see chapter 2). In fact, looking at the current structures of power can provide some insights about (i) cross-scale power dynamics and (ii) their effect on DRG networks, especially in term of identities and network positions. In this context, reconceptualizing networks as a reflection of levels of marginalization and power asymmetries in a given context can provide an understanding of the power dynamics at play, whose values and knowledge are represented, their influence and domination as well as the scope and scale of these governance processes in supporting or hindering DRG processes.

1.4.3. Polycentric and network governance

There is a broad consensus in the disaster literature that people play a central role in devising ways to address disaster risks (Blackburn, 2014; Blaikie et al., 2004; Grove, 2013; Tierney, 2012). While the role of national governments in small islands is also important especially in disaster risk reduction programming, communities can generally pinpoint issues and identify solutions when they are needed (Hiwasaki et al., 2014; Veland et al., 2013). Disasters, and more widely large-scale environmental change, do not fit perfectly within the purview of any government or institutional body. In fact, public entities cannot perform all functions pre, during, and post-disasters as addressing disaster risk goes beyond the usual government function of legislation, regulation and planning (Tierney, 2012). Instead, national governments may rely on processes that include new forms of collaboration using not only state laws and regulations, but also market-based mechanisms (e.g., public-private partnerships) and self-regulation through public participation and engagement (Tierney, 2012).

Ideally, addressing complex social-ecological problems such as disasters requires input from both state and non-state actors such as public and private institutions operating at various jurisdictional scales, through a participatory and deliberative process (Armitage & Plummer, 2010; Djalante et al., 2011; Lemos & Agrawal, 2006; Tierney, 2012). This is done to various degrees, which vastly depend on the level of institutional centralisation or decentralisation. Here, centralised governance theories are based on "unitary strong centralised governments, state elitism and top-down decision making" (Kim, 2006). In contrast, decentralised governance processes are a direct challenge to centralised governance models, giving way to co-production, networks, collaboration and more bottom-up approaches (Kim, 2006; Lemos & Agrawal, 2006; Djalante et al., 2011; Zwitter & Hazenberg, 2020). The definition of governance used in this research stems from Rhodes (1996), who defines governance as self-organizing, inter-organizational networks that complement markets and hierarchies as governing structures for authoritatively allocating resources and exercising control and coordination (Rhodes, 1996). However, because this research focuses

mainly on governance networks, the definition of governance provided by Torfing (2005) encompasses the various aspects within which networks influence actions that address disaster risks. Here, "governance" represents "(i) relatively stable horizontal articulations of interdependent, but operationally autonomous actors who (ii) interact with one another through negotiations which (iii) take place within a regulative, normative, cognitive and imaginary framework that is (iv) self-regulating within limits set by external forces and which (v) contributes to the production of public purpose" (Torfing, 2005).

Within disaster scholarship, governance typically promotes collaborative, participatory and decentralized decision-making processes that devolve power to multi-stakeholder groups within flexible, adaptive, multi-levels arrangements as a way to address complex social-ecological problems more effectively (Djalante et al., 2011) in contrast to more common command- and-control types of governance (table 1.2). Multiple groups are involved in the process at various stages and scales; the way they design and implement DRR measures are governed by the institutions they are part of, the arrangements in place to do so, and also the socio-cultural and political context within which they are implementing these measures in response to the hazard(s) they are facing. These processes are shaped by the governance regimes – or network of collaborating entities – that determine how, when, and who is involved. While these governance approaches are not new, they offer significant potential as they aim to provide a voice to the "governed" through a variety of social norms and interactions that can potentially challenge power asymmetries, market mechanisms and other social engagement processes such as participation, coordination, collaboration, negotiation as well as different types of power typologies to facilitate collective decision making and action (Hinds, 2019, chap.3; Tierney, 2012).

Collaborative, shared governance regimes can take various forms, from national government 'upwards' to international institutions, 'downwards' to regional and local tiers of authority (through decentralisation and polycentricity), and 'outwards' to a range of non-state actors and private sector stakeholders, through networks (Ahrens & Rudolph, 2006; Jones et al., 2014; Aysan and Lavell, 2014) (see table 1.2 for summary of the different type of governance applied to disasters). Originally, decentralisation and local empowerment were promoted by development assistance actors to compensate for a lack of public funding and to address the disconnect in terms of participation and ownership between national investments and local actions (Chandler, 2012; Lavell & Maskrey, 2014).The paradigm shift toward a redistribution of power that aims to address power asymmetries – in a system of shared governance – follows repeated calls for empirical cross-scale, as a policy tool and an example of good governance, alongside participation, rule of law, transparency, responsiveness, consensus orientation, equity, effectiveness, efficiency, accountability, and strategic vision in regard to disaster risk reduction (UNDP 2004; Aysan and Lavell, 2014). This type of governance is often promoted as a key policy modification to identify and address the underlying roots of vulnerability and power asymmetries, especially by foreign aid agencies involved in disaster response (Blackburn, 2014). Moreover, rather than the sole sharing of authority, cross-level interactions, collaboration, and cooperation are required for

decentralisation to be successful (Adger, Brown, et al., 2005; Marks & Lebel, 2016). Polycentricism allows for institutional interactions to improve the diversity of responses and stimulate collaboration and can be viewed as decentralisation with coordination (Folke et al., 2005; Marks & Lebel, 2016).

Although decentralisation, polycentricity, and collaboration have been promoted as key governance models to address disaster risks, they are not effective if the resulting institutions are without adequate, organised networks, funding, human capacity, trust, power and recognition by the central government (Djalante et al., 2011). Decentralisation by itself does not guarantee better collaboration, efficiency and success but can offer an enabling environment and space for flexibility and innovation. Further, decentralisation does not erase the need for accountability and responsibility and for better coordination across administrative levels (Folke et al., 2005; Marks & Lebel, 2016). This is especially relevant for existing bureaucracies, which in the case of formal networks (Folke et al., 2005), which can translate into political trust, legitimacy and reputation; but also, for the informal ones whose flexibility, accountability and relevance can be translated in terms of social trust and cohesion. Formal and informal networks often co-exist in small islands settings (Duda, 2020). While only limited information is currently available on formal vs informal disaster networks, existing literature indicates that informal disaster networks emphasise closeness, interpersonal connections and can bridge power differentials (Kapucu & Demiroz, 2017; Duda, 2020). Understanding who the actors are and why they are involved in formal or informal DRG network not only speaks the relative power of these actors but can also help conceptualises the drivers and far-reaching ramifications of these networks.

Understanding governance processes through networks of collaborating and diverse people and institutions provides a means of addressing "wicked" problems: whether they are formal or informal, networks are flexible, adaptable, span across multiple scales and capable of mobilizing diverse resources and knowledge (Tierney, 2012; Kapucu & Demiroz, 2017; Faas & Jones, 2017). Governance, and specifically network governance theories can provide an understanding of the actors and their interactions in relation to the state of the resources, highlight potential barriers to participation and potentially enable evidence-based change. When applied to disaster research, network governance critiques the assumption that risk reduction outcomes simply emerge as the sum of effort of the people and institutions (e.g. as implied by organisations such as UNDRR); rather, network governance embodies the embeddedness of the co-existing actors and institutions within networks to improve the delivery of goods and or information to meet policy and risk reduction goals (Jones et al. 1997, Stoker 2006, and Crawford 2006). These dynamics are further shaped by power differentials that relates to actors' positions and identities with these networks (see for instance Crona & Bodin, 2010 and Vallet et al., 2020 when discussed within wider environmental governance) and well suited to be analysed through an intersectional lens. As a result, network governance theories appear to be well suited to the investigation of disaster risk governance arrangements (Tierney, 2012). Considering the wide range of governance

arrangements and capacities and gaps occurring in the Caribbean, these approaches are particularly relevant for place-based-contextual research on systemic risks.

Type of governance	Definition	Attributes	Advantages for addressing disaster risks	Disadvantages	References
Command-and-control	"Indicate a problematically large degree of authoritative centralization and control in a governance system, rather than a particular type of policy instrument (e.g., regulations instead of incentive-based instruments)" (Cox, 2016)	• Hierarchical mode of governance • Centralised body of decision-making	• Centralised planning and response • Set standards and regulation for cooperation – this can be particularly important for the coordination of humanitarian aid organisations for instance • Clearly defined roles and responsibilities lead to a strong accountability and responsibility from actors and institutions in charge.	• Analytical simplification of the problem and promotion of "Top-down, technocratic governance of social and ecological systems" (Cox, 2016) • Currently the preferred mode of governance for DRR activities as it focuses mainly on disaster response and technical/structural fixes • Disconnection from local context and centralisation of power • Rigid structures, not well equipped to deal with uncertainty and surprise	(Cox, 2016; Lavell & Maskrey, 2014)
Polycentric governance	"Complex form of governance with multiple centers of decision making, each of which operates with some degree of autonomy" (Carlisle and Gruby, 2019)	• Mostly self-governance processes but with various degrees of co-governance characteristics • Autonomous units of decision making independent from one another	• Promote organisational learning and adaptive capacity to address change • Internalise multiple goals for collaboration • Recognise human interest and values within complex SES	• Degrees of autonomy depends on the context and needs • Vulnerable to power unbalances which can affect the type of solution that are devised and their implementation strategy and their successes	(Blomquist, 2009; Carlisle & Gruby, 2019; Folke et al., 2005; Morrison et al., 2019; Ostrom, 1990, 2005, 2010)

		• Implemented through processes of collaboration, competition, conflicts and conflict resolution • In some smaller settings, networks (formal or informal) can provide guidance to governing bodies • Multiple overlapping processes at various scales: redundancy	• Redundancy can help mitigate risks of institutional failure • Focus on nested institutions, their scales of action (multilevel and cross-scale) and the type of collective action (polycentric) • Decentralisation with power	• Devolution of responsibilities can make difficult to create strong accountability among decision-makers.	
Network governance	"Decentralized and self-organized mode of governance where multiple state and non-state actors collaborate and coordinate in the face of shared challenges" (Pittman and Armitage, 2019)	• Related polycentric governance: network governance relates to a horizontal devolution of power while polycentric governance refers to a vertical devolution of power • Mostly co-governance processes but can exhibit characteristics of self-governance • The structural characteristics of a network (size, composition, etc.) have an impact on the	• Promote collective learning to address complexities, uncertainties and surprise • Foundations in dynamic collaborative processes: different groups in society, from governments to individuals and organisation – collectively make decisions on disaster risks • Leverage of actors with their values, perspective, knowledge and capacities	• Reliance on informal networks can result in ad hoc decision making and actor homogenisation, that in turn, decrease adaptive capacity • Network can create a democratic vacuum with low responsibly, transparency and accountability from actors • Power is central to the composition and effectiveness of networks, creating a potential issue with equitable access to and sharing information	(Ansell & Gash, 2007; Carlisle & Gruby, 2019; Folke et al., 2005; Hysing & Lundberg, 2016; Klijn & Koppenjan, 2012; Morrison et al., 2019; Newig et al., 2010; Pittman & Armitage, 2019; Renn, 2008; Rhodes, 1996; Swyngedouw, 2004a; Torfing, 2005)

	learning capabilities of the system • Defined by the boundaries and its actors • Situated between market and hierarchies • Displays both formal and informal components	• No well-defined boundaries or actors • Uncertain and unpredictable system dynamics linked to the variety and movement of actors involved in the processes

Table 1.2. Selected governance theories applied to disaster risks.

1.4.4. Social networks

Social networks are an important part of addressing disaster risk and this research has helped characterise the governance processes and collaborative forums involved in reducing risks, specifically in Dominica. Networks are collaborative arrangements that reflect vertical or horizontal organizational patterns of exchange, involving independent flows of resources and knowledge as well as reciprocal lines of communication. These patterns are shaped by social mechanisms, power relations, and the size and strength of relationships, among others (Powell, 1990; Jones et al., 1997).

Understanding local governance dynamics of these various centres requires a comprehensive assessment of social governance networks (Gall et al. 2014). Theoretically, social networks are typically used for the study of two types of social-ecological interactions: (i) as an analytical concept that summarises researcher-perceived patterns of relationships or interactions between various components of a given systems and (ii) as a way to quantitatively measure these patterns or relationships and interactions and more widely and quantitatively assess the complexity and degree of change within these networks (Janssen et al., 2006; Jones & Faas, 2017). This research addresses both aspects by exploring disaster networks across the island of Dominica (see chapter 4).

The analysis of networks can provide an understanding of the various degrees to which actors understand disaster risks, collaborate, communicate, and coordinate action and identify the gaps, strengths and weaknesses of local governance systems. Social networks do not exist in a vacuum but are part of a messy web of collaboration and relationships that can reveal the various actors involved in disaster response, and what kinds of tension or conflicts could arise from varied interests (Maldonado, 2017). In addition, several institutional governance barriers have been identified by Cashman (2017) and Hinds (2019): these barriers range from fragmented but centralized bureaucracies, to top-down, paternalistic governance processes with authoritarian tendencies that remain an important feature of the Caribbean Region. Despite these issues, these institutional arrangements are not static; they evolve over space and time, are contextually dependent on political, social, and economic factors and are infused with power and cultural values (Forino et al., 2015; Ishiwatari, 2013).

In this context, examining social networks implies looking at the broader picture of risk, in term of the problem-solving capacity of each actor, their norms, power, values and perspectives, behaviours, and the challenges and formal or informal pathways within which they operate to achieve their goals (Renn, 2008; Forino et al., 2015). Networks provide a structural representation of actors' individual power and overall system's power asymmetries as an actor (or group of actors)' position (or absence) within a given network can provide some important insights on these power dynamics. This process will provide some insights regarding the potential strengths and limitations of said networks to address DRG issues in small islands contexts.

1.4.5. Intersectional disaster risk governance through networks: a conceptual framework

Figure 1.1. illustrates the conceptual framework guiding this research, with individuals and their characteristics ("bodies") at the centre of the framework (as the core component of networks and overall DRG processes).

Framing disaster risk governance within a broader island-wide social-ecological system paradigm can be helpful to address entrenched complexities and uncertainties, but more importantly, it can reveal the gaps in current governance systems. This framework will internalise the existence of cross-systems disaster risks (spatially and temporally), intersectional factors and power dynamics. Networks operate at various governance scales (temporal, spatial, jurisdictional etc.); each node represents a center of power (an individual/organisation). Each one of these nodes is located within its own systems which is affected by natural hazards and incorporates the social and societal determinants of risk in Caribbean islands. It is important to note that the island-wide social-ecological system processes and power differentials between and within each intersectional factor are only represented here at the individual level. However, they also impact the wider DRG networks. The context-dependency and place-based nature of identity and power is at the core of intersectionality. Here, intersectionality is intended as a mean to account for the values, power dynamics, and identities within these governance structures, enabling the identification of patterns related to marginality and inclusion. People are shaped by their simultaneous membership to multiple, intertwined social categories that, within a context of interconnected systems and structures of power, translates into membership or exclusion from various social networks. In simple terms, DRG networks can provide an understanding of who is doing what, with whom, with the support of whom and where.

The resulting framework represents an intersectional island-wide, place-based system that incorporates the social and historical determinants of identities, the effect of natural hazards and incorporates the complex linkage between and within social and ecological systems to create inclusive disaster risk governance processes, within a social-ecological sustainability pathway. This framework can be applied at various governance scales: at individual levels, it provides an understanding of trust and marginalisation within social networks and the position of these actors within these networks; at island levels, it provides some insights on the formal and informal characteristics of DRG networks occurring in Dominica.

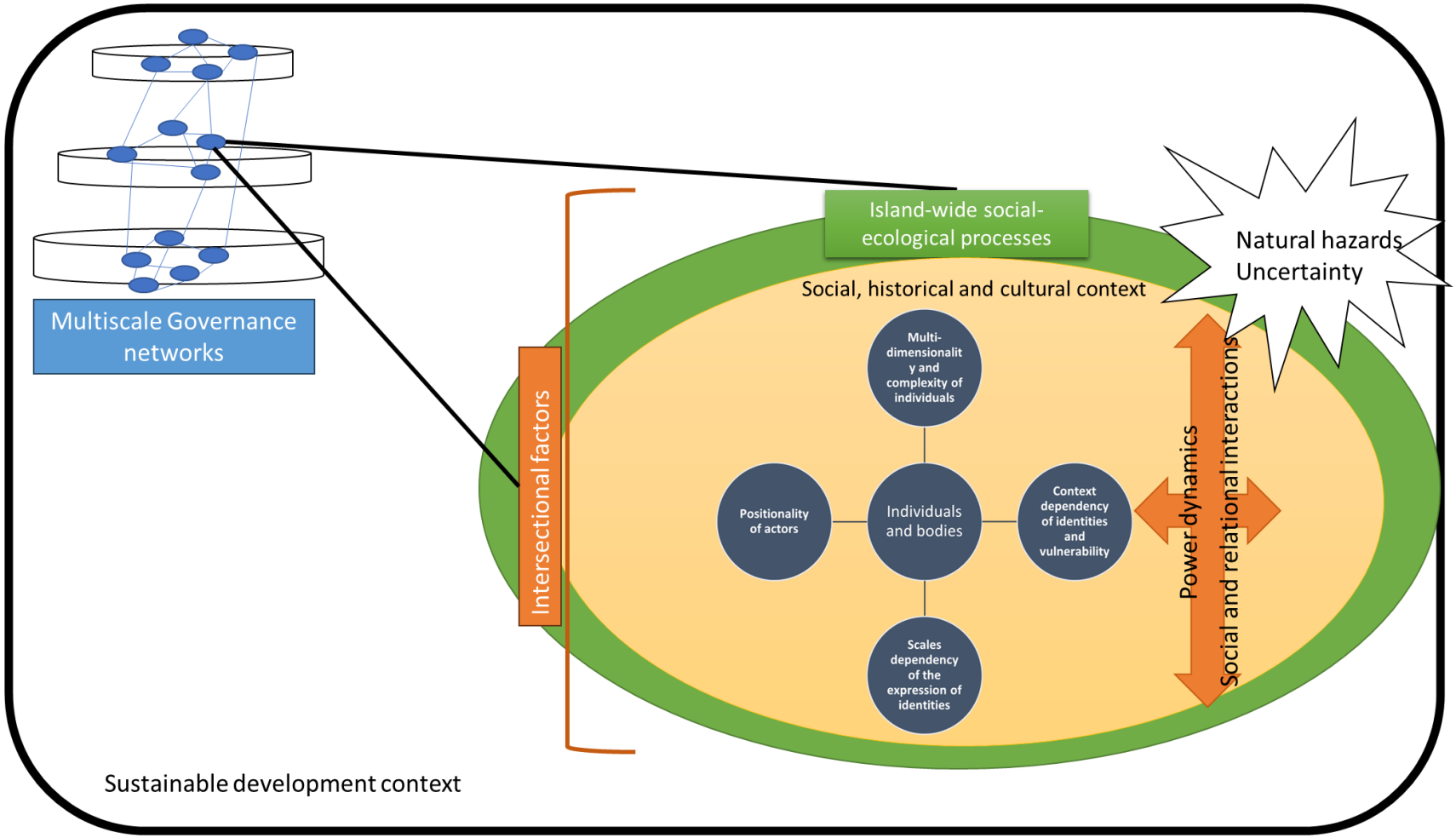

Figure 1.1.: Conceptual framework of the present research.

1.5. Methodology

Hazards become disasters partly as a result of relational patterns in societies – how people and institutions coordinate, collaborate or hinder each other before, during and after disasters (Jones & Faas, 2017). Therefore, social network analysis is a robust tool to investigate patterns of relationships and interactions within social-ecological systems (Jones & Faas, 2017).

This methodology section describes the "logic, potentialities, and limitations of research methods" (Grix, 2002). Both the ontological, epistemological and decolonial position of this research are explained within this section. Further, this research uses a mixed-methods approach in its design, with the adoption of both qualitative and quantitative methods (section 1.5.3.). Each manuscript chapter has its own methods section; this methodology provides a general overview of the research design as well as data collection analysis, validity and limitations.

1.5.1. Philosophical foundations

The research process relies on five interconnected but independent building blocks: ontology, epistemology, methodology, methods and sources (Grix, 2002) (see table 1.1 for summary). Ontology is the starting point of the research and refers to the social reality upon which the overall research is based on and what needs to be investigated (Grix, 2002; Walliman, 2015). The ontological position of this research is that of a constructivist perspective which puts social actors' interactions at the core of the studied social phenomena (Bryman, 2001; Grix, 2002; Walliman, 2015). The assumptions underpinning the researcher's ontological position was presented in sections 1.1. Research context and justification and 1.2 Problem rationale. This position is justified by the social and ecological dimensions of disasters : while the study of hazards falls within objectivism (the reality is independent from social actors), the making of disasters cannot be separated from their social context (Lupton, 2012). A social constructivist approach within the study of disasters argues that socio-cultural knowledge as well as belief systems and moral positions are at the core of the very definition of what constitutes a disaster (Lupton, 2012).

Research building blocks	Researcher's position	Corresponding sections
Ontology	Social constructivist approach	1.1. Research Context and justification and 1.2. Problem rationale
Epistemology	Postpositivist research paradigm	Positionality Statement Section 1.4. Theoretical foundations and literature review
Methodology	Mixed method approach (qualitative and quantitative) with case studies	Section 1.5
Methods	Comprehensive literature review Sociometric surveys	Section 1.5.3

	Semi-structured interviews Online survey	
Sources	Data collected from case studies. Literature review	Throughout the research

Table 1.3. Summary of the researcher's philosophical positions for the present research

Epistemology, one of the central tenets of philosophy, underpins the knowledge framework for this research, delving into the ways we acquire understanding of a given phenomenon (Walliman, 2015). The two main contrasting epistemological positions are represented by the perspectives of 'positivism' and 'interpretivism' (Grix, 2002). Here, positivism advocates "the application of the methods of the natural sciences to the study of social reality and beyond" while interpretivism recognise "the differences between people and the objects of the natural sciences and therefore requires the social scientist to grasp the subjective meaning of social action" (Bryman, 2000, cited in Grix, 2002). In addition, while positivism strives for robust validity and reliability through qualitative evidence, it may overlook the fact that human experience often diverges from strictly quantitative methods of data collection and analysis (Fox, 2008; Walliman, 2015). Post-positivism denotes a departure from strict positivist perspectives and embraces a broader spectrum of non-positivist approaches, including interpretivist/constructivist orientations; thus, aligning more closely to the constructivist ontological position of this research. Post-positivism recognises that knowledge remain a social construct and incorporates approaches to knowledge growth in its application (Fox, 2008).

In the context of disaster research, there is an epistemological uncertainty where an individual's response to disasters is subject to a "subjectivist interpretation within a realist paradigm" (Bradbury, 1989, cited in Lupton, 2012). Further, the very definition of disasters is determined by the impact of a hazard (natural phenomenon) on a specific social, economic, political and historical context. This reality result in research that further acknowledges its grounding within the realm of social-ecological system thinking and therefore is at the convergence of post-positivism and interpretivism. This position (i) incorporates approaches to knowledge growth and acknowledge the importance of context and contingency in knowledge production (Fox, 2008); (ii) further acknowledges the role of the researcher through their positionality and reflexivity in shaping the research practice (Fox, 2008; Hill et al., 2023) and (iii) recognises that the study of social networks is inherently subjective and might not represent accurately and objectively Dominica's social and political system. This does not imply bias but rather that there is an active reflection from the scholar to identify their biases and assumptions (see section on Positionality statement).

1.5.2. Conducting decolonial research

Given the current global environmental crises and the widespread injustices faced today by some communities and groups of people, there has been growing calls to pluralise epistemologies and to challenge current siloed research practices (Sultana, 2021). Further, research in the fields of

social and ecological system and governance intends to address problems that cannot be solved through conventional and traditional disciplinary approaches alone. Transdisciplinarity – the process of collaborating with various stakeholders: from scientists to non-academic actors such as civil society organisations, government and the private sector (Lang et al., 2012) – emerges as a way to frame the problem and design suitable solution options from the perspective and with input from these stakeholders. In this context, disaster risk governance becomes "a vehicle for the sustainable and equitable management of land and water resources, energy efficient building, and similar development choices rather than a technocratic vehicle focused on reducing losses" (Lavell & Maskrey, 2014).

More recently, transdisciplinary research has shifted to adopt more engaged forms of practices, highlighting issues of power, equity, and decoloniality (Sultana, 2007; Zanotti et al. 2020,). Here, decoloniality is part of the epistemological decolonisation process – or a reflection on who holds the knowledge and who decides what type of knowledge is recognized as valid (Ndlovu-Gatsheni, 2013; Trisos et al., 2021). Hence, in addition to the ontological, epistemological, and methodological stances described in the previous section (see section 1.1), the research also aimed to incorporate decolonised research practices.

The praxis implemented in this research was developed following a three-step process developed by Hill et al. (2023), that facilitated a reflection of the researcher's positionality and privileges within the research process, induced an exploration of the meaning of decolonisation within the current research, and the identification of ways to apply these understandings within the subsequent manuscripts. Further, the current research has attempted to move beyond academic and disciplinary boundaries into research that encouraged and emphasised the active involvement of local participants throughout the research process (see chapter 3 and chapter 4 respectively).

Finally, using intersectional principles, this research has attempted to highlight and challenge dominant rationalities about disaster, people, and islands in the Caribbean. The conclusion section of the present thesis will discuss this outcome, the linked opportunities, and barriers. The end goal is research that supports a paradigm shift, from research that is generalising, contextualized and reductionist (Wickson et al., 2006) to research that is place-based, context-specific and culturally appropriate; but is also decolonised in nature.

1.5.3. Methods

1.5.3.1. Research design

To answer the research questions and objectives, this research focused on the analysis of social networks through the use of a mixed methods approach. To do so, the research utilised a two-pronged approach through a comprehensive literature review and a case study. More details are provided below. The research was conducted in one study site (one county) and included four sub-national cases studies for comparative purposes, as described by Yin (2003). The use of case study research provides an overview of the overall risk reduction processes through the investigation of a few in-depth, detailed studies (Neuman, 2014). The case study method helps to explore "a real-

life, contemporary bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information." (Creswell, 1998; 2013). As per the guidelines provided by Neuman (2007; 2014), three important factors have to be considered when selecting field research sites: (i) the richness of the data, specifically in terms of important social relations, a variety of activities, and diverse events over time; (ii) the unfamiliarity of site to avoid biases and (iii) the suitability of the research site for the type of investigation that will be conducted. Meeting all these criteria, this research was conducted in the Commonwealth of Dominica.

1.5.3.2. Research sites

The island of Dominica occupies an area of about 750 km^2; its capital city is Roseau. The island is located on the northern part of the Windward Islands groups. It is a highly mountainous island, with about 70% of its total land area unsuitable for modern agriculture, primarily due to the risk of sheet erosion or waterlogging (Burke & Lovell, 2000; Barclay et al., 2019). Like most small island states globally, Dominica faces multiple natural hazards, including hurricanes, the most recent ones being hurricanes Maria and Irma in 2017, earthquakes and volcanic eruptions (with five active volcanoes). Dominica is also subjected to intense rainfall, erosion and slope instability, and possible storm surges and tsunamis (Wilkinson et al., 2016; Barclay et al., 2019). There have been several government-led initiatives to mainstream disaster risk reduction (DRR) within policies and institutional frameworks such as the National Resilience Development Strategy 2030 (NRDS) of 2018, the Climate Resilience Act (2018) (and the creation of the Climate Resilience Execution Agency (CREAD)) and the Dominica Climate Resilience and Recovery Plan (CRRP) of 2020. Finally, Dominica markets itself as one of the most stable and 'green' countries in the Caribbean, making it a data-rich environment and suitable site for research.

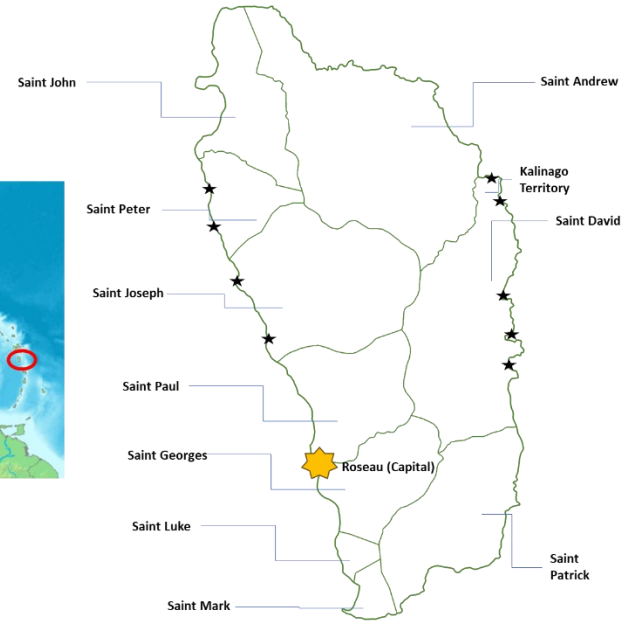

Figure 1.2: Map showing the ten parishes of Dominica. Black stars indicate data collection sites. Insert: localisation of Dominica within the wider Caribbean (Base maps adapted from ©Wikimedia Commons; ©Demis map server)

For the research, four data collection sites were selected around the island: the Kalinago Territory; Saint David (Castle Bruce and around); Saint Joseph (St Joseph, Mero and around) and Saint Peter (see figure 1.2 for details). Since Dominica's economy is mainly based on agriculture with fishing and farming contributing to more than 20% of the country's GDP (PDNA, 2018), fisherfolks and farmers represent a key demographic to understand disaster risk on the island. As a result, the data sites were selected following the recommendations of the Ministry of Agriculture, Fisheries, Blue and Green Economy, and from the vulnerability analysis conducted by Pinnegar et al., (2019) (as per figure 1.2). Areas with the highest vulnerabilities (>0.5) from a fisheries perspective were selected; the final data collection locations were chosen to also include the Kalinago Territory as they are a key stakeholder group in the country.

1.5.3.3. Data collection

Both qualitative and quantitative data were collected; the data collection techniques and strategies used in this research are presented below.

a. Comprehensive literature review

A comprehensive literature review was conducted to collect and generate secondary and historical data that fed into the design of the analytical framework and address the theoretical objective: to develop an integrated framework for the consideration of intersectionality in place-based disaster risk governance in islands. The comprehensive literature review is presented in section 1.4 of the present chapter. The review involved both peer-reviewed articles and relevant international/regional/national/local policies, plans, technical reports and projects documents in English, French and French-based Antillean Créole. Considering that oral history is an important aspect of Caribbean history, oral storytelling and local personal experiences were also taken in consideration. Peer-reviewed articles were analysed under the themes of (i) DRR theory, (ii) intersectionality and identities (iii) Small islands social ecological systems, (iv) network governance and (v) social networks. In addition, documents such as policy reports, government statistics and reports, UN and non-profit organisations reports (national, Caribbean-wide and overall small islands literature on DRG), and any other documents that my research partner and supervisors recommended. This literature review has provided the background for all my research questions and objectives.

b. Sociometric surveys

Sociometric surveys are data collection tools that provide the basis for a quantitative measurement of structures, dynamics, and interpersonal relationships within social groups and allow for the structural analysis to empirically establish the leadership of a social network (Wasserman & Faust, 1994). These surveys asked respondents to identify the presence and nature of their relational ties

associated with DRR formal and informal institutions as well as their information sources. Sociometric questionnaires were developed, built into and administered at the same time as the semi-structured interviews between April and December 2021. Several delays occurred due to COVID-19 outbreaks; data collection was paused for about 3 months between September and December 2021 for the security of the local research assistants.

At both national and local levels, the surveys targeted the individuals, local actors, formal and informal organisations, and agencies affiliated with the governance of disaster risks. Table 6.1 in appendix 4 provides an overview of sample used for the analysis. The survey focused on fisherfolks and farmers with a particular emphasis on people with other intersecting social characteristics such as sex, indigenous affiliation, migration status, and sexuality. The surveys were conduced in English and French-based Antillean Créole, depending on the choice of the participant. The questionnaires employed a name generator technique, asking participants to list individuals with various relational ties (e.g. knowledge exchange, collaboration) (Marsden 2011). Name interpreter questions were also used to elicit responses on the nature of the ties (e.g. frequency, directionality, strength) and capture stronger ties, trust, and power relations. The surveys were developed and administered to 30 local stakeholders within each sub-national location (total n=120 surveys) to capture both local and national networks. This type of surveys provided insights into the network's characteristics (research question 2) and the influence of social relations (research question 3 and 4). This survey also provided additional understanding on the quality of actor interactions, explored DRG practices, and identified perceived barriers to system effectiveness and areas for action and/or improvement.

c. Semi-structured key informant interviews

In order to approach and engage with a wide range of different stakeholders, the researcher conducted semi-structured interviews with national and international key stakeholders operating in the wider Caribbean Region. The semi-structured interviews covered the necessary themes or topics as listed below, while remaining flexible toward issues and topics raised by the participants (Yin, 2003). An interview guide was developed to ensure consistency between interviews, for validity (see appendix 2) and reliability. In this context, the interview guide was developed to foster a conversation, a narrative, clarify a context and build a relationship, and allow flexibility for a discussion (Kvale, 1996).The surveys were conducted using open-ended questions on the following topics: (i) links to national and regional governance structures; (ii) roles and responsibilities within national and regional disaster governance structures; (iii) initiatives, projects, strategies and general involvement with the studied communities; (iv) effectiveness and outcomes of these activities, and (v) discuss any results that emerged from the sociometric surveys. These sociometric surveys were used to gain in-depth information on individual, national and international perceptions of local governance structures. They represent one of the ways researchers engage people to discuss about their lives (Blee and Taylor, 2002). The semi-structured interviews were conducted mainly via zoom; they were recorded with consent from the interviewee and transcribed with Otter.ai when conducted in English. In order to respect the official langue of

the Kalinago People, interviews with the members of the Kalinago Council were conducted in French-based Antillean Créole and transcribed by the researcher. Ten (10) interviews were conducted, ranging from the United Nations Development Programme (UNDP) (2 people), the Organisation of Eastern Caribbean States (OECS), the Caribbean Disaster Emergency Management Agency (CDEMA), the Climate Resilience Execution Agency for Dominica (CREAD), the Dominica Red Cross, Kalinago Council, The Ministry of Agriculture, Fisheries Blue and Green Economy (2 people), the Office of Disaster Management and the Minority Rights Dominica (MiRiDom) organisation.

d. Online survey

An online survey was conducted, targeting specifically gender and sexual minorities (LBGTQ+ groups) in the Caribbean to understand their involvement within disaster governance processes in the region. In order to protect the anonymity of respondents, it was agreed that an online survey will be used. The online survey was created on the platform Qualtrics and was disseminated by social media platforms (Instagram, Facebook, Snapchat) and local formal and informal LGBTQ+ organisations' WhatsApp groups. The survey (n=38, table 1.4) was conducted to elicit insights specifically from GSM in Dominica (n=17) mainly and the Caribbean Region more widely (n=11) to understand their involvement within disaster governance processes in the region. The survey was developed similarly to the sociometric survey, adapted to online data collection and translated in French, English and Spanish. The survey questions and invitation poster are available in appendix 2 (in English and French).

Table 1.4: Online Sample overview (account for only the respondents who answered demographic questions (about 70% of respondents)

Category	Responses	Number of respondents
Sex assigned at birth	Male	19
	Female	7
	Unknown	1
Locations	Dominica	17
	Guadeloupe	5
	Montserrat	1
	Other	5
Sexual orientation	Lesbian/woman who has slept with women	3
	Gay/ man who has slept with men	9
	Queer	1
	Bisexual	7
	No label/Unknown	5

1.5.3.4. COVID-19 considerations

Due to the restrictions associated with the current COVID-19 pandemic, all data was collected using a combination of phone interviews, WhatsApp discussions and Zoom meetings, and with the help of locally recruited research assistants for in-person data collection with local community members. The research was paused between September and December 2021 due to COVD-19 outbreaks in the targeted communities. In addition, focus group discussions could not be conducted as group gatherings were prohibited. Since local communities do not use online communication tools apart from phone and social media, it was agreed that no group discussion would be conducted during the research.

1.5.3.5. Ethical considerations

As this research engaged with human participants, specific ethical considerations are necessary. This research is funded by the Social Sciences and Humanities Research Council of Canada (SSHRC) and by the International Development Research Centre (IDRC). Therefore, the researcher ensured compliance with the ethical guidelines provided by the Tri-Council Policy Statement on Ethical Conduct for Research Involving Humans (TCPS 2)[2]. The TCPS 2 requires that researchers and their institutions funded by any of the three federal research agencies – the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council of Canada (NSERC), and the Social Sciences and Humanities Research Council of Canada (SSHRC) to apply the ethical principles for the conduct of research involving human research participants. This research also received formal ethics clearance from Office of Research Ethics at the University of Waterloo (ORE# 42692).

In addition, the present research complied with the research protocols provided by the Commonwealth of Dominica's Ministry of Blue and Green Economy, Agriculture and National Food Security regarding data collection, consent from the communities, and confidentiality in the surveys and overall interactions. Special attention was given to maintaining anonymity and confidentiality of research participants as some of them identified as gender and sexual minorities.

1.5.3.6. Data validity

Targeted communities experienced a "survey fatigue" due to the volume of surveys and projects that were implemented in the country in the aftermath of Hurricane Maria in 2017. As a result, the number of women willing to respond and participate in the research was low (consisting of 30% of the total respondents). In addition, there is a general distrust of government officials throughout the island which was particularly apparent in the selected areas for data collection. Despite the researcher's ties to the island and the help of local research assistants for the data collection process, many members of the communities were reluctant to participate in the research and share information about their networks.

Finally, due to the status of gender and sexual minorities in the country, it was not possible to openly ask about the sexual orientation of community respondents for the analysis conducted in

[2] For more information, please consult https://ethics.gc.ca/eng/tcps2-eptc2_2022_introduction.html.

Chapter 3. Instead, in addition to the online survey, other questions were used within the sociometric surveys to provide an intersectional understanding of identities within DRG processes in the island. These questions included people's trust in disaster information coming from people involved (allegedly or not) in same-sex relationships, or with different gender identities, ethnicity, religion migration status and political affiliation within a given community. Further, respondents were asked freely to answer questions about their sex and gender identities, rather than answering predetermined questions.

As a result, and coupled with the COVID-19 limitations, data emerging from the surveys do not accurately represent the entire disaster risk governance system present in Dominica. Despite these issues, results from the sociometric interviews were further validated during discussions with the key interviewees. Specifically, discussions with key informants have led to adjusting the line of questioning during sociometric interviews by (i) using "traditional" demographic questions and (ii) measuring actors trust in information emerging from people who share specific identities such as gender, ethnicity, migration status, religion, sexual orientation, and political affiliation.

1.5.3.7. Data analysis

a. Qualitative analysis

Conducting intersectionality research is an analytical challenge. Typically, data collection is designed to collect independent and unidimensional identity data while intersectionality, by definition, integrates the notion that identities are interdependent and mutually constitutive (Bowleg, 2008; Hill et al. 2023). Data obtained through the interviews were transcribed and analysed using a structured, inductive qualitative analysis methodology based on a grounded theory approach (Glaser et al., 1968), using NViVo 1.0 for qualitative analysis. First, an inductive, open coding process was used as codes emerged directly from analysing the meanings within the data and the linkages with the questions asked (Linneberg & Korsgaard, 2019). Inductive reasoning is a process-oriented research methodology that allows for the emerging of theories through observations and data collection and analysis (Neuman, 2014). Using an analytic inductive strategy (Bryman, 2012), this research has supported the identification of common themes, trends and patterns emerging from discussion with participants. The principles developed in chapter 2 guided the design of the data analysis framework and the data coding process presented in chapter 3. Second, an axial coding process was conducted to further organise and categorise the data according to emerging themes. The main themes emerged following discussions with the key informants and during the first step of the data analysis process. Other codes emerged directly from analysing the meanings within the data and the linkages with the questions asked (Linneberg & Korsgaard, 2019). These themes were further refined during the axial coding process and revolved around trust, identities (sexuality, gender, religion, political affiliation, and migration status) and governance actions.

b. Quantitative analysis: Social Network Analysis

Social Network Analysis (SNA) is a technique allowing the systematic quantitative and qualitative analysis of the links among actors in various contexts (Scott et al., 2008). This method helps to study the relationships (power distribution for instance), connections and exchange mechanisms (or "ties") between social entities (people, communities, and organisations or "nodes") (Scott, 1988). The SNA also provides a perspective on the patterns and implications of these relationships (Wasserman and Faust, 1994). Because DRR institutions (formal or informal) are part of networks that go beyond the official laws and regulations that are in place in a specific place and time (Lassa, 2010), the use of SNA can highlight the influence of certain groups of people on the mechanisms and processes currently in place to address disaster risks (as described within section 1.3.b). In order to answer the research questions 2 and 3, the SNA not only provided a description of the actors but also some insights on how the structure of these social networks influence how, what, and why information travels. Using the data gathered through the sociometric surveys and interviews, this analysis provided an in-depth understanding of the local governance processes, which will be key to determine appropriate policy recommendations and answer questions 2 and 4.

This research used an egocentric approach for the SNA. The egocentric approach aims to acquire information regarding personal networks from the respondent's perspective (Hawe et al., 2004). The attributes of each respondent were captured (gender, age range, religion, citizenship status Indigenous status, occupation, income range, etc.). Further, the strength of each tie (or weight within the network representation) was captured by asking participants the following questions: (i) how long have you known that person; (ii) how frequently do you receive advice from this person; (iii) how frequently do you give advice to this person; (iv) how useful is the advice you received to you; (v) how relevant this person is for your decision-making regarding disasters and; (vi) how trustworthy this person is for you. Each participant was asked to assign a 1-5 mark for each of their alter (the persons that the respondents are connected to). The resulting ties weight was calculated by adding the score for each of the responses.

The resulting SNA was visualised and analysed using Gephi version 0.9.1. The software was chosen because it allowed researchers to map and visualise the structure of social networks and their properties (Trias et al., 2019). In addition, network metrics were calculated to further structurally characterise the network: (i) network density represents the number of relations in a network divided by the maximum possible number of relations (Newig et al., 2010), or in other words, the degree to which all actors are connected to other actors in the network; (ii) degree centrality is a measure of the number of edges (connection) each node (actors) has and is related to the importance or power that each actor has (Newig et al., 2010); and (iii) betweenness centrality measures the shortest path between every pair of nodes and allows for the identification of brokers i.e. actors that links two of more otherwise disconnected clusters (Freedman, 1979). The network is visualised using the Fruchterman-Reingold Algorithm (Fruchterman and Reingold, 1991).

1.6. Organisation of the present thesis

This dissertation follows a manuscript-based format and consists of three standalone manuscripts (chapters 2, 3 and 4) followed by a concluding chapter that draws the research strands together. Each manuscript has a distinct objective that addresses specific research questions (see table 1.5 for the objective of each chapter).

Chapter 2 proposes a new DRG conceptual framework that encompass the concepts of place-based thinking and intersectionality. This manuscript presents an intersectional approach for DRG to support inclusive and contextualised actions and examines how an intersectional perspective generates pathways to address the root causes of vulnerabilities to disasters beyond the "one size fits all" approaches promoted globally. This manuscript is published under: Hill, L. S., Armitage, D., Collins, A. M., & Pittman, J. (2023). Principles for the consideration of intersectionality in place-based disaster risk governance in islands. Sustainable Development, 1– 12. https://doi-org.proxy.lib.uwaterloo.ca/10.1002/sd.2684

Chapter 3 and Chapter 4 apply the framework with different perspectives. Chapter 3 focuses on the experience of gender and sexual minorities and generates insights on intersectional disaster governance opportunities (or barriers) through the understanding of trust and marginalisation within social networks occurring in Dominica. Positioned as a first stocktaking exercise that brings forward the concerns and contributions of GSM within local DRG processes, this paper presents a practical reflection formulated through four main themes: (i) navigating identities (ii) victimisation and vulnerability; (iii) the importance of place and scale and (iv) how power defines access and agency. This manuscript, in its shortened form, has been submitted for consideration for the book Dominey-Howes D. et al. (Eds*). Hazards, disasters, climate change and sexual and gender diversity*. Routledge Studies in Hazards, Disaster Risk and Climate Change series.

Chapter 4 adopts a birds-eye perspective on formal and informal DRG networks occurring in Dominica. This manuscript explores the structural and functional elements of disaster risk governance (DRG) networks in Dominica and examines the impact of actors' identities on information sharing dynamics. This manuscript also presents some insights on the capabilities of social networks to act as barriers and enablers of intersectional risk reduction opportunities in small islands. The reflection draws particular attention on gender, Indigenous status and occupation and is organized around four main themes: (i) identify the key features of information sharing networks; (ii) present the formal and informal characteristics of the DRG networks and the influence of scale-crossing brokers; (iii) demonstrate evidence of glocalisation and siloisation and (iv) present the characteristics of the networks in terms of marginalisation and social exclusion. This manuscript will be submitted for consideration for the International Journal of Disaster Risk Reduction as an open access publication.

Finally, Chapter 5 provides a synthesis of the dissertation, highlights its contribution to policy and practice and emphasizes certain considerations for future research. A reflection on the limitations of the present research is also included.

Chapter	Manuscript title	Target journal	Status	Corresponding objective
2	An intersectional approach to place-based disaster risk governance in small-island developing states.	Sustainable Development	Published	To develop an integrated framework for the consideration of intersectionality in place-based disaster risk governance in islands.
3	Identities in disasters: experiences of gender and sexual minorities within disaster risks governance networks in Dominica.	Submitted in a shorter form as a book chapter for the book Dominey-Howes D. et al. (Eds). Hazards, disasters, climate change and sexual and gender diversity. Routledge Studies in Hazards, Disaster Risk and Climate Change series)	Accepted	To reposition disaster risk governance within an island-wide, intersectional approach through the analysis of actor identities within their social networks.
4	Towards multi-stakeholder, multilevel and intersectional Disaster Risk Governance: Implications of social identities for social networks in Dominica.	International journal of disaster risk reduction	In preparation	To identify opportunities to strengthen existing governance processes and achieve better disaster risk reduction outcomes through an intersectional lens.

Table 1.5: Summary of manuscript chapters, submission status, and corresponding research objectives

Chapter 2: Principles for the consideration of intersectionality in place-based disaster risk governance in islands[3]

2.1. Chapter summary

This paper advances disaster risk governance (DRG) research and practice by incorporating elements of intersectionality and place-based thinking. Intersectionality provides a crucial yet underutilized lens to examine power, positionality, and individuals' experiences facing disasters and other climatic events. Through six principles and using examples from small islands and a synthesis of the literature, this paper presents an intersectional approach for DRG to support inclusive and contextualised actions: (i) individuals are multi- dimensional and complex; (ii) identities and vulnerability are not predefined; (iii) spatial and temporal differences influence the expression of identities; (iv) materiality of ecological systems influences intersectionality; (v) power relations are central the emergence of social processes and epistemologies; and (vi) positionality plays an important role in defining risk reduction agendas and choices. This paper examines how an intersectional perspective generates pathways to address the root causes of vulnerabilities to disasters beyond the "one size fits all" approaches promoted globally.

Keywords: disaster risk governance, identities, intersectionality, islands

2.2. Introduction

The purpose of this perspective paper is to present a pivot in disaster risk governance (DRG) research and practice by incorporating elements of intersectionality and place-based thinking. Specifically, this paper presents an intersectional framework and an approach for DRG that centres inclusive and contextualised governance processes, and that challenges existing notions of social difference. To do so, we draw upon and synthesise several strands of literature on intersectionality, disaster risk reduction (DRR) and governance, and use examples from small islands to further situate these ideas.

The Sendai Framework for Disaster Risk Reduction 2015-2030 (thereafter Sendai Framework or Framework), the current guiding framework for the design and implementation of actions aiming at reducing disaster risks globally recognises that inequalities and poverty are direct drivers of vulnerability to disasters, that people and communities are at the center of DRR mechanisms, and that collaborative and decentralised forms of governance are at the core of the effective management of disaster risks at national, regional and global level (Chmutina et al., 2021; UNISDR, 2015). The Framework does so through its four priorities for action: (i) understanding of disaster risk in all its dimensions; (ii) strengthening disaster risk governance to manage disaster risk; (iii) investing in DRR for resilience; and (iv) enhancing disaster preparedness for effective

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response, and to «Build Back Better» in recovery, rehabilitation and reconstruction (UNISDR 2015). These principles mark a significant change in the way disaster risks are addressed internationally and build on learnings from the Hyogo Framework for Action 2005–2015 (thereafter the HFA) and the 1994 Yokohama Strategy and Plan of Action for a Safer World. However, the priority is still on the reduction of existing disturbances and losses through disaster preparedness and response rather than aiming to identify and transform the underlying drivers of risks and vulnerabilities (Lavell & Maskrey, 2014), and implement real change in practice (see Lavell and Maskrey, 2014; Thomalla et al., 2015; Chmutina et al., 2021).

Current DRR pathways do not internalise the complex interactions, individual and group perceptions or social-relational uncertainties related to risk. As a result, available studies on disasters often reflect only a partial assessment of the drivers of vulnerability, and this result in mostly short-term, project driven actions to address these issues. In parallel, this situation leads to homogenisation of risk reduction strategies which forms a "glocalisation" of actions, or a disconnect between global narrative about DRR actions and their local application (Gaillard & Mercer, 2013). With the frequency, intensity and the distribution of these shocks potentially increasing due to climate change (IPCC, 2018), current governance practices may not be adequately positioned to address present and future disaster risks.

Within this context, the focus on small islands is deliberate: islands are often described as the embodiment of vulnerability to environmental change. Specific physical island characteristics are the basis for the categorisation of islands' geographies as vulnerable: the exposure to multiple environmental hazards, the physical, economic and political "smallness", the limited natural resources available for consumption, despite being home to important biodiversity, and the isolation (real or perceived) from their continental counterparts (Kelman, 2018b; Jarillo & Barnett, 2022). Based upon the current dominant Eurocentric colonial perspectives, these characteristics have created the epitome of low adaptive capacities and latent disaster zones, often in contrast to the view of their inhabitants (Rivera, 2020; Jarillo & Barnett, 2022). Natural hazards are a common occurrence in most small islands; they have shaped many of the socio-cultural factors that define small islands communities. This reality suggests that the current "vulnerable" label applied to previously self-reliant communities is less in relation to natural hazards and physical characteristics and more a result of socio-economic and historical factors that have accrued in present time. Colonial and post-colonial legacies have not only affected some of the institutional characteristics of islands but they have also shaped local culture, identities, relationships and knowledge production, creating a condition of coloniality where epistemologies are shaped by patterns of power that emerged as a result of colonialism (Bankoff, 2001; Rivera, 2020).

The paper is structured as follows. First, we define and outline the relationship among disasters, governance and intersectionality. We then present six (6) principles that guide the operationalisation of an intersectional approach for DRG to better support inclusive and contextualised governance processes. Finally, we conclude with some reflections on the implications of centring intersectionality within DRG for future research. The principles emerge

from an analytical synthesis based on a review of the literature and application of DRG initiatives in small island developing states. Our main examples and application are drawn from cases in the Caribbean, although other international examples are used where applicable.

2.3. Disaster risk, governance and intersectionality

No single stakeholder (individual, community or organisation) has the necessary knowledge and/or resources to address complex, multiscale problems (Armitage et al., 2017) such as disaster risks. People play a central role in devising action to address disaster risks: communities can generally pinpoint issues and identify solutions when they are needed (see Blackburn, 2014; Blaikie et al., 2004; Grove, 2013). Public entities are also necessary in addressing disaster risks, however, these entities cannot solely carry out all functions pre-, during and post-disaster since addressing disaster risk goes beyond government activities (i.e. legislations, regulations and policies) (Tierney, 2012). Risk reduction activities rely on the collaboration of diverse stakeholders, operating at different levels, often through networks between local users, municipalities, regional and national organisations, and international bodies (Folke et al., 2005), and through the pooling of information and resources (Djalante et al., 2011). As such, collaborative and participatory decision-making processes that devolve power to multi-stakeholder groups within flexible, adaptive multi-level arrangements are typically more effective at addressing complex social-ecological problems (Djalante et al., 2011; Hiwasaki et al., 2014; Lemos & Agrawal, 2006; Tierney, 2012; Veland et al., 2013).

Multiple groups and individuals are involved in governance processes at various stages and scales; the way these individuals and groups design and implement these measures are governed by the institutions they are a part of, the arrangements in place to do so, but also the socio-cultural, ecological and political context within which people are implementing these measures in response to the hazard(s) they are facing. These processes are shaped by the governance regimes that determine how, when and who is involved, and encompass the way various groups collectively make decisions and rules within their social networks (Tierney, 2012). Here, we use the definition of governance provided by Rhodes, (1996) as self-organizing, interorganizational networks that complement markets and hierarchies as governing structures to authoritatively allocate resources and exercise control and coordination. This type of governance system relies on a variety of social norms, market mechanisms and other social engagement processes such as participation, coordination, collaboration, and negotiation to facilitate collective decision making and action (Tierney, 2012). Further, the notion of governance here draws attention to the importance of scale.

For this paper, we adopt the definition of Cash et al., (2006) who define scale as “the spatial, temporal, quantitative, or analytical dimensions used to measure and study any phenomenon”. Within each scale, levels are defined as the units of analysis that are located at different positions on a scale (Cash et al., 2006). There are several implications worth noting. First, the Sendai Framework failed to recognise how individuals, communities and groups of actors at various scales interact and collaborate with each other, how information flows and how these interactions ultimately affect the outcome of DRR activities. As well, the Sendai Framework provides guidance

for the establishment of national-level policies which often do not translate into effective policy practice at local levels (Biholar, 2014; Lavell & Maskrey, 2014; Thomalla et al., 2015). Further, despite the assumption of the Framework, policy implementation is not a linear process; it depends on relationships, entrenched interests, networks, priorities, "convenience" and "negotiations" (Mohammed, 2014). More so, a review conducted by Imperiale and Vanclay (2020, 2021) highlighted how the translation of the Sendai Framework into national top-down, emergency-centred civil protection system and business-as-usual strategies in place in some areas can further hinder community resilience building and impact long-term sustainable development endeavors. Finally, the Sendai Framework relies on essentialized, unidimensional groups denomination such as women, children and youth, elderly, Indigenous Peoples, and migrants without providing a pathway to understand intra- and inter-groups dynamics. Doing so requires an introspection into the characteristics of the people involved in these governance processes (Bakker & Bridge, 2006). Accordingly, recognising the differentiated and dynamic nature of vulnerability and its root causes, resilience building capabilities (at individual and/or community levels) and capacities to address disaster risks calls for the creation of a more nuanced narrative, towards conceptualising identities, power and their interlinkages, and their relevance in the very definition of what constitutes a disaster.

Gender is typically described as the most visible factor that influences one's experience with disasters and environmental risks in general, even if it is far from the only one (Arora-Jonsson, 2011; Djoudi et al., 2016). The focus on gender called attention to the inequalities to which women are subjected in their everyday lives and their impact on the making of disasters, it has also created a situation where women's agency and capacities to act are seldom acknowledged. Thinking about women as vulnerable homogenises the experiences of (cis) women and doesn't take in consideration the various experiences and identities – or intersecting factors – that influence their agency and power and ultimately intervene in the creation of disasters.

Intersectionality theory (Crenshaw, 1989, 1990) critiques the unidimensional, essentialized and fragmented representation of identity and provides an understanding of the interlinkages and interconnection between the social factors or characteristics that shape identities, oppression and lived experiences such as race/ethnicity, Indigeneity, gender, class, sexuality, geography, age, disability/ability, migration status/nationality, religion, etc. in a given context (Hankivsky, 2014; Collins, 2015). Intersectionality emerged from the need to account for the multidimensionality of marginalized black women, their lived experiences and identities when analysing social issues (Crenshaw, 1989, 1990). People's social position in a society is not the result of a single factor but the consequence of the intersections of the aforementioned social factors and characteristics from which will arise intersecting structures of oppression (Arora-Jonsson, 2011; Djoudi et al., 2016; Enarson et al., 2007; Fletcher, 2018; Gaillard, Sanz, et al., 2017; Neumayer & Plümper, 2007).

There are currently few empirical studies that explicitly use an intersectional framework to analyse context specific identities and the associated axes of power and privileges in DRG. Moreover, little research focusses on the situational specificity of these processes, notably understanding how

diverse the actors involved in DRG processes are. In this regard, network governance – a decentralised and self-organised mode of governance where state and non-state actors collaborate and coordinate in the face of shared challenges (Newig et al., 2010; Klijn & Koppenjan, 2012; Pittman & Armitage, 2019; Carlisle & Gruby, 2019) – encompasses the governance processes and collaborative forums involved in reducing risks but also represents the various ways social and power relations emerge within a given society (Swyngedouw, 2004b; Renn, 2008; Morrison et al., 2019). The various nodes within which networks actors operate within their communities and at other societal scales are characteristics of polycentric and multi-layered social institutions and are an important aspect in building disaster resilience (Djalante et al., 2011). Notably, this power manifests in the hierarchies of actions at different scales (i.e. Adger et al., 2005) but also within individuals' realities of disaster risks.

Most studies of network governance ignore the realities of power relations and structural inequities that an intersectional lens can help explore. The social categories emphasised by the intersectional theory shape people's identities, needs and capacities to act, and their relative position within their social and governance networks. The current lack of comprehension of the resulting interlinked social structures (local customs, cultures, institutions and networks) undermines the design and implementation of equitable and effective risk reduction interventions and governance practices.

2.4. Principles for intersectional DRG

For the purpose of sense making, we outline six core principles here that reflect a more intentional intersectional and place-based focus within disaster risk governance. We augment our synthesis of with a series of examples from the literature as well as those specifically from small islands. These principles have evolved from an analysis of how intersectionality is applicable to DRG, and our aim is to build a nuanced understanding of social processes, vulnerabilities and adaptive capacities linked to activities aiming at addressing risks. Table 1 summarises these reflections.

Table 1: Summary of the guiding principle for the consideration of intersectionality within DRG.

Principle	Meaning	Core references for examples
Individuals are multi-dimensional and complex	• Essentialist narratives focus mainly on single identity categories without questioning the variability within these categories. • These narratives fail to capture the complex nature of identities and their contextual vulnerability to environmental disruptions.	Mohammed, 2011; Eriksen, 2011; IGLHRC and SEROvie, 2011; Yamashita et al., 2017
Identities and vulnerability are not predefined	• Vulnerability is typically not treated as a complex concept relaying on intersecting set of social, environmental, historical and institutional factors but as a simplified binary phenomenon. • It is necessary to take a critical look at internal social hierarchies to understand the societal and identity dynamics emerging from these hierarchies. In the Caribbean, this principle speaks toward a redefinition of masculinities and family structure.	Mulot, 2000; Jonkman and Kelman; 2005; Dunn, 2016; Pittman and Armitage, 2017; Rushton et al., 2021
Spatial and temporal differences influence the expression of identities	• There is a disconnect between the scale at which risk is experienced, analysed and discussed, and the scale at which risk is perceived and decisions are made to address this risk. • Scale contextualises temporally, geographically and institutionally the marginalisation arising from the expression of identities, and reveals apparent power differentials and inequalities	O'Shaughnessy and Krogman; 2011; Blackburn, 2014
Materiality of ecological systems influences intersectionality	• Intersectionality focuses solely on the social lens, with little to no mention of the importance of ecological systems in shaping individual and collective (i.e., social-cultural) identities. • Geographies are integral part of the development of identities; hence, its consideration within an intersectional DRG framework can strengthen and ground deliberations and actions within local social-ecological contexts.	Hiwasaki et al., 2014; Nalau et al., 2018; Awatere et al., 2021

Power relations are central to the emergence of social processes and epistemologies	• Social differences in power shape both vulnerability and capacity to act, specifically in the face of environmental change • Apparent and invisible structures of power linked to identities reveal the processes that produce relationships between actors and the scale at which such relationship take place and help expose the processes by which national-level actors influence lower-level actors and vice-versa through social relationships and networks	IGLHRC and SEROvie, 2011; Marcelin et al., 2016; Petchesky, 2016; Rivera, 2020
Positionality plays an important role in defining risk reduction agendas and choices	• The concept of positionality is not often discussed in DRR discourse. Positionality is important for two main reasons: • Individuals who understand their own social position and privileges can use their power to advance specific risk reduction agendas and choices. • Aid organisations establish risk reduction targets and more widely development goals based upon the implicit and explicit assumptions and biases they have about an affected population. Interventions, agendas and solutions are justified from their own perspective rather than from the affected population.	Jobe, 2011; Singh et al., 2018; Ober and Sakdapolrak, 2020

2.4.1. Principle 1: Individuals are multi- dimensional and complex

Understanding how identities are enacted, switched, put forward or repressed in disaster situations can help effectively operationalise actions aiming at reducing risks. This understanding has been key in many areas of environmental governance, with emerging research showing the effect of people's identities in climate justice and activism and climate change adaptation (Adger et al., 2011; Frank et al., 2011; Fresque-Baxter & Armitage, 2012; Barnett et al., 2021). However, current DRG programming is often inadequate in its ability to internalise the complexity of identities.

In addition, previous framing of identities typically relies on essentialist perspectives that are useful from a macro level standpoint (i.e., at the level of the deliberations linked to the Sendai Framework) but fail to capture the complex nature of identities at a smaller spatial scale that might affect their contextual vulnerability to environmental disruptions (i.e. at individual and community levels). For example, experiences of members of lesbian, gay, bisexual, transgender, queer and other identities (LGBTQ+) groups can be quite different from cis-gendered heterosexual individuals in disaster situations. Following the earthquake in Haiti in 2010, the emergency operational policies implemented by aid organisations prioritised cis- and married women as head of households, excluding already marginalised gay men, lesbian and single women, and transgender people for accessing emergency food rations (IGLHRC and SEROvie, 2011). Similar experiences have also been recorded in the aftermath of the 2011 earthquake in Japan (Yamashita et al., 2017).

Common essentialist framings in DRR include gender, or more specifically women; people with disabilities, youths, Indigenous Peoples and/or people from the Global South. Like other multilateral environmental frameworks, the Sendai Framework and the projects, activities and policies that emerge from its implementation focus mainly on single identity categories without questioning the variability within these categories (Arora-Jonsson, 2011; Fletcher, 2018). In the case of gender, researchers (notably Arora-Jonsson, 2011; Djoudi et al., 2016; Fletcher, 2018) have called DRR practitioners to go beyond the oversimplified, binary notions of "woman and men" and "women are vulnerable" to explain the differential effects of disasters. In this context, essentialist perspectives are only valid where meanings, roles and responsibilities are similar across contexts (Carr et al., 2015). In addition, given that most disaster research takes place in emerging nations, the construction of the "Third World Woman" depicts women as a monolith of oppressed, passive, virtuous victims (Arora-Jonsson, 2011; Thompson, 2016) that need to be saved from their implied oppressive, backward and often black or brown male counterpart. The aforementioned normative and essentialist assumptions of social relations, i.e. gender neutrality, heterosexuality, ability, etc. have been used in the creation of both prosaic places (work, streets, venues) and discursive spaces (the nation, law, politics) (Gaillard, Sanz, et al., 2017) which are at the basis of social norms and constructs.

For instance, social identities in the Caribbean Region present an interesting case that demonstrates the multidimensionality and complexity of island identities. Caribbean Islands are considered "plural societies": they are constituted of distinct cultural groups but are united under island

specific political and economic systems that have emerged from plantation societies (Mohammed, 2011; Eriksen, 2011). These unique conditions have created an environment that led to the development of unique, localised and culturally complex mixed identities that are united in some ways, fragmented in others (Eriksen, 2011; Mohammed, 2011). For the past 500 years, the Caribbean islands have been a crossroad of people – from African slaves and Indian and Chinese workers brought following the abolition of slavery, the Indigenous Peoples of the Region, to the European explorers, slave masters and subsequent migrants (Mohammed, 2011). This diversity of people with their various languages, traditions, cultures, cuisines, religious beliefs systems, sexualities and genders have created socially and culturally complex societies with strong differences within and between social groups (Mohammed, 2011). In this context, it is important to ask: "which form of exclusion are practiced in the society and what are the requirements for inclusion [within communities and groups]" (Eriksen, 2011). Under this reality, there is a need to explicitly recognise the existence of the complexity and multidimensionality of these identities in DRR programming and processes within institutional spaces. As such, essentialist narratives around islands and their inhabitants do not capture the diversity and complexity of identities within societies in these locations. More so, the exploration of the dynamics of inter/intra group can be used to pinpoint drivers of vulnerability and foster community resilience-building.

2.4.2. Principle 2: Identities and vulnerability are not predefined

The notion of vulnerability is a central tenet within disaster scholarship (UNISDR, 2015), but its conceptualisation is quite problematic. Specifically, it becomes an issue when vulnerability is used to define entire communities and peoples as an identity. Vulnerability is complex and situational; however, the operationalisation of DRR focuses on the generalised, paternalistic understandings of social identities and contexts (i.e. Carr et al., 2015; Imperiale & Vanclay, 2021). Stemming from principle 1, women are often represented as the epitome of vulnerability. Similarly, islands are also the symbol of place of "inherent" vulnerability to both disasters and climate change (Jarillo & Barnett, 2022). Within the disaster risk literature, gender has been accepted as a significant cause of vulnerability, particularly when it intersects with other axes of difference such as location, economic class, race, age, disability and other factors (notably by Arora-Jonsson, 2011; Djoudi et al., 2016; Dunn, 2016; Fletcher, 2018; Rushton et al., 2019 among others). However, the predominant narrative promoted within projects aimed at operationalizing the Sendai Framework and other multilateral environmental frameworks still tends to essentialise and homogenise the contribution of gender to inequalities and vulnerabilities, particularly in islands. As a result of these assumptions, vulnerability is not treated as a complex concept relaying on intersecting set of social, environmental, historical and institutional factors but as a simplified binary phenomenon (Arora-Jonsson, 2011).

This principle is not necessarily a critique of the notion of vulnerability, but rather a call to take a critical look at internal social hierarchies to understand the societal and identity dynamics emerging from these hierarchies. To illustrate this point, we look at gender and social dynamics in the Caribbean. Gender relations and sexual identities in the region are often portrayed as a rigid,

within a patriarchal and heteronormative society where male and female gender roles are clearly defined, with strong and hyper-heterosexual masculinities and fixed sexualities (i.e. Dunn, 2016). However, the complexity of post-colonial Caribbean societies is represented by the plurality of social relations and the difficulty of defining them (Mulot, 2013). Particularly, the relationship between cis women and men represents a key paradox: both matriarchal and patriarchal power structures co-exist within the society. Matriarchal structures – more commonly referred as matrifocality (Smith, 1974) – are represented by single-women or women headed family units. Matrifocality is prominent in both anglophone and francophone Caribbean islands within a matrilinear society – where knowledge and authority are held by women (Condé, 1979). In Guadeloupe and Martinique, two French overseas territories, between 30 to 40% of households are single-mother family units, an important contrast from about 7.5% in continental France for instance (Giraud, 1999; Kempadoo, 2009; Guillemaut, 2013). More so, cis women are viewed as "poto mitan" (in francophone islands): as the personification of resilience and a central pillar of the society and of the family unit. They have been able to use their agency, social position and sexualities as a tool for empowerment, negotiation and material emancipation (Kempadoo, 2009, Guillemaut, 2013).

These characteristics have two main consequences for the gendered impact of disasters. First, the inclusion of masculinities and sexual practices and identities is generally non-existent within disaster narratives. Men in the margins - poor men, men with disabilities, gay men, men who have sex with men (MSM); and trans-men – are often forgotten in disaster policies, programs and strategies. Using examples from New Zealand and Jamaica respectively, Rushton and colleagues (2021), as well as Dunn (2016), documented the realities of masculinities in disaster contexts and highlighted the need to interrogate masculine identities and their importance within disaster response and recovery. Moreover, an analysis conducted in by Jonkman and Kelman (2005) highlighted that 70% of flood-related fatalities in Europe and the US were male. An intersectional framework provides that backdrop for the redefinition of masculinities in disaster situations, to include a wider range of identities and sexualities (Dunn, 2016). More so, this framework can help mobilise knowledge and networks to mitigate risks associated with disasters from identities at the margin of societies (Dunn, 2016).

Second, in contrast to normative models of family units, which follow a "deep rooted" structure with several generations and a localised and traceable history, the family structure in the Caribbean is represented as transverse, rhizome-type of societal structure that spread horizontally rather than vertically (Guillemaut, 2013). Eurocentric perspectives and biases presented this type of family structure as 'deformed' and 'dysfunctional' that diminish or entirely overlook the connectedness that exist beyond the core members of the unit (Barrow, 1996; Renaud, 2020). This reality not only questions the characterisation of people in these contexts as vulnerable but also depict a picture where these rhizome-type relationships foster the effective collection, diffusion and sharing of information, and is a strong substrate for the emergence of collective action. There are limited examples in the literature to illustrate this point, especially in regard to disasters. However, several

authors have noted the "koud'min" (from the French 'coup de main' meaning 'giving a hand') culture; loose, ad hoc network of extended family and friend that work and put together resources (material, financial, etc.) in the aftermath of hurricanes (Mulot, 2000, Pittman & Armitage, 2017). These social ties allow for the creation of a system of trust, reciprocity and shared values and resources within a community that facilitate adaptation and risk reduction behaviors and capacities.

2.4.3. Principle 3: Spatial and temporal differences influence the expression of identities

Intersectionality is a concept entrenched in scale. For example, racial privileges and power formations are reproduced and perpetuated by space and knowledge production is entrenched within spatial and temporal scales (Mollett and Faria, 2018). Further, since knowledge and knowledge systems are stakeholder and level-specific, the cross-scale institutional relations emerging from DRG processes ultimately limit, disqualify, promote, modify, or reinforce the various forms of knowledge, identities and power held by these multiple actors within their context (M. Glaser & Glaeser, 2014; K. J. Grove, 2013). In addition, social identities are enacted through social networks; these networks emerge and operate at various scales (Deaux & Martin, 2003). Here, scale is used to contextualise marginalisation temporally, geographically and institutionally and reveal apparent power differentials and inequalities. Participation in a specific network is determined by the level of support that individuals receive, and as a result, the consideration of scale provides some insights on the relationship among actors between and within each scale (Deaux & Martin, 2003; Baptiste & Devonish, 2018).

We recognise that understanding scale within an intersectional DRR framework requires a constructivist approach (i.e. Blackburn, 2014). Like governance, scale is inherently dynamic, socially constructed (rather than strictly the result of place) and power and politics play an important role in defining who is involved, in what capacity (the position of the actors) and how (type of interactions taking part in the process) within governance networks. Identity categories need to be understood as "specific spatial and temporal moments" (Valentine 2007). Therefore, situating identities within the broader social and institutional structures draws a context specific picture of disaster risks, but also highlights some of the formal and informal governance processes that are in place to address them.

Examples to illustrate this principle are rare in the literature. This is one of the reasons why there is a disconnect between the scale at which risk is experienced, analysed and discussed, and the scale at which risk is perceived and decisions are made to address this risk (Lebel et al., 2005; Gaillard & Mercer, 2013). Indirectly, Blackburn (2014) has demonstrated that there is a need for an analysis of scale to identify the factors that shape, facilitate or constrain the reach local actors within sub-regional and national DRG processes in Jamaica and vice versa. More so, the consideration of identities at scale can reveal the processes through which identities and relationships are created and enacted for strengthening local agency. For example, O'Shaughnessy and Krogman (2011) demonstrated using studies in the US and Canada that gender as an identity category requires the examination of both its material (e.g. social structures, conditions, relations) and discursive (the ways in which gendered and sexual identities are displayed, or inscribed onto

bodies, landscapes and other spaces) dimensions of scale at three levels: macro (e.g., cultural, political and economic structures), meso (e.g., communities and regions), and micro (e.g., subjectivity, identity) levels.

Understanding cross-scale interactions provides some insights on the diverse realities and the various techniques stakeholders use to influence, distort and reconfigure existing structures of power at various scale (Adger, Brown, et al., 2005; Blackburn, 2014; M. Glaser & Glaeser, 2014). Individual and group identities fluctuate between a plurality of meanings through different times and spaces (Twigger-Ross and Uzzell 1996). Within DRG structures, the interplay of both intersectionality and scale is manifested through three main components (as summarised by Baptiste and Devonish, 2018 and Newell, 2005): (i) increased exposure of poor and marginalised groups to environmental risks; (ii) limited options and solutions to address these risks; and (iii) marginalisation from decision making.

2.4.4. Principle 4: Materiality of ecological systems influences intersectionality

Natural hazards are normal occurrences in most small islands. As a result, human settlements in these locations have crafted everyday cultural practices and mechanisms that incorporate the existence of natural hazards and local ecological characteristics. Some of these mechanisms include agricultural practices (e.g., shifting planting seasons, choosing appropriate crops, etc.), fishing strategies (e.g., shifting fishing calendar and fishing grounds), and everyday life choices (e.g., where/how to build, warning and preparedness, timing of cultural activities, etc.). Many of these coping mechanisms and strategies are embedded within local knowledge systems and historical, place-based experiences (Hiwasaki et al., 2014).

However, a limitation of intersectional theory is the focus solely on the social lens, with little to no mention of the importance of ecological systems in shaping individual and collective (i.e., social-cultural) identities. Individuals and social groups adapt to their physical surroundings; hence, identities incorporate the attributes of place within which those identities emerge. We are not adopting nor advocating for a determinist view of the materiality of ecological systems. Rather, we see geographies as an integral part of the development of identities and point to how its consideration within an intersectional DRG framework can strengthen and further ground deliberations and actions within local social-ecological contexts. For example, drawing on cases in Indonesia, the Philippines and Timor-Leste, and the Pacific islands, Hiwasaki and colleagues (2014) as well as Nalau and colleagues (2018) have demonstrated how islands and their inhabitants have a strong history of adapting, coping and responding to changing social, cultural and environmental conditions since the beginning of island settlements. Here, intersectionality provides a crucial lens from which the determinant of "nature" is viewed as an integral part of the people's identities and influence social-ecological relations. Swyngedouw (2004) posited that understanding actor agency cannot be done without the examination of the "geometries of power" present in the social and ecological systems. These "geometries of power" can reveal the social-ecological processes that produce relationships between actors and the scale at which such relationship take place (Blackburn, 2014) (see Principle 5).

The consideration of ecological systems within intersectionality has started to take roots in social justice circles. For instance, the Intersectional Environmentalist (Instagram @intersectionalenvironmentalist) promotes a vision of climate justice based on the differential impacts of environmental degradation and the recognition that there is a need to think about the environment from an intersectional perspective for sustainable futures (Thomas, 2022). Here, intersectionality is viewed as a complex web of social categories that form one's identities and that takes place within and influenced by one's geographical and ecological realities (A.E. Kings, 2017; Thompson, 2016). A person's relationship with their ecological system(s) is not dependant on one specific aspect of their identity, rather, it is influenced by the intersection of multiple social characteristics (Thompson, 2016; A.E. Kings, 2017). For example, the Te Ao Māori climate change report 2021, published by Māori researchers, highlights how changing conditions in the natural environment (namely freshwater, terrestrial and coastal-marine ecological processes and biodiversity) will affect the Māori way of life, culture and customary practices, and exacerbate existing challenges and inequities that the Māori and other Indigenous People face (Awatere et al., 2021). In this context, the intersection of ecological processes also affects the construction of the relationship between social and ecological systems (Thompson, 2016), therefore influencing vulnerability, risk and resilience-building capabilities, and overall relationships with natural hazards.

Ultimately, the construct of 'place' (Masuda & Garvin, 2006; Fresque-Baxter & Armitage, 2012) provides one way in which intersectionality, the materiality of ecologies and DRG can be woven together. Place is a socially constructed but it has ecological and physical foundations: it is multidimensional and dynamic concept which is characterised by a geographical location where people live and with which they identify (Adger et al., 2011; Fresque-Baxter & Armitage, 2012; Masuda & Garvin, 2006). Place offers an entry point to reflect on individual and collective identities linked to a sense of attachment, community and rootedness, all of which are 'vulnerable' in the context of disasters. Indeed, the notion of place identity is defined as the 'those dimensions of the self that define an individual's personal identity in relation to the physical environment by means of a complex pattern of conscious and unconscious ideas, beliefs, preferences, feelings, values, goals and behavioral tendencies' (Proshansky, 1978). A place-based intersectional lens applied to DRG can potentially lead to a paradigm shift toward risk-driven, deconstructed DRG that incorporates the problem-solving capacity of each of these actors, their norms, values and perspectives, behaviour and the challenges and formal or informal pathways, institutions and geographies within which they operate to achieve their goals.

2.4.5. Principle 5: Power relations are central to the emergence of social processes and epistemologies

Power is a core feature of intersectionality: social differences in power shape both vulnerability and resilience building capabilities, specifically in the face of environmental change (Wisner & Luce, 1993; Kaijser & Kronsell, 2014; Dunn, 2016; Fletcher, 2018). Looking at power relations through an intersectional lens implies looking at the societal structures of constraint – structures

that are in place to create asymmetries regarding access and control of resources to parts the society (UN Women, 2013). These structures are often apparent within local customs, laws, and culture and the social networks that are created as a result of these structures. For example, in the aftermath of the 2010 Earthquake and the 2016 hurricane Matthew, Marcelin and colleagues (Marcelin et al., 2016) as well as IGLHRC and SEROvie, 2011 described how informal social networks were a central component in coordinating disaster response and overall governance in Haiti. However, both noted how highly segregated these networks are: most exchanges occur within networks with people with similar characteristics: socio-economic class, gender and sexual orientation. "Different" individuals were commonly excluded and the success of these networks in disseminating information and relief depended on the societal position and relative power of their members.

In addition, power influences epistemologies, determines access to information and resources, and shapes the availability of options and choices, also through social relationships and networks. More widely, power differentials shape the performance of the governance arrangements best suited to address systemic issues (Djoudi et al., 2016; Morrison et al., 2019). These "geometries of power" that emerge within governance arrangements can reveal the processes that produce relationships between actors and the scale at which such relationships take place (Blackburn, 2014). Understanding the manifestation of power at scale helps to expose the processes by which national-level actors influence lower-level actors and vice-versa. For instance, the decentralised nature of DRG in Haiti accentuates the power of some local actors: (Marcelin et al., 2016) described how these actors (in villages and cities) managed to affect the flow distribution of humanitarian aid at due to their political connections at national level, further excluding people and groups whose identities already put them in the margins of society (see IGLHRC and SEROvie, 2011 for more details).

Understanding power relations in the Caribbean involves deliberately questioning the historical, geopolitical, and structural origins of identities and values in order to create tangible actions to address present and future disaster risks. Such power relations ultimately emerge though lived realities linked to sexuality, race, gender, and skin color (i.e. colorism) as they act as factors of segregation and hierarchization (Clarke, 1976; Petchesky, 2012). The diverse institutional arrangements present in the Caribbean greatly influence decision-making processes and further warrant against essentialist framings of identities, generalisations and assumptions. The stark complexity of history, traditions, socio-economic characteristics, institutional arrangements, languages, cultures and ethnicities within the regions impact the composition of networks and ultimately, the way island-wide disaster risk governance pathways and power differentials emerge and are applied in a given island. For instance, in the non-sovereign territories, the centres of power and decision making are located spatially and culturally far away from the geographies impacted by the natural hazards. As a result, they often fail to effectively engage with local actors, instead insisting on solving issues through top down, paternalistic, colonial government-led actions. This fact has been documented in the aftermath of the hurricanes Irma and Maria, in Puerto Rico (for

instance in Rivera, 2020) and in Guadeloupe (personal communication with a member of the disaster response team). Consequently, local governance structures and networks are further dismantled and give way to this perpetuate status of emergency and "slow disaster" (Rivera, 2020). To date, there is no study on the influence of (past or present) colonial power in (i) shaping the narrative and influencing the social characteristics of the people involved in locally addressing disaster risks; (ii) how these characteristics further shape the governance processes taking place in these geographies and (iii) how social power relations, whose values and knowledge are represented as well as the scope and scale of these governance processes influence risk reduction and adaptation activities.

2.4.6. Principle 6: Positionality plays an important role in defining risk reduction agendas and choices

The concept of positionality is not often discussed in DRR discourse. Positionality refers to one's social standing or representation as influenced by personal characteristics such as race, gender, marital status, and physical ability levels. Positionality is fluid, cannot be neutral and changes with context, and is a central component of dismantling supremacy and saviourism (Sultana, 2007; Schiffer, 2020). Explicitly recognising the institutionalisation of one's social position enables actors involved in research, design and implementation and decision making to address disaster risks in a way that acknowledges colonial legacies and privileges. We highlight two key dimensions of positionality in this regard.

First, individuals who understand their own social position and privileges can use their power to advance specific risk reduction agendas and choices. According to Collins (2015), "individuals and groups differentially placed within intersecting systems of power have different points of view on their own and others' experiences with complex social inequalities, typically advancing knowledge projects that reflect their social locations within power relations". Addressing vulnerabilities requires actions that are "contextual, relational, embodied, and politicized" (i.e. Sultana, 2007). Individuals and communities living in hazardous areas have developed a "disaster subculture"(i.e. Mercer et al., 2012) – or, we would argue, a "hazard subculture" – where social behaviours, knowledge and traditions have been developed in response to periodic and/or recurrent natural hazards. Contextual cultural factors, such as norms, values, beliefs, biases and the resulting governance processes influence the framings of problems, perceptions of vulnerability and risks, as well as the conceptualisation of the solutions and choices involved in addressing these issues (Thomalla et al., 2015, 2018). Social choices are shaped by goals, values and risks faced by individuals and groups within a given society, which in turn, will determine adaptation and risk reduction actions (Adger et al., 2009). However, these choices are challenging to explicitly integrate in decision making and governance processes. More so, whose goals and values are reflected, and by extension, whose actors are included in the process depend on their positionality and resulting power and privileges.

Second, the implicit and explicit assumptions and biases that some (often foreign) organisations have on establishing risk reduction targets and more widely development goals and justifying

intervention from their own perspective can also shape agendas as well as how and what solutions are implemented (Abimbola et al., 2021; Kothari, 2006). Dominant framings of global change processes often take a reductionist approach, depicting the issues as a technical, contemporary, and localised problem to be solved by 'improved' science, engineering, or economics (Sealey-Huggins, 2017), or improved institutional capacities and knowledge (Ober & Sakdapolrak, 2020). These dominant technocratic narratives often promoted by foreign aid agencies, rarely account to local realities, and are driven by unacknowledged assumptions about the context (Singh et al., 2018; Ober & Sakdapolrak, 2020). Further, they are often disconnected from the socio-economic and historical context within which the risks occur. Singh and colleagues (2018) documented such case in the Nicobar Islands, located 1,200 km off the east coast of India. Following the devastation from the 2004 tsunami, national and international aid organisations flooded the small archipelago to provide support in cash and kind. The "relief" provided by the international organisations were supply-driven rather than need-driven (Singh et al. 2018). More so, the long-term social and environmental consequences of the aid organisations responses have created "complex disasters" – a "state more vulnerable than what was caused by the disaster itself, and is a consequence of inappropriate human interventions" with more significant long-term effects on the islands social and ecological systems than the initial physical destruction from the tsunami (Singh et al., 2018). Similarly in Haiti, the free rice generously provided in the aftermath of the 2010 earthquake contributed to the sharp decline of the local rice economy, further creating a dependence on foreign aid for subsistence. Prior to that, Haiti had been self-sufficient in domestic rice production (Jobe, 2011). As mentioned by Abid (2006 in Singh et al., 2018) "[aid] organisations are driven by their own agendas, and they have heedlessly introduced new concepts, ideas, schemes, and projects without taking into account the socio-cultural milieu of the district".The agenda that these organisations promote often lead to recommendations and actions for one-size-fits-all, standardised solutions that fail to acknowledge compounding and interconnected histories of unsustainable resource exploitation, slavery, violence, and land dispossession that occurred in some islands. More so, these actions fail to recognise and internalise how their assumptions, biases and views influence how and what decisions are made. It will be difficult to address disaster risks effectively if people's and organisations' essentialized views about the populations they are trying to "save" remain unexamined and unchanged i.e. without a thorough reflection on their positionality. This reality also speaks to the wider issues of saviourism and privileges within humanitarian and the wider development aid system. Foreign aid organisations influence local, national and international decision-making discourses, narratives and processes, erodes local and community resilience building capabilities, victimises, essentializes and disempowers hazards-affected groups, and ultimately increase dependency on foreign aid, which justify further interventions to implement short-term, sometime further marginalising and maladaptive solutions (Frerks et al., 2011; Kelman, 2018b; Singh et al., 2018).

2.5. Moving forward: Centring intersectionality in DRG

In this paper, we have proposed a pivot in disaster risk governance research and practice by incorporating elements of intersectionality and place-based thinking, specifically in small islands.

Through the six principles presented, we have demonstrated how intersectionality theory is well suited to examine identities, power and positionality within disaster risk governance. As argued by Grove (2013), ‘‘the challenge for radical disaster research is to unearth and mobilise subjugated knowledges of catastrophe and adaptation silenced by unreflexive participatory initiatives that sustain rather than change unjust socioecological systems’’. Currently, limited research provides situational specificity to DRG processes, and notably understanding how diverse the actors involved in theses processes are, beyond their essentialized identities and how their various identities can enable community resilience-building. Intersectionality theory thus provide a comprehensive way of understanding and analysing social characteristics, inequalities and power dynamics beyond the emphasis on gender and entitlements.

While an intersectional framework is not easily actionable, it is an important tool for understanding how social identities and power play an important role in defining the type of actors that will be involved in the risk reduction processes and networks. The principles listed here can help to identify, understand, and potentially overcome barriers to individual and community resilience-building. These principles encourage researchers and practitioners to challenge their biases, assumptions and essentialized perspectives and ask “who dominates?’ “who benefits?” and “who gets left behind?”.

Further, there is a need to reflect whether these actors are aware of their relative power and position within the network(s) in which they operate, and if they can deliberately manipulate this knowledge to their advantage. Answering these questions will provide a deeper understanding of place-based social relations and their influence on risk reduction, adaptation actions and governance.

The principles we outline provide a pathway to address these questions, but also acknowledge the need for bodies (and their characteristics) to be embedded within the study of governance networks, and for the design and implementation of actions aiming at addressing disaster risk and wider environmental change. For instance, understanding individual or group adaptation and risk reduction strategies requires research that analyses pattens of behaviours and choices, and more importantly, their social embeddedness. This is more important as for some islands, as the centres of power and decision making are historically, culturally, and geographically distant from the places of where the hazard take place. There are currently no specific tools to do so because of the limited understanding that we have of the way the different moving parts (people, communities, governments, private sector and other stakeholders) are connected and how they exchange information. In this context, the work of Crenshaw (1989, 1990) on structural and political intersectionality can provide the context needed to: (i) analyse how intersecting identities interact to create individual experiences; and (ii) provide the empirical basis to understand how identities and bodies are incorporated and used within networks and centres of power to address disaster risks.

The analysis of networks is a central component of an intersectional DRG: the identities of actors involved in networks will determine the nature of relationships across scales, which in turn, will limit, disqualify, promote, modify, or reinforce various forms of knowledge (Grove, 2013), and ultimately affect the type of emerging responses, actions and policy decisions. In order to challenge current structures of power and empower marginalised and often silenced communities, the analysis of governance networks through an intersectional lens draws attention to the diversity of both sexual and gender identities, paternalistic practices, degrees of abilities/disabilities beyond the usual man/woman binaries, in both theory and practice. Institutions will need to identify these intersecting identity patterns and recognise the assets that a diversity of actors bring to the policymaking and problem-solving table. As stated by Dunn (2016), they bring "local knowledge networks, resources, cultural insights and trust"—all of which are strategically important to the disaster risk reduction and adaptation process.

Chapter 3: Identities in disasters: experiences of gender and sexual minorities within disaster risks governance networks in Dominica[4]

3.1. Chapter summary

Focusing on the experience of gender and sexual minorities in the island of the Commonwealth of Dominica (thereafter Dominica), this manuscript aims to generate insights on intersectional disaster governance opportunities (or barriers) through the understanding of trust and marginalisation within social networks. Structural inequalities and identity processes are fundamental to understanding disaster risk governance in Dominica. While the legal status of same-sex activities is currently being challenged, the current status quo has significant effect on the participation of gender and sexual minorities (GSM) within disaster risk governance networks. Through an intersectional analysis of both the experiences of GSM and the communities within which they live, this research undertakes a practical reflection formulated through four main themes: (i) navigating identities (ii) victimisation and vulnerability; (iii) the importance of place and scale and (iv) how power defines access and agency. More generally, this chapter is a first step toward an explicit stock taking that brings visibility to the concerns and contributions of GSM within local DRG processes. The experiences of GSM embody a nuanced depiction of fragmented identities. In this context, equitable inclusion, trust building, and disaster justice are meaningful steps toward the improvement of nuanced and contextualised DRG in Dominica and the wider Caribbean Region.

3.2. Introduction

Focusing on the experience of gender and sexual minorities in the island of the Commonwealth of Dominica (thereafter Dominica), this manuscript aims to generate insights on intersectional disaster governance opportunities (or barriers) through the understanding of trust and marginalisation within social networks. Here, we define intersectional disaster risk governance as the place-based and intersecting dimensions of identities and power within decision-making processes that ensure that policies, strategies and actions aiming at reducing disaster risks centre the individual, collective vulnerabilities and social/relational inequalities. This perspective acknowledges that individuals are not homogenous and that their experience within DRG structures are influenced by multiple social factors.

Disasters are the result of pre-existing social and environmental disruptions and vulnerabilities, and often have major long term, systemic impacts (Blaikie et al., 2004; Hewitt, 1983; Maskrey et al., 2022). As a result, minorities, people already living on the margins, or whose identities are the

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intersection of inequalities and discrimination are worse off and recover more slowly (Gorman-Murray et al., 2017; Hill et al., 2023). Marginalised individuals and groups experience unique combinations of risk and are thus in need of specific considerations. In particular, people that do not conform to the place-based "standard" – gender binary, heteronormativity and patriarchal norms, family composition, ethnicity, immigration status, are invisibilised within DRR discussions and actions (Djoudi et al., 2016; Kaijser & Kronsell, 2014; Walker et al., 2021; Yamashita et al., 2017).

Gender and sexual minorities (GSM), more commonly referred as lesbian, gay, bisexual, trans, queer and other minority gender and sexual identities (LGBTQ+) are a key, yet often invisible demographic whose needs and unique challenges are typically absent from disaster governance processes (Dominey-Howes et al., 2014; Gaillard et al., 2017; Gorman-Murray et al., 2017; King, 2022; Yamashita et al., 2017). Here, we will deliberately refer to gender and sexual minorities (GSM) instead of the acronym for LGBTQ+: it includes individuals who do not necessarily self-identify with any of these terms. Individuals may refuse to identify as LGBTQ+ while recognising that their gender and sexual identities may differ from heteronormativity and gender binaries (Agard-Jones, 2009; Kempadoo, 2009).

There is an important body of literature regarding the need to account for the gendered experience of disaster, beyond the typical gender dichotomy of men/women (Djoudi et al., 2016; Enarson et al., 2007; Fletcher, 2018). However, despite a growing awareness of the societal issues faced by GSM, their considerations and experiences in disaster situations are largely absent from DRR and disaster management strategies (Haworth et al., 2022). More so, their contribution and support to disaster relief operations and recovery is often not officially acknowledged nor captured (Tacloban LBGTQ+ groups, 2016, for the response to cyclone Haiyan/Yolanda, personal communication). Including gender and sexual minorities within DRR efforts and wider governance processes is consistent with the whole-of-society, "leave no one behind" systemic risk approaches promoted by the Sendai Framework for Disaster Risk Reduction (2015–2030) and by the Dominica Climate Resilience and Recovery Plan 2020-2030 (GCD, 2020; IFRC, 2021).

Beyond the indisputable ethical need for an intersectional, inclusive approach to effectively address systemic risks, this manuscript adopts a disaster justice perspective. According to Douglass and Miller (2018, p. 271), disaster justice is a moral claim on governance, which arises from anthropogenic interventions in nature that incubate environmental crises and magnify their socially and spatially uneven impact. International and national frameworks addressing disaster risks promote the safety of all people and prohibit discrimination. In fact, in its Climate Resilience and Recovery Plan (2020-2030), the Government of the Commonwealth of Dominica (GCD) "recognizes that delivery systems must be attuned to the challenges and obstacles faced by vulnerable, as well as disadvantaged groups and take special measures to protect these" (GCD, 2020). However, whether nationally or internationally, this often translates into one-size-fits-all, blueprint approach to DRR and more widely, climate actions (Abimbola et al., 2021).

Trust is a core component of the functioning of governance networks as it enables open collaboration, reciprocal relationships and resources exchange (Klijn et al., 2010; Klijn & Koppenjan, 2012; Newig et al., 2010). Within these networks, actors play a central role in defining the foundations for collaboration, information sharing and overall effectiveness of these networks in addressing complex societal challenges (Blackburn, 2014; Tierney, 2012). In small islands particularly, such networks facilitate the understanding of how social identities and relational power define the type of actors that will be involved in risk reduction actions and their location and influence within island-wide governance processes, specifically whether they are at the center or the margins of these networks (Hill et al., 2023). They also facilitate the identification of identity-specific barriers to people's participation in these governance mechanisms (at various scales), therefore at the basis for the identification of equitable, just solutions that support better DRG outcomes. Here, the focus is particularly on the importance of identities regarding information trust. Research has shown that sexual and gender minorities have limited access to disaster information and are at the margin of mainstream disaster governance networks, which affect their safety and capacity to act (Gaillard et al., 2017; Haworth, et al., 2022).

The insights emerging from this analysis highlight the importance of individual and collective identities within DRG processes and foster transferable lessons for similar small islands. To do so, this paper is organised as follows. First, we discuss the status of gender and sexual minorities' rights in Dominica and in the wider Caribbean Region. Then, we present the conceptual framework that guided the reflection and data analysis, including a focus on trust, networks, governance and intersectionality. Third, we present the data collection methods and next, discuss the findings, using the framework presented by Hill et al., (2023). Finally, this manuscript examines the manner in which these insights can improve "fit-for-purpose", context-dependent, place-based, multiscale disaster risk governance outcomes that better respond to the unique challenges faced by marginalized and underrepresented communities.

3.3. Status of gender and sexual minorities rights in Dominica and the Caribbean

The violent and oppressive policies inherited from colonial and religious past and present greatly influence gender and sexuality politics in the Caribbean (Harris & Pires, 2015). For the English-speaking Caribbean islands (and other countries colonised by the United Kingdom), the root of the anti-buggery laws that are enacted within national legislation originate from section 377 of the British Code that stated that "whoever voluntarily has carnal intercourse against the order of nature with any man, woman or animal, shall be punished with imprisonment for life or with imprisonment of either description for a term which may extend to ten years, and shall also be liable to fine". Further, the "politics of respectability" informed by Christian and other religious values are often over-emphasized as an argument to maintain these anti-buggery laws (Agard-Jones, 2009; Thomas, 2004, Harris & Pires, 2015). These laws are still enacted in several English-speaking Caribbean countries, criminalising consensual sexual relations between same-sex adults in private. Recently, these laws have been challenged, resulting in a wave of law repeals in Antigua and Barbuda (2022), Barbados (2022), Saint Kitts and Nevis (2022), and Trinidad and Tobago

(2018) (Dickson et al., 2022). In Dominica, the two sections of the Sexual Offences Act (SOA) that criminalize consensual same-sex activities were challenged in September 2022 through the High Court of Justice, with the ruling currently awaited at the time of writing. In Spanish speaking Caribbean (i.e. Cuba and the Dominican Republic), the situation is also varied: for instance, in Cuba, anti-homosexuality laws were repealed in 1979; since September 2022, the Family Code now includes provisions for same-sex marriage, civil unions and adoption by same-sex couples[5]. On the other hand, in the Dominica Republic, sexual acts among same-sex consenting adults (over 18) have been legal since 1822, however, same-sex relationships and rights are not recognised by law[6]. Finally, citizens of British, French, US and Netherlands' territories are generally afforded the same rights and protections as their continental counterparts. In French Caribbean islands, France's legal code provides both protections and rights regarding sexual acts among consenting adults of the same sex with the decriminalisation of homosexual acts between two consenting adults since 1781, civil union available since 1999, and same-sex marriage legal since 2013 (Dickson et al., 2022).

A review of the current DRR literature highlights the limited number of research, frameworks, policies and discussion regarding the experiences of sexual and gender minorities (Gorman-Murray et al., 2017). Hence, it is "no surprise that international and national institutional and legal frameworks geared towards reducing the risk of disasters are consistently silent on the needs and potential contributions of sexual and gender minorities" (Gaillard, Gorman-Murray, et al., 2017). The small body of literature currently available mostly discusses the experience of the gender and sexual minorities within disaster contexts in the US, Europe and Australia (Dominey-Howes et al., 2014; Goldsmith et al., 2022; Gorman-Murray et al., 2017), with a few stories in Haiti (IGLHRC and SEROvie, 2011), Brazil (Haworth et al., 2022) and Japan (Yamashita et al., 2017). Most authors stress that the marginalisation of members of GSM increased in disaster situations and inequalities are magnified (Dominey-Howes et al., 2014; Gorman-Murray et al., 2017; Jacobs, 2019; King, 2022; Rushton et al., 2019; Yamashita et al., 2017). Here, the use of the term gender and sexual minorities rather than LBGTQ+ is deliberate; this distinction will be particularly important in the result and discussion sections.

Research on the experience of GSM has reached a pivotal moment: knowledge on social vulnerability and marginality in disaster context is well established. However, its translation into concrete actions and policies is currently limited (Haworth et al., 2022). Further, at the time of writing, no other study analyses the unique position of GSM within disaster risk governance networks.

[5] Cuba Family Code: Country votes to legalise same-sex marriage
Published on 26 September 2022. Available here: https://www.bbc.com/news/world-latin-america-63035426.
[6] See information from the United Kingdom Foreign Office, available here: https://www.gov.uk/foreign-travel-advice/dominican-republic/local-laws-and-customs.

3.4. Conceptual Framework

The conceptual framework of this research is based on the principles proposed by Hill et al., (2023). These six principles guide the operationalisation of an intersectional, place-based approach for DRG to better support inclusive and contextualised decision-making processes that specifically build on experiences from small island geographies. The principles are as follows: (i) individuals are multi- dimensional and complex; (ii) identities and vulnerability are not predefined; (iii) spatial and temporal differences influence the expression of identities; (iv) materiality of ecological systems influences intersectionality; (v) power relations are central the emergence of social processes and epistemologies; and (vi) positionality plays an important role in defining risk reduction agendas and choices (Hill et al., 2023). These principles are not applied here directly, rather the research here is organized following four themes within which most of the principles are reflected.

Building on these principles, the concepts of "governance", "networks", "trust", "intersectionality", "identities" and "power" are central constructs associated with this research. Here, "governance" in the context of governance networks, represents "(i) relatively stable horizontal articulations of interdependent, but operationally autonomous actors who (ii) interact with one another through negotiations which (iii) take place within a regulative, normative, cognitive and imaginary framework that is (iv) self-regulating within limits set by external forces and which (v) contributes to the production of public purpose" (Torfing, 2005). These governance networks are shaped by i) interdependency and trust; and ii) identities, relationship and power of the actors at the centre of these networks (Klijn et al., 2010; Mehta et al., 2017). According to Klijn et al., (2010) trust has many definitions but has generally three main characteristics: vulnerability, risk and expectations. The assumption is that governance actors will refrain from action if trust is absent. Trust plays a significant role in communication, information exchange and decision making at multiple scales (Mehta et al., 2017). Trust does not occur immediately nor in a vacuum. Trust is built over time through personal connections. Klijn et al. (2010) presented three reasons why trust is important within governance networks: (i) trust fosters greater predictability within networks, thus reducing transaction costs; (ii) trust increases the probability that actors will invest resources (time, money, knowledge, etc.) to strengthen the relationship and in the processes, creating opportunities for collaboration; and (iii) trust stimulates learning and information exchange. In this paper, the focus will be particularly on the second and last dimensions of trust, with an emphasis GSM and other local community members. Trust is particularly important in situations of high uncertainty and high variability such as disaster risks. As many actors are involved within DR governance networks, trust manifests through their connection to other actors to achieve their goals (Klijn et al., 2010).

Another aspect of these governance networks involves the identities of governance actors. Most of the literature on governance networks focuses on institutional identities and groups, i.e. categories such as "decision-makers", "communities" and "government" for instance. However, in this research the focus is explicitly on actors' individual identities and the biases, assumptions, power and positionality that emerge or are influenced by these institutional identities. Here, we

draw on Tajfel's (1974) definition of "(social) identity" as "[…] an individual's self-concept which derives from his knowledge of his membership of a social group (or groups) together with the emotional significance attached to that membership". These identities define group memberships and network of relationships that an individual will be part of or excluded from over the course of a life. The study of identities is emerging as a core concept in climate change adaptation (Adger et al., 2011; Barnett et al., 2021; Frank et al., 2011; Fresque-Baxter & Armitage, 2012) and to a lesser extent, in disaster risk reduction (Carr et al., 2015).

Intersectionality is especially suited to study the conundrum of identities, trust and disaster risk governance. Interdependence, multi-dimensionality and mutually constitutive relationships are at the core of intersectionality (Bowleg, 2008a), but also are characteristics of social networks. Here, intersectionality represents the "critical insight that race, class, gender, sexuality, ethnicity, nation, ability, and age operate not as unitary, mutually exclusive entities, but as reciprocally constructing phenomena that in turn shape complex social inequalities" (Collins, 2015: 2). Intersectionality explores the complexity and dynamics of identities and oppression, social positioning, normative values and power across various scales and levels and between particular divisions (Fletcher, 2018; Osborne, 2013). Intersectionality is also a way of acknowledging the need for bodies (and their characteristics) to be embedded within networks and social-ecological research to foster social action (Bakker & Bridge, 2006). In this context, the work of Crenshaw (1989, 1990) on structural and political intersectionality can provide the context needed to (i) analyse how intersecting identities interact to create individual experiences and (ii) provide the empirical basis to understand how identities and bodies are incorporated or marginalised, and used within networks and centres of power to address disaster risks. Within a given society and culture, some identities are more important and "public" than others, and hence generate different outcomes in disruption situations.

Finally, intersectionality explains how power structures and identity categorisation foster or hinder solidarity and agency, and how, through this power, these social categories are reinforced, challenged or renegotiated (Kaijser & Kronsell, 2014). Power – defined in here as the ownership of resources and the uneven capacity of different actors to control the goals, processes, information and outcomes within polycentric environmental governance processes (Wisner & Luce, 1993; Morrison et al., 2019) – is a core component of intersectionality: social differences in power shape both vulnerability and capacity to act, specifically in the face of environmental change (Wisner & Luce, 1993; Kaijser & Kronsell, 2014; Dunn, 2016; Fletcher, 2018). Here, the focus is on examining the "geometries of power" (see Swyngedouw, 2004b; Hill et al., 2023), as they can generate insights on stakeholder agency and reveal the processes that produce relationships and build trust between actors. Furthermore, power shapes the performance of different governance systems to address the problems they were created for (Morrison et al., 2019) and overall, is a reflection of the level of marginalization that potentially occur with DRG networks.

3.5. Materials and methods

3.5.1. Study sites and location

Dominica is a tropical island that occupies an area of about 750 km^2. The island is located on the northern part of the Windward Islands groups in the Caribbean Region. It is a highly mountainous island, with about 70% of the island's total land area unsuitable for modern agriculture, primarily due to the risk of sheet erosion or waterlogging (Burke & Lovell, 2000; Barclay et al., 2019). Due to its geographical location, Dominica faces multiple natural hazards, including hurricanes, the most recent and destructive one being hurricanes Maria and Irma in 2017, earthquakes and volcanic eruptions (with nine volcanoes on and around the island). Dominica is also subjected to intense rainfall, erosion and slope instability, and possible storm surges and tsunamis (Wilkinson et al., 2016; Barclay et al., 2019).

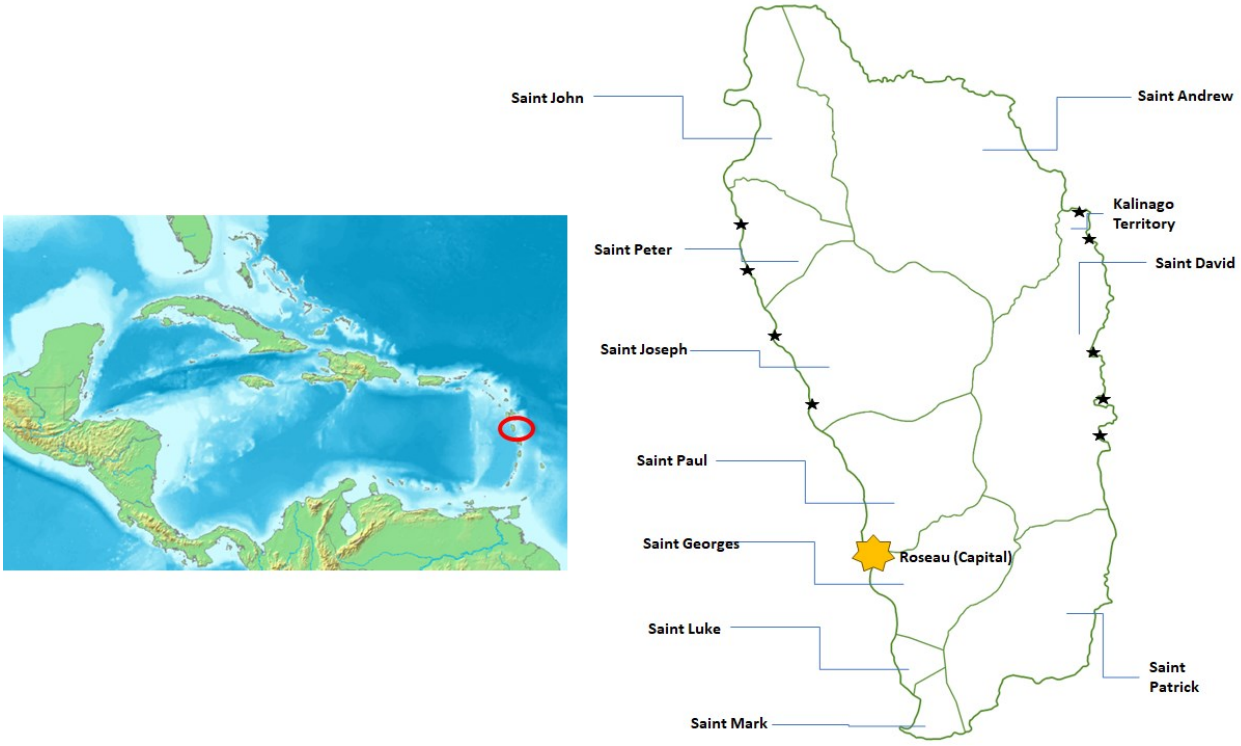

Figure 3.1: Map showing the ten parishes of Dominica. Black stars indicate data collection sites. Insert: localisation of Dominica within the wider Caribbean (Base maps adapted from ©Wikimedia Commons; ©Demis map server)

The research was conducted in one study site (Dominica) and four sub-national case studies were selected around the island: the Kalinago Territory and Saint David (Castle Bruce and around) on one side and Saint Joseph (St Joseph, Mero and around) and Saint Peter on the other side of the island (see figure 3.1 for details). The data sites were selected following the recommendations of the Ministry of Agriculture, Fisheries Blue and Green Economy and from the vulnerability analysis

conducted by Pinnegar et al. (2019) (as per figure 3.2). Dominica's economy is mainly based on agriculture with fishing and farming contributing to more than 20% of the country's GDP (PDNA, 2018). As such, fisherfolks and farmers represent a key demographic to understand disaster risk on the island. Hence, the survey focused on fisherfolks and farmers as the first or secondary income generating activity. The vulnerability analysis, conducted by Pinnegar et al., (2019) in the aftermath of Hurricane Maria, calculated the areas with the highest vulnerabilities (>0.5) from a fisheries perspective and provided the justification for the site selection (see figure 3.2). As a result, the parishes of Saint David, Saint Joseph and Saint Peter were selected as representative of the island. The Kalinago Territory was also concluded in the analysis as the Kalinago are a key stakeholder group in the country and their inclusion also helps looking as at DRG issues from an intersectional perspective.

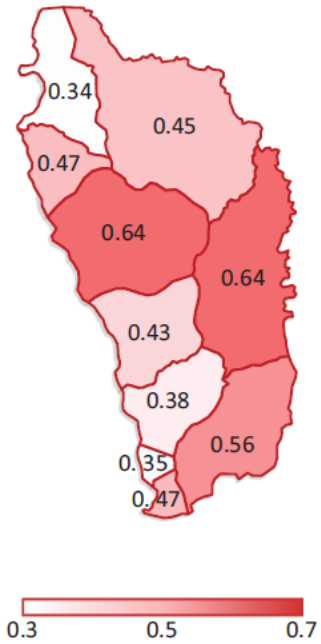

Figure 3.2: Overall climate vulnerability from a fisheries perspective in the ten Parishes of Dominica. This map was the basis for the selection of data collection sites. From Pinnegar et al., 2019.

3.5.2. Data collection methods, limitations and analysis

Data was collected using three complementary but different techniques: in-depth sociometric interviews, key informant (KI) interviews and an online survey. The use of multiple data collection techniques was considered effective to maximize representativity and strengthens the credibility of the research outcomes (Shanks & Bekmamedova, 2018). In this case, these multiple techniques provided data that portrayed different interpretations and meanings to the problem at play.

3.5.2.1. In-depth sociometric interviews

In-country data collection took place between April and December 2021 and was completed using a field research team of four locally selected individuals. Due to COVID-19 restrictions, data collection was paused for about 3 months between September and December 2021 for the security of the local research team. The initial vulnerability assessment that enabled the identification of the data collection sites focussed on fisherfolks. However, Dominica's economy is mainly based on agriculture with fishing and farming contributing to more than 20% of the country's GDP (PDNA, 2018). As such, fisherfolks and farmers also represent a key demographic to understand disaster risk on the island. The interviews focused on fisherfolks and farmers as the first or secondary income generating activity (n=120). A total of 90 men and 30 women were willing to participate in the surveys. Community members were selected using a snowball sampling method on the basis of their profession and residence within the targeted locations. Each interview was conducted within each community at a location of the interviewee choice, with a duration that varied between 30-35 min.

3.5.2.2. Key informant interviews

Further, key informant interviews were conducted (n=10) with stakeholders from national and international entities involved in disaster risk governance processes. In-person, community interviews were conducted by the local research team while the key informant interviews were conducted remotely by the first author. Both the community and key informant interviews were conducted in English, French or Antillean Créole and translated in English for data analysis.

Key informants were selected using both a purposive expert sampling method and a snowball technique: participants were selection on the basis of their involvements within DRG processes as well as following recommendation from previous interviewees.

3.5.2.3. Online survey

Because of the status of gender and sexual minorities rights in the Caribbean region, an anonymous online survey was determined to be the most appropriate tool to reach out to participants and guarantee their anonymity and security. The online survey was created on the platform Qualtrics and was disseminated by social media platforms (Instagram, Facebook, Snapchat) and local formal and informal LGBTQ+ organisations' WhatsApp groups. The survey (n=38, table 2) was conducted to elicit insights specifically from GSM in Dominica (n=17) mainly and the Caribbean Region more widely (n=11) and understand their involvement within disaster governance processes in the region. The survey was developed similarly to the sociometric survey, adapted to online data collection and translated in French, English and Spanish.

Table 3.1: Online Sample overview (account for only the respondent who answered demographic questions (about 70% of respondents)

Category	Responses	Number of respondents
Sex assigned at birth	Male	19

	Female	7
	Unknown	1
Locations	Dominica	17
	Guadeloupe	5
	Monserrat	1
	Other	5
Sexual orientation	Lesbian/woman who has slept with women	3
	Gay/ man who has slept with men	9
	Queer	1
	Bisexual	7
	No label/Unknown	5

3.5.2.4. Data collection limitations

Conducting intersectional research is an analytical challenge: typically, data collection is designed to collect static, independent and unidimensional identity data while intersectionality, by definition, integrates the notion that identities are interdependent, dynamic and variable, and mutually constitutive (Bowleg, 2008; Hill et al., 2023). In addition to the relative shortage of researchers discussing the methodological aspects of intersectional research, it is challenging to create a single methodology and/or framework that can be used across disciplines. In fact, most intersectional research is conducted through trial and error (Bowleg, 2008a).

This research also raises some important insights regarding the use of an intersectional framework for understanding place based DRG in small island communities. The research design used here aimed to analyse and interpret research findings with the local social, economic, historical, and to a lesser extent, ecological context that created structural inequalities and social hierarchies (Crenshaw, 1989, 1990; Bowleg, 2008a; Collins, 2015) that GSM face within DRG processes. The intersectional framework presented by Hill et al., (2023) is grounded in the contextualised experience of ordinary people and aims to inform research and policy interventions that address gaps in DRG, particularly through networks. As highlighted by Bowleg (2008), designing an intersectional research protocol that effectively captures the nuanced and differential identities of people is challenging but does provide researchers and practitioners with relevant tools to advance knowledge and challenge structures of power that currently shape DRG networks.

In this research, due to the status of gender and sexual minorities in the country, it was difficult to openly discuss issues related to GSM with community respondents for the analysis conducted in manuscript. Further, some community participants took offence when asked to freely respond about their sex and /or gender or other questions related to their identities. After a short trial, it was agreed to remove some of these questions and use more “traditional” demographic questions. This paper will briefly reflect on the challenges of conducting applied intersectional research, specifically regarding DRG research. Finally, targeted communities experienced a “survey fatigue” due to the volume of surveys and projects that were conducted in the country in the aftermath of

the Hurricane Maria in 2017. As a result, the number of women willing to respond and participate in the in-depth sociometric interviews phase of the data collection was low, representing about 30% of the total respondents.

3.5.2.5. Data validity

Despite ties from the researcher in the island and the help of local research assistants for the data collection process, many members of the communities were reluctant to participate in the research and share information about their networks. There is a general distrust of government officials throughout the island. This was particularly apparent in the selected areas for data collection. Hence, some community members are reluctant to participate in the research, despite confirmation that this research was not linked to any government programmes. As a result, and coupled with the COVID-19 restrictions occurring at the time of data collection, data emerging from the surveys inevitably represent a partial representation of the entire disaster risk governance system present in Dominica and experience of GSM on the island. Despite these issues, results emerging from the sociometric interviews, and the online survey were further validated during discussions with the key interviewees; hence, the data presented in this research are considered as valid.

3.5.2.6. Data analysis

A thematic analysis was conducted using NViVo 1.0. The principles highlighted in Hill et al., (2023) guided the design of the data analysis framework and the data coding process. Interviews were transcribed; subsequent coding was done in phases following a grounded theory approach (Glaser et al., 1968). First an inductive, open coding process was used as codes emerged directly from analysing the meanings within the data and the linkages with the questions asked (Linneberg & Korsgaard, 2019). Second, an axial coding process was conducted to further organise and categorise the data according to emerging themes. The main themes emerged following discussions with the key informants and during the first step of the data analysis process. These themes were further refined during the axial coding process and revolved around trust, identities (sexuality, gender, religion, political affiliation and migration status) and governance actions. The data was subsequently analysed to specifically capture narratives around the experience of GSM.

3.6. Results and discussion

The goal of this research was to investigate the unique forms and challenges faced by gender and sexual minorities for improved disaster risk governance in Dominica. Though the implementation of the framework described by Hill et al., (2023), four main themes have emerged: (i) navigating identities (ii) victimisation and vulnerability; (iii) the importance of place and scale and (iv) how power defines access and agency.

3.6.1. Navigating identities

> *Sexual orientation shouldn't be a factor when it comes to decision making of any sort. At least, it should be the most capable people involved without prejudiced judgement on whatever sort. (GSM respondent).*

Understanding structural inequalities and identity processes are fundamental to navigate disaster risk governance in Dominica. Identities can positively and negatively impact social norms and community cohesion: on one hand, identities are at the core of collective decision-making and trust building within a community; one the other hand, identity-based systemic and structural inequalities and oppression have been shown to decrease community cohesion and trust post-disaster (Templeton et al., 2020). In parallel, policies and decision making processes tend to homogenise vulnerability and the experience of marginalised communities, typically erasing the complexity of people identities and the unique, intersecting factors that impact their marginalisation, capacity to act and options available to do so (Haworth, et al., 2022).

Essentialist perspectives, which typically focus on single identity categories, fail to capture the complexity of identities, hindering a comprehensive understanding of their contextual vulnerabilities. For instance, essentialist perspectives for gender emphasise for instance traditional gender roles, predetermined gender binaries and biological determinism (see Djoudi et al., 2016; Rushton et al., 2019). In fact, gender and sexuality are key factors that potentially shape the position and experience of individual actors within DRG processes. However, disaster research and policies generally maintain the normative status quo regarding the framing of gender, sexuality and identities (Fletcher, 2018; Haworth, et al., 2022; Jacobs, 2019). Social identities play a key role in evaluating the validity of information and is a central element of adaptation and risk reduction capacities (Frank et al., 2011). In the Caribbean, sexual identities are generally kept private, heterosexual or not (Agard-Jones, 2009). In fact, GSM respondents acknowledged the multidimensionality of their identity and that their sexuality is only one aspect of their lives. Some refused to identify with the LGBTQ+ label, referring more to "the freedom to sleep with whoever they want" and inferring that their sexuality is not as important as their other, more visible identities (e.g., sex, race, ethnicity, etc.) (GSM respondent, male, Dominica). Further, they questioned the way issues and identities are contextualised and framed, or even if some of these issues were relevant for the population at play. Western narratives that "centers around coming out and the assumption of queerness as an identity" can be in contradiction with the view the Dominica or Guadeloupe Queer communities (see Agard-Jones, 2009; Kempadoo, 2009 for more details).

This research revealed a key paradox in regard to the way GSM navigate the expression of their identities. On the one hand, sixty-six percent (66%) of GSM respondents have stated that their sexuality or any part of their identities has not affected their experience in the aftermath of a hazard (2017 Hurricane Maria was given as an example of disaster situation). In addition, more than 70% of community respondents stated that a person's identities do not matter in their ability to trust the information that will be shared with them. Further, about 87% of community respondents said they would trust information coming from people involved in a same-sex relationships whether person's sexuality is open, assumed, or implied. Similarly, about 83% of community respondents mentioned that sexuality does not impact the quality of the disaster information received or their ability to share this information with someone involved in same-sex relationships. Some community

members specifically mentioned that it is important that the person providing the information be from the same community, rather than any of their social identities.

> *Personally, I think, as I told you, it's the information they're giving you. It has nothing to do with the person. Whether they are lesbian, they're gay…they're giving me information. If it's something I can use, it's okay with me. I don't have a problem.* (FFKal022 – community respondent)

On the other hand, 72% of the GSM respondents have indicated that they have to hide some or all aspect of their gender and/or sexual identities in order to live within their respective communities and maintain trust and social cohesion. This aspect has also been echoed by one of the key informants who stated that if GSM are embedded within other groups and communities through their other intersecting identities, then they are not directly marginalised as people (KI #002).

Further, of the 34% that stated that their sexuality or any part of their identities has affected their experience in the aftermath of a hazard, they cited emotional abuse (19%), financial abuse (19%) psychological abuse (15%) and verbal abuse (12%). A local LGBTQ+ leader in Dominica described the difficulties that they had for accessing relief following the Hurricane Maria in 2017. They mentioned how relief information was purposefully withheld, especially regarding the distributions of rations and relief material (KI #003). Similarly, in Haiti, predominantly faith-based aid organisations responding after the 2010 earthquake prioritised cis- and married women as head of households, explicitly excluding already marginalised gay men, lesbian and single women, and transgender people for accessing emergency food rations (IGLHRC and SEROvie, 2011). Similar experiences of marginalisation were also reported in the aftermath of the 2011 earthquake in Japan (Yamashita et al., 2017).

As described in the subsequent sections, the paradox is reflected within this sense of "one of us", of belonging within a community, and is particularly relevant to assess the validity of disaster information that was shared within the communities who participated in this research. As shown here, individuals who were perceived as "one of us" were more likely to be trusted, and were met with a sense of solidarity, despite other intersecting identities that might not be as well received within the community. This is not only applicable for gender and sexual minorities but also for people whose intersecting identities can lead to compounding marginalisation and oppression. Further, this paradox is particularly relevant for small islands, as they are the embodiment of dichotomies: people's and communities' narratives shift between unity and inclusion, and separateness and exclusion to navigate norms, conflict and expectations (UNESCO, 2011; Foley et al., 2023; Hill et al., 2023). In particular, the cultures of kinship networks (i.e. figure 3.3) and resourcefulness that are at the core of some small island inhabitants' identities can either foster an improved and inclusive DRG networks or hinder the development of equitable DRG outcomes (Foley et al., 2023; Hill et al., 2023). These kinship networks can also facilitate more "homogenous" cultural norms that tend to push to the margins minority or dissident voices (Foley et al., 2023).

Dominica showcases a complex multidimensionality where individuals are allowed to assert their unique identities, attributes and experiences, but only within certain (often arguably flexible) community norms and values. This behaviour is not necessarily exceptional; in fact, it is fairly consistent with other studies on the linkages between identities and, disaster and climate change adaptation (Adger et al., 2011; Barnett et al., 2021; Fresque-Baxter & Armitage, 2012). However, it becomes more important for people and, more importantly, disaster practitioners to understand the societal conditions fostering the outward manifestation of one's gender and sexual identities. Navigating identities implies working beyond the narrow definition of gender and sexual identities to address issues for the society as a whole. In fact, there are no one-size-fits-all approach that can navigate the expression of these identities within local DRG networks. In this context, a place-based intersectional perspective can explicitly deepen the nuanced understanding of relationalities and sensitivities linked to the expression of identities more generally in islands, but specifically within disaster governance networks at scale.

3.6.2. Victimisation and vulnerability

> *During a disaster everyone should be involved. If everyone is included in the planning process, it mitigates the risk of person from a certain group being left out, gay people will always look out for their kind during a disaster (GSM respondent).*

One of the aspects that emerged from the research is related to victimisation: several GSM respondents mentioned that their sexuality does not define their whole identities and therefore refuse to be considered as powerless, helpless victims. The results presented in the previous section demonstrated the flexibility and adaptability that GSM have displayed to navigate the complexity of the expression of their gender and sexual identities and the requirements of belonging to communities related to their other intersecting identities. While every island is different in that regard, GSM have learned to negotiate between being open with their gender and sexual identities and trying to "pass" as heterosexual if/when necessary (Agard-Jones, 2009), even before the wave of decriminalisation and anti buggery law repeals occurring in the Caribbean. Here particularly, the nuance is clear: identity-specific needs should be presented within governance arrangements, but they shouldn't be used to define someone's whole identities and subsequent vulnerabilities. Answering the question of what needs to be done to improve the way disaster are addressed in their respective countries one of the GSM respondents stated:

> *As part […] of those fully considered during disaster planning which includes all [our] varying needs due to sexuality and ethnicity. (GSM respondent)*

The paradox described earlier also applies here: GSM might not be specifically excluded from disaster networks because of their sexual identities, yet they are not able to voice identity-specific needs within policy advocacy and decision-making processes. Despite the existence of local disaster networks in most communities around the island (formal or informal – Key informant #006), about 72% of GSM responders stated that they have not received any help from these local disaster groups. Instead, most relied on support from family and friends (29%), from their

professional networks (19%) and from the government (for post-disaster relief) (23%). In contrast, about 80% of community respondents (108 out of 120 people) stated that they received some support from local and national disaster groups. This is consistent with figure 3.3 where more than 20% GSM responders selected kinship, i.e. family, friends and acquaintances, as their main source of disaster information. There is also a significant difference in other sources of information between the two groups – such as radio, schools and social groups – that could be attributed to difference in the age of the respondents: more than 50% of community respondents were over 50 years old while more than 75% of GSM respondents were between 18 and 40 years old. GSM have displayed high variability in their sources of information that could be used to fill information and resources gaps.

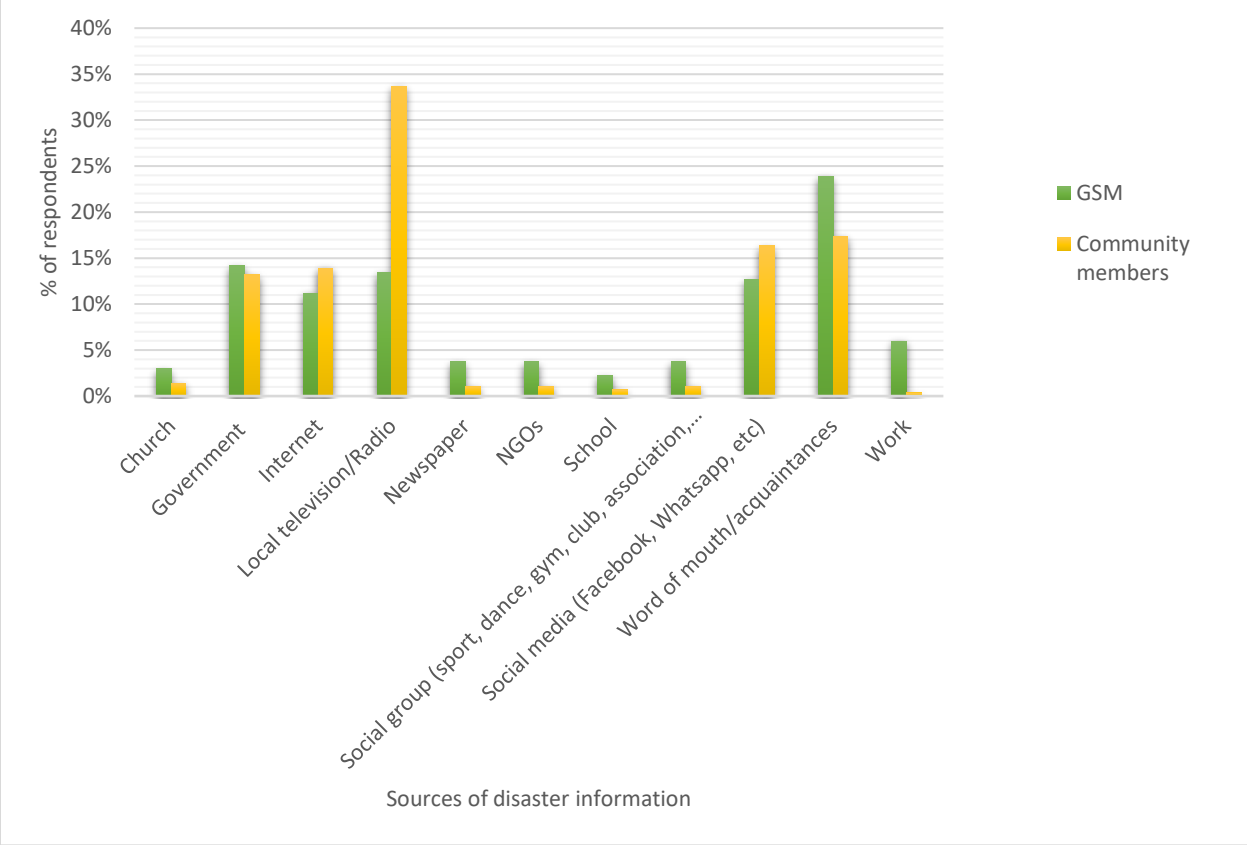

Figure 3.3: Sources of disaster information from the community (yellow) and gender and sexual minorities (GSM; green). The category "Word of mouth" includes information from kinship, i.e. family, friends and acquaintances. It appears that information from kinship network is more important for gender and sexual minorities than for the general population.

In further discussing with KI#006, they argue that including alternative framings within disaster risk governance processes is important, as these framings limit the process of victimisation while actively addressing identity-specific vulnerabilities and supporting agency. These identity-specific vulnerabilities go beyond physical vulnerability and should point to the systems of oppressions –

embodied within culture and customs – that have denied these communities access to networks and resources (Jacobs, 2019). When questioned, KI #003 mentioned that the improvement of local and national level DRG processes requires a change in the wider institutional arrangements within which they operate, and the decriminalisation of same-sex relationships is a first step in addressing the social stigma that is linked with this specific identity.

> *The needs of the LGBTQ community are often overlooked because of the stigma that goes with being LGBTQ in a generally homophobic society. In some cases, support and assistance are denied to people who belong to that community. Having members of the LGBTQ community working with disaster preparedness and planning can help after for their needs and curb the issue of discrimination in post disaster situations.* (GSM Respondent)

Besides the repeal of anti-buggery laws, it is also important to create a supporting environment from a social and cultural perspective. This includes identifying policies and legislation related to disaster and environmental management that can directly or indirectly create and/or exacerbate vulnerabilities, and work at community levels to conduct advocacy that identify and empower marginalised communities (Haworth et al., 2022). This can lead to more in-depth engagement with the community and the explicit mention of gender and sexual minority concerns and needs during disasters, within policy documents.

In summary, the improvement of local and national level DRG processes can potentially occur through a multifaceted approach that includes a pluralisation of voices. This pluralisation of voices involves (i) creating a space where people can express their identity-specific vulnerabilities and (ii) draft concrete and measurable outcomes within an intersectional place-based governance framework that promote accountability and equity, and incorporate a diversity of thoughts and ways of doing.

3.6.3. The importance of place and scale

> *None of that matters. I would accept whoever it is and make them feel happy. I'm not in the business of discriminating; I don't have that business [of discriminating] on my mind* (FFGHo006, community respondent)

This theme speaks to the importance of scale and place for (i) the contextualisation of identities; (ii) the scale at which decisions are made versus the one at which risk is experienced and (iii) the decisions (individual and institutional) that result from these considerations.

A lack of trust within networks of people can significantly hinder the effectiveness of governance networks at multiple jurisdictional scales. Policy makers recognise the need for inclusivity however, the institutional requirements needed to do so are not necessarily present within the island and outside. At regional and international levels, discussions regarding the explicit inclusion of GSM and other marginalised identities are treated as a sovereign issue that can only be addressed

if and when raised by national stakeholders (KIs #007 and #008). At national and local levels, as communities are relatively small, it might not be beneficial to single out identities (KI #006).

However, insufficient consideration of identities and related marginalisation in the impact of disasters and limited participation of these identities within DRG processes can worsen the overall "quality" of risk reduction activities.

> *"In building resilience within the population and excluding another population who may significantly be impacted by everything that you're doing, [you might reach your project targets and goals] […], even if it's not explicitly stated I should probably focus on them [excluded vulnerable population] because in focusing on them, I then strengthen the resilience of everybody else" (KI #002).*

A similar point was raised by a GSM respondent. When asked about the reason why GSM and other marginalised communities should be included in decision making regarding disasters, they responded:

> *Democratize nation building and become more mindful of the power dynamics currently operating in one's surroundings. The good of the community is what is good for everyone in the community. (GSM respondent)*

As mentioned by one of the GSM respondents:

> *If these groups are not being consulted and are continuously ignored by policy makers, then the vision is for the groups themselves to create parallel societies that offers a more effective and united front to address DRR (as compared to those in power) (GSM respondent).*

This quote raises an important point: the informal, parallel identity-specific networks of people recognise that trust and marginalisation are constantly at play within DRG networks at various scales and time. Hence marginalised identities groups (even beyond GSM) create parallel networks to address their specific needs.

> *Normally marginalized communities are the most frequently hit with disasters and so they will know better how they need help. (GSM respondent).*

The key informants that we talked to noted that trust in DRG networks can be eroded by top-down disaster risk governance and power imbalances. These networks already contribute to formal and informal governance processes at local and national levels. As such, results emerging from this research suggest that it is necessary to support and capitalise on the knowledge and lived experiences emerging from these networks and conceptualise practical pathways to include GSM contributions into disaster research, policy and practice. To do so, this requires addressing community participation gaps within local DRG processes. However, despite the relevance of these of these ideas, they might be difficult to implement in the country and in the Region more widely. As mentioned by Cashman (2017) and Hinds (2019), most Caribbean democracies are

young (for instance, Dominica has only been independent for 42 years) and share common institutional features such as fragmented but centralized bureaucracies, as well as top-down, paternalistic, Christian governance processes and authoritarianism (Hinds, 2019). These factors are actively undermining the ability of the general population and of already marginalised communities to participate in formal (decentralised) governance processes, outside of elections (Hinds, 2019).

Like scale, the notion of place plays a key role in shaping governance arrangements. As mentioned in Hill et al. (2023), "place" offers an entry point to reflect on individual and group identities and focuses on the problem-solving capacity of each of actors operating within their governance networks. Most of the literature on governance networks emphasise the importance of trust for learning and information exchange (Klijn et al., 2010) which particularly important for reducing risks and adapting to environmental change. Respondents mentioned that belonging and place identities were the primary requirement for information trust.

> *Like I said, it depends on what they're talking about because if a person has no experience of living here, then they wouldn't understand what we go through. Or, they may not be able to understand the problems that the people are faced with, and then the advice they give may not be the advice that we need based on where we live.* (FFKal009 – community respondent)

In this case, the assessment of the value of the information depends on the way and context within which the information is conveyed, rather than the individual identities of the information "giver". Further, the social relationships involved in the transmission of this information are also key in for community trust (Frank et al., 2011).

> *Because it's information. It doesn't matter who gives it to me. If they give me wrong information then, we have a problem. If they're talking nonsense then I'll say, you're talking nonsense. […] They experienced it [the hurricane]. They're talking from their experience.* (FFKal030 – community respondent)

Similarly:

> *It doesn't matter the person's characteristics as long as the man's status* [i.e. citizenship status] *is valid, the information is suitable, then the person has no problem.* (FFDub011 – community respondent)

The survey data and qualitative interviews revealed disaster information sharing and trust depends on individuals whose most important identities include place-based ties (being part of the community) and experience dealing with similar natural hazards. Social identities play a key role in evaluating the validity of information and is a central element of adaptation and risk reduction capacities (Frank et al., 2011).

In Caribbean islands, hazards are typically accepted as being part of life, rather than an external factor. Similar observations were made for Pacific small islands (Kelman, 2015). Discussion with the communities revealed that while the distrust in the government is generally important, communities come together beyond identities to help each other. The "Koud' min"[7] culture, as mentioned below, often transcend identities; there is a cultural aspect of disasters were communities deal with the issues as they come and as best as they can.

> *For example, there were two ladies that had [issues during Maria] and I just showed them how to put [back their house together]. It is my duty to help whenever I can.* (FFMer004 – community respondent)

The two ladies mentioned by the respondent are a known lesbian couple living in the community. The "Koud'min" mentality ensure that GSM are still considered an integral part of their communities and as such, will receive assistance and trust in disaster situations. It is worth noting that while the experience of other minority groups is beyond the scope of this manuscript, similar observations were made regarding migrants (specifically from Haiti and the Dominican Republic) and that political affiliation played a greater role in determining trust than sexuality, whether open, assumed or implied.

In this context, more than social identities, sense of belonging and the notion of place, embodied by the Koud'min mentality, play a key role in evaluating the validity of information and is a central element of adaptation and risk reduction capacities. The Koud'min mentality often transcends identities; there is a cultural aspect of disasters were communities deal with the issues as it comes and as best as they can.

3.6.4. Power defines access and agency

> *Ensuring that those involved in planning are fully capable of executing their jobs with little to no bias to ensure that information and resources are available prior to and after a disaster. (GSM respondent)*

Biases and power play an important role during disaster relief and recovery as they will determine who will get support and access recovery programs and projects. From a disaster justice perspective, power differentials derive from highly unequal social and economic circumstances and governance arrangements. These power differentials translate for instance into choices when coping with the effect of disasters as well as access to and influence over networks and services. Here, we do not equate limited power with powerlessness, however, it does require a broader engagement with discussions on governance and justice.

Individuals and groups have a unique combination of identities and as a result, experience unique combinations of risk and are thus in need of specific consideration. Within an intersectional framework, no one person is only a woman, or only a GSM. However, people that do not conform

[7] From the Antillean créole. Means giving a hand, helping out. Translated by the first author.

to the societal identity standard find way to build their own parallel (often cross cutting) networks using their other intersecting identities (GSM respondent; echoed by KI #002). Through these other identities, they are embedded within other groups and communities thus limiting the extent of direct marginalisation that they face as people. This does not mean that long-term discrimination against GSM does not exist in Dominica and the rest of the Caribbean. Rather, they use their power and agency to exert meaningful influence within their governance networks. Because they do not have a power or even recognition as a group, nor are they part of the decision-making process at higher institutional scales, it is then difficult to explicitly identify and incorporate their needs with the governance processes. It is then important that norms and approaches for GSM inclusion utilize a more nuanced understanding of local contexts that need to factor for individual and group agency. These approaches need to also provide opportunities and spaces for these individuals to express their needs, concerns and inform distinctive perspectives, thus facilitating trust building within small islands communities.

Another aspect of the discussion about power within governance networks relates to positionality. The concept of positionality is not often discussed within wider environmental disciplines despite its importance in understanding risk reductions agendas and choices (Hill et al., 2023). Here, positionality is particularly important regarding the social position and perception of GSM within the island. Discussions with community members highlighted the fact that because communities are typically small, it might not be well received if people are seen to discuss anything with someone who might openly identify as a GSM:

> *For example, people can just see you talking to me and think you are my girlfriend. So, it is a similar thing. Sometimes, people can say things if they see me talking to [a gay person] and if I receive assistance, others could say that I am involved with that person. So, I rather "starve" than to interact with someone who is gay. Maybe if the person comes to me and I do not know their sexuality. But if I am aware of it, I will not interact with the individual.* (FFDav014 – community respondent)

They have also stated that they could still trust the information provided by the person but recognise that it is not well received by the community for someone to openly display/disclose their sexuality.

> *Yeah, because it's not looking good to be a gay or whatever.* (FFDSan002)

> *Because in terms of…if the person is that…it wouldn't be trustworthy…in terms of negativities… […].* (FFKal007 – community respondent)

In fact, during the interview process, one of the young fisherfolks initially stated that a person's sexuality did not play a role in determining this person trustworthiness, however, the respondent later changed their answer following disparaging comments from fellow older members of the community who were in the vicinity. Peer pressure and power structures determine roles and

responsibilities and, in this context, shape distinctive social power relations and hierarchies (Bowleg, 2008a; Bennett et al., 2020). This interaction highlighted how dominant community narratives, that are apparent within interdependent actors (fisherfolks of the same community in this case) are put forward, how power dynamics have influenced community responses and how more nuanced progressive viewpoints are silenced and ostracised. The power asymmetry – here between the younger and older members of the community – can, on a larger scale, affect community decisions, including resource allocation and distribution (see for instance in Vallet et al., 2020). While these discussions are beyond the scope of this manuscript, the power asymmetry displayed here sheds light on possible barriers to transformation resulting from these biases but also affect the transparency of the relationship and mutual trust among fisherfolk. This raises the questions that if the researchers and research assistants were from a different country or if each interview was private (which often was not possible), would the some of the community answers be different? If so, what would be the implication of such shift on local DRG networks and more widely on the inclusion on GSM within said networks? As highlighted by Hill et al. (2023) norms, values, beliefs, biases as well as power asymmetries influence the framings of the problem, the solution devised to address these asymmetries and the overarching governance processes that guide these actions.

3.7. Conclusions and implications for DRG

Following the landfall of Hurricane Maria in 2017, Dominica has taken bold steps to ensure that it becomes the "first resilient country in the world" (CRRP 2020). The country aims to achieve this target mainly through the design and implementation of the National Resilience Development Strategy 2030 and Climate Resilience Act (2018). This will be done through a people-centred strategy that "aims at integrating climate resilience and disaster risk management into the national growth and development planning framework" (IFRC, 2021). Under this strategy and legislation, the government recognises a need to address the systemic barriers that hinder marginalised groups to be resilient. In fact, because communities in Dominica are small, there are clear societal and institutional barriers to people to bring forward their identity-specific needs especially if they risk being further marginalised as a result. Instead, GSM may choose to maintain the status quo and rely on their other identities to build, maintain social cohesion and trust within their communities.

The status of GSM in Dominica makes it difficult to envision specific, targeted actions that can directly address the potential ostracization and voicelessness that GSM face within disaster risk governance networks. However, disasters can create an opportunity for existing risk governance systems to be challenged and transformed (Wilkinson, 2015). Dominica has demonstrated that it has the capacity and the will to capitalise on this window of opportunity. Addressing some of the institutional and societal barriers highlighted by this research may enable better collaboration among stakeholders, capitalising on innovative strategies to advance policy reform and facilitate policy implementation.

The results described here present a solid argument against the static, uniform understandings of gender, sexuality and vulnerability that still persist today in disaster policy and practice (Haworth

et al., 2022). This research re-emphasizes the necessity to further investigate how disasters can either worsen or improve preexisting social inequalities related to factors such gender and sexual identities as well as their impacts on social networks (Tierney 2006, 2007). This investigation is not only necessary for gender and sexual minorities but also for people whose intersecting identities can lead to compounding marginalisation and oppression. As mentioned by one of the key informants, it is important to work beyond the narrow definition of gender and sexual identities to address issues for the society as a whole. While there are currently no formal protocols to do so within the Caribbean context, an intersectional perspective is essential for devising effective, relevant, just and sustainable actions. The aforementioned paradox serves as a reminder of nuanced and multifaceted nature of identity and power dynamics, and trust within DRG networks in Dominica. This paradox highlights the importance of recognizing that while progress has been made in fostering trust within Dominica's DRG networks and overall communities, challenges and disparities persist for GSM individuals, particularly those who must navigate the delicate balance between authenticity and social integration. Neglecting to incorporate GSM within DRG processes can lead to inadequate policies and actions being devised and implemented, impacting the society as a whole and reinforce existing social inequalities. Although there is limited literature on the experience of GSM within DRG in the Caribbean, this article is a first step toward an explicit stock taking that brings visibility to the concerns and contributions of GSM within local DRG processes. The experience of GSM embodies a nuanced experience of fragmented identities; in this context, equitable inclusion, trust building and more widely disaster justice are meaningful steps toward the improvement of nuanced and contextualised DRG in Dominica and to a certain extent, to the wider Caribbean Region.

Chapter 4: Towards multi-stakeholder, multilevel and intersectional Disaster Risk Governance: Implications of social identities for social networks in Dominica.

4.1. Chapter summary

Using an intersectional Social Network Analysis (SNA), this paper explores the structural and functional elements of disaster risk governance (DRG) networks in Dominica and examines the impact of actors' identities on information sharing dynamics. Through this analysis, this paper reflects on the value of identities in enabling and/or hindering intersectional risk reduction opportunities on the island. Here, we offer some insights to reframe existing governance systems and approaches with actors' identities at the core of governance processes. These perspectives have emerged by analysing how identities affect scale-crossing brokering capabilities, glocalisation and marginalisation within these networks. Findings have shown that DRG processes occurring in Dominica display both centralised and brokerage network characteristics with formal and informal governance networks occurring alongside each other. Further, scale-crossing brokers are at a unique position where they can both receive and share information at all the levels they broker knowledge to, and often between formal and informal networks. Finally, clear power asymmetries, polarity, and silos have emerged within the networks with actors' identities either reinforcing or hindering their ability to coordinate collective action. Reflections emerging from this research can help to capitalise on the identities of DRG actors and foster improved and relevant risk reduction outcomes.

4.2. Introduction

Complex social and environmental "wicked problems" such as disasters cannot be addressed solely by one government entity or organisation (Tierney, 2012; Djalante et al., 2011). Individuals and communities are at the core of governance processes involved in addressing disaster risks as they can identify the problem and help to co-create targeted solutions that address their issues (Adger et al., 2011, 2013; Hiwasaki et al., 2014; Tierney, 2012). To do so, disaster risk governance (DRG) networks play an important role in the provision of formal and/or informal social, material and informational support to address disaster risks at various scale and levels (Faas & Jones, 2017; Varda et al., 2017).

Hurricane Maria provided the setting through which DRG networks are explored in this research. The Category 5-hurricane, which made landfall on the island of the Commonwealth of Dominica on 18-19 September 2017, pushed the country to assess its current disaster risk management systems and reflect on the effectiveness of existing governance mechanisms to address present and future disaster risks. The annual economic cost of natural hazards in the Caribbean Region is about two percent of GDP (in USD) which is typically more than four times that for larger continental countries (IMF, 2016). In fact, the damages and losses suffered by the island of the Commonwealth of Dominica (thereafter Dominica) in the aftermath of Hurricane Maria in 2017 accounted for

about 226% of the GDP, mostly impacting the farming and fishing sectors (CoD, 2017; Pinnegar et al., 2019). Following this event, the country established the Climate Resilience Execution Agency for Dominica (CREAD) and committed itself to an ambitious rebuilding programme guided by the vision to "build back better" and to become "the World's first climate-resilient nation" (CoD, 2017).

Although there is a growing literature on DRG networks (i.e. Faas & Jones, 2017; Jones & Faas, 2017; Tierney, 2012; Trias et al., 2019; Varda et al., 2017 among others), a significant gap remains in relation to small island contexts and the focus on the identities of actors within these networks to improve governance arrangements and better risk reduction outcomes. DRG networks are seen as flexible, adaptable arrangements consisting of individuals, groups and organisations that are capable of mobilizing diverse resources (i.e. knowledge, financial, material and human) to address disaster risks (Tierney, 2012; Trias et al., 2019). Comparative research conducted in Dominica and in the Arctic Archipelago of Svalbard (Sweden) highlighted how small islands (i.e., Dominica) disaster networks are often informal, socially based, and used as core sources of disaster-related information and to address power differentials (Duda, 2020). In addition, existing DRG structures and systems often provide a surface-level analysis on the identities of DRG actors and oversimplify or overlook complex identities into broad, homogenous groups. As described by Fuhse (2009), the construction of identities of the actors involved in a particular network affect the type of ties that will be created and the overall structure of the network.

In this context, the use of an intersectional lens is particularly relevant for the analysis of identities within DRG networks. Intersectionality represents "the critical insight that race, class, gender, sexuality, ethnicity, nation, ability, and age operate not as unitary, mutually exclusive entities, but as reciprocally constructing phenomena that in turn shape complex social inequalities" (Crenshaw, 1989, 1990; Collins, 2015). The concept explores how the different facets of one's identity can affect their social position and power. Intersectionality is particularly relevant for the study of DRG networks: examining social networks entails looking at the broader picture of risk, in term of the problem-solving capacity of each actors, their norms, power, values and perspectives, behaviour and the challenges posed by formal or informal pathways within which they operate to achieve their goals (Renn, 2008; Forino et al., 2015). The different dimensions associated with individual identities shape their ability to cope; capacities to act and the choices that they are going to make as a response to the context within which they evolve (Blackburn, 2014; Blaikie et al., 2004; Grove, 2013). For instance, a study investigating the relevance of men and masculinities within disaster risk management narratives in the Caribbean highlighted the vulnerabilities faced by men already at the margins of society, including poor men, men with disabilities and gay men (Dunn, 2016). This study revealed that due to their identities as well as socially constructed norms about masculinity (i.e. protector role, staying behind during the hazards, etc.), the needs of men at the margins of society disaster risk management policies, programs and strategies is rarely taken in consideration (Dunn, 2016). In fact, the position, or even the presence and/or absence of marginalised individuals within a given network can provide some important insights on network

dynamics as well as some perspectives regarding the potential strengths and limitations of social networks to address DRG issues in small islands contexts.

The goals of this research are: (i) to explore the structural and functional elements of DRG networks in Dominica; (ii) empirically examine how identities and social positions impact information sharing dynamics; and (iii) present some insights on the capabilities of social networks to act as barriers and enablers of intersectional risk reduction opportunities in small islands. To do so, this research draws on intersectionality and social network analysis (SNA) scholarships. This research represents a pioneering effort to bridge the realms of intersectionality and SNA, an endeavor that has not been formally explored until now. Here, SNA is used as a transdisciplinary tool and method to provides a perspective on the patterns and implications of these relationships and their ability to facilitate or hinder the capacity of an individual, group, community or organisation to cope with, adapt to, resist, or recover from hazards and disasters (Wasserman & Faust, 1994; Faas & Jones, 2017).

4.3. Theorising Intersectional Social Network Analysis

Governance networks, and more widely social networks, do not exist in a vacuum but are part of a complex web of collaborations and relationships that can reveal the various actors involved in disaster response, and what kinds of tensions or conflicts could arise from varied interests (Maldonado, 2017). Within these networks, actors can leverage knowledge and resources that enable them to influence outcomes and decisions (Armitage et al., 2017, Chapter 13). Here, "governance" in the context of governance networks, represents "(i) relatively stable horizontal articulations of interdependent, but operationally autonomous actors who (ii) interact with one another through negotiations which (iii) take place within a regulative, normative, cognitive and imaginary framework that is (iv) self-regulating within limits set by external forces and which (v) contributes to the production of public purpose" (Torfing, 2005). These institutional arrangements are not static; they evolve over temporal, spatial and institutional scales, are contextually dependant on political, social and economic factors and are infused with power and cultural values (Forino et al., 2015; Ishiwatari, 2013).

The term "network" is used here to describe any trust-based coordinating and/or collaborating arrangements that are not hierarchal or market based (Kapucu et al., 2009). These networks are shaped by social and institutional relationships, power relations, and the size and strength of relationships (among other characteristics) (Powell, 1990; C. Jones et al., 1997). Social networks and partnerships play an important institutional role in addressing the effects of natural hazards (Kapucu et al., 2009). The study of social networks – or social network analysis – researches the relationships (power distribution for instance), connections and exchange mechanisms (or "ties") between social entities (people, communities and organisations for instance or "nodes") (Scott, 1988; Faas & Jones, 2017; Jones & Faas, 2017). SNA provides relevant insights into social relationships, information flows and bottlenecks, and collaboration efforts at all stages of the disaster risk reduction cycle (Varda et al., 2017, 2017). Further, the patterns and implications of these relationships and their ability to facilitate or hinder the capacity of an individual, group,

community or organisation to cope with, adapt to, resist, or recover from hazards and disasters are also brought to light (Wasserman & Faust, 1994; Faas & Jones, 2017).

Intersectionality within an SNA can be better represented through the analysis of power asymmetries within DRG networks. Power is defined here as the uneven capacity of different actors to control the goals, processes, information and outcomes within polycentric environmental governance processes (Morrison et al., 2019). Power is often seen as a negative, exogenous factor that limits to the effectiveness of DRR actions due to established social and economic inequities, cultural biases and political injustice (Blaikie et al., 2004). However, power can also be used within a process for self empowerment (of individuals and groups) through the co-creation of new epistemologies (Gaventa & Cornwall, 2006; Morrison et al., 2019; Vallet et al., 2020).

SNAs have been used to assess power differentials within organisations (Harris & Doerfel, 2017; Kapucu & Demiroz, 2017) and among actors (Faas & Jones, 2017; Vallet et al., 2020). As described by Vallet et al., (2020), power relations emerge from the complex social structures and interconnections between individuals, which can then be visually represented with a SNA. SNA provides a structural representation of individual power and social hierarchies as it related to an individual's position within networks (Faas & Jones, 2017; Vallet et al., 2020). SNA is a visible representation of power asymmetries occurring within networks (Vallet et al., 2020).

Building on this foundation, an intersectional analysis can offer valuable insights into how actors' identities, as viewed from their positions within these networks, influence their functional roles and characteristics within said networks. An intersectional SNA can improve the conceptual and analytical strength of the visualisation of DRG issues in three main ways. First, because DRG actors and institutions (formal or informal) are part of networks that go beyond the official laws and regulations that are in place at a specific place and time (Lassa, 2010), the use of SNA can highlight the influence certain specific actors or groups of people have on the mechanisms and processes currently in place to address disaster risks. Second, SNA provides some insights into the impact of identities on social relationships and information flows on network structure (Jones & Faas, 2017; Maldonado, 2017). In particular, the focus here is on gender, livelihood and Indigeneity and sexuality, to a lesser extent. Finally, small islands often face unique challenges related to disaster risks (i.e. Alcántara-Ayala, 2019; Dunn, 2016; Foley et al., 2023; Kelman, 2015; Kelman & West, 2009; Singh et al., 2018; Wilkinson et al., 2016) and, as a result, they offer an interesting backdrop to understanding how social networks can contribute (or hinder) to risk reduction outcomes.

Here, we define intersectional DRG as the place-based and intersecting dimensions of identities and power within decision-making processes that ensure that policies, strategies and actions aiming at reducing disaster risks centre the individual, collective vulnerabilities and social/relational inequalities (Hill and Philip, forthcoming; Manuscript 2). This perspective acknowledges that individuals are not homogenous and that their experience within DRG structures – or networks in this case – are influenced by multiple social factors at various scales.

Scale is defined as "the spatial, temporal and jurisdictional quantitative or analytical dimensions used to measure and study phenomenon" (Cash et al., 2006; Blackburn, 2014). A constructivist approach to scale (Blackburn, 2014), as adopted in this research, recognises that governance is inherently dynamic, socially constructed (rather than strictly the result of place) and where power and politics play an important role in defining who is involved, in what capacity (the position of the actors) and how (type of interactions taking part in the process) within a specific time and space. Actors are active at different scales within their networks and often have scale-specific knowledge and information about their surrounding environment (Ernstson et al., 2010; Nowell et al., 2018). More widely, the analysis of social networks can provide some understanding of cross-scale power and information sharing dynamics and linkages, between local actors and their institutional counterparts. The structure of said network is central to defining these cross-scale dynamics and actor's behavior and performance within the network (Ernstson et al., 2010). Here, we specifically focus on two main scale-crossing processes: brokering and glocalization.

The consideration of scale provides some interesting insights into the concept of "scale jump". Scale jump refers to people or organisations that are partnering with other organisations that have similar endeavors but operate at a different (spatial, jurisdictional, institutional, etc.) scale for improved actions (Blackburn, 2014). Therefore, scale-crossing brokers are agents (individuals or organisations) in particular network positions that link otherwise disconnected actor groups and potentially control access to information and groups (Ernstson et al., 2010; Vallet et al., 2020).

Glocalization refers to the process where "institutional/regulatory arrangements shift from the national scale both upwards to supra-national or global scales and downwards to the scale of the individual body or to local, urban or regional configurations and, secondly, economic activities and inter-firm networks are becoming simultaneously more localised/regionalised and transnational" (Swyngedouw, 2004a). When applied to disaster risks policy and practice, glocalization translates into a disconnect within institutional scales, especially among the organisations and actors operating within those scales. While glocalisation has been identified as a major obstacle for sustainable risk reduction actions (Blackburn, 2014; Gaillard & Mercer, 2013), it can also facilitate the diffusion and localisation of global ideas, thus potentially shaping individual's identities, power and social interactions within glocalised settings.

4.4. Materials and Methods

4.4.1. Study context

The island of Dominica presents distinct characteristics that are especially relevant for the study of DRG on islands. As a small island, the country has one of the most rugged landscapes in the Caribbean and occupies an area of about 750 km^2. Dominica faces multiple natural hazards, including hurricanes, earthquakes, and volcanic eruptions (with five active volcanoes). Dominica is also subjected to intense rainfall, erosion and slope instability, and possible storm surges and tsunamis; and is also vulnerable to long-term climate change (Wilkinson et al., 2016; Barclay et al., 2019; Pinnegar et al., 2019).

The successive colonial powers (the French followed by the British Empire) in place in the islands have had a substantial impact on land use, labor practices and population distribution and dynamics, which in turn, has affected the coping and recovery capacity of the country and its communities in the face of natural hazards to this day (Barclay et al., 2019). The country received its independence from Britain in 1978 has since built its economy on agriculture with fishing and farming contributing to more than 20% of the country's GDP (CoD, 2017). As a result, fisherfolks and farmers represented a key demographic within disaster risk governance processes.

The country has faced multiple hazards over the course of its history; since the 1600s, more than 170 significant hazards (i.e. including hurricanes and earthquakes, with a significant death toll and infrastructure damage) have been recorded (Burke & Lovell, 2000; Barclay et al., 2019). More recently, the category 5 Hurricane Maria made landfall on 18 September 2017 and affected 100% of the island's population (CoD, 2017). Following this event, the Government of Dominica led several initiatives to mainstream Disaster Risk Reduction (DRR) and incorporate disaster uncertainty within their national policies and institutional frameworks such as the National Resilience Development Strategy 2030 (NRDS) of 2018, the Climate Resilience Act of 2018 (and the creation of the Climate Resilience Execution Agency (CREAD)) and the Dominica Climate Resilience and Recovery Plan (CRRP) of 2020. Finally, Dominica has marketed itself as one of the most stable and 'green' countries in the Caribbean, making it a multifaceted, data-rich environment and suitable site for intersectional research.

4.4.2. Data collection methods, analysis, and limitations

This research is based on primary data collected in Dominica. About 120 participants listing fishing and/or farming as their main occupation were selected within nine communities in four parishes around the island of Dominica: Kalinago Territory and Saint David (Castle Bruce and around) on one side and Saint Joseph (St Joseph, Mero and around) and Saint Peter on the other side of the island (see figure 1.2). Details about the methodology to select participants are explained in the following section (see in-depth interviews and sociometric surveys). Further, these parishes were selected following recommendations from Dominica's Ministry of Agriculture, Fisheries Blue and Green Economy and from the vulnerability analysis conducted by Pinnegar et al. (2019). From this study, areas with the highest vulnerabilities (>0.5) from a fisheries perspective were selected. This was the main criterion used to select the parishes. As a result, the parishes of Saint David, Saint Joseph and Saint Peter were selected as representative of the island. The Kalinago Territory was also included in the sample as the Kalinago people are a key stakeholder group that has been historically marginalised within decision making circles on the island (Rock et al. 2018).

The in-country data collection took place between April and December 2021 using a field research team of four locally recruited individuals. Due to COVID-19 restrictions, data collection could not take place continuously during this period and was paused during high-risk periods of exposure to ensure the health and wellbeing of local research team and the local communities. The ethics and COVID-19 Safety protocol for this study was approved by the University of Waterloo Office of Research Ethics.

Data was collected using two different methods: in-depth interviews/sociometric surveys, and key informant interviews.

4.4.2.1. In-depth interviews and sociometric surveys

Sociometric surveys are data collection tools that provide the basis for a quantitative measurement of structures, dynamics, and interpersonal relationships within social groups and allow for the structural analysis to empirically establish the leadership of a social network (Wasserman & Faust, 1994). These surveys were administered to the 120 research participants at the same time as in-depth interviews. They were primarily implemented to collect data that was used for the SNA (see data analysis section). These surveys provided data that characterise the network in terms of nodes (e.g. individual stakeholders, people and organisations), their ties (e.g. linkages and strength of relationship) and the network structure (e.g. centrality, heterogeneity, density) (Wasserman and Faust 1994). In order to understand the value of identities in shaping social relationships within a DRG context and present some insights on their networks, community members were selected using a snowball sampling method on the basis of their profession and residence within the targeted parishes. Each interview was conducted within each community at a location of the interviewee's choice, with a duration that varied between 30-45 minutes. Responses were collected using KoboToolbox (https://www.kobotoolbox.org).

Appendix 3 includes an anonymized summary of the interviews collected (see Appendices). The questionnaires employed a name generator technique, asking participants to list individuals with various relational ties (e.g. knowledge exchange, collaboration) (Marsden 2011). In the trial stage of administering the surveys, each respondent was asked to provide up to five (5) names, however, due to the survey fatigue observed in the parishes (see survey limitations), the number of close alters required was later lowered to up to three (3). The surveys helped to capture both the presence and nature of community members' relational ties associated with DRR formal and informal institutions present in their communities and around the island. In addition to demographic characteristics (i.e. sex, gender, Indigenous affiliation and migration status for instance), a particular emphasis was made to capture other intersecting social characteristics and power differentials such as trust in networks, information control and access and direct or indirect affiliation with the governance of disaster risks within their communities.

The study of social networks involves capturing both strong and weak ties. Name interpreter questions and a snowball interview technique were also used to elicit responses on the nature of the ties (e.g. frequency, directionality) and have been used to capture stronger ties and power relations. In addition, participants were prompted with different actor/organizational types (e.g. other community members, Ministry of Blue and Green Economy, Agriculture and National Food Security, non-governmental organisations) as a means to encourage thoughts of other possible relational ties. This particular technique was used to capture weaker network ties. While these questions can seem similar, they have helped capture some nuance within the community: some participants stated for instance that while they recognise that that the person they listed as their

alter is a relevant person, that does not mean that this person is particularly trustworthy as that person can be from the opposite political party and as such, deemed untrustworthy.

The sampling methods used was deemed the most effective to capture community members' network within the restrictions posed by the COVID-19 pandemic. Surveys were conducted by trained research team members that were selected for their affiliation to the selected communities.

4.4.2.2. Key informant interviews

Key informant interviews were conducted (n=10) with stakeholders from national and international entities involved in disaster risk governance processes. In-person, community interviews were conducted by the local research team while the key informant interviews were conducted remotely by the first author. Both the community and key informant interviews were conducted in English, French or Antillean Créole and translated in English for data analysis.

Key informants were selected using both a purposive expert sampling method and a snowball technique: participants were selected on the basis of their involvements within DRG processes as well as following recommendation from previous interviewees.

4.4.2.3. Analytical framework and data analysis

This research uses an egocentric approach for the SNA. The egocentric approach aims to acquire information regarding personal networks from the respondent perspective (Hawe et al., 2004). The demographic attributes of each respondent were captured (gender, age range, religion, citizenship status, Indigenous status, occupation, income range, etc.). In order to better understand trust, power, information sharing dynamics and overall better integrate principles of intersectionality, the strength of each tie (or weight within the network representation) was captured by asking participants the following questions: (i) how low have you known that person; (ii) how frequently do you receive advice from said person; (iii) how frequently do you give advice to said person; (iv) how useful the advice that you receive is to you; (v) how relevant this person is for you in decision making regarding disasters and (vi) how trustworthy this person is for you. Each participant was asked to assign a 1-5 mark for each of their alter. The resulting ties weight was calculated by adding the score for each of the responses.

The resulting SNA was visualised and analysed using Gephi version 0.10.1. This software has been chosen because it allowed researchers to map and visualise the structure of social networks and their properties (Trias et al., 2019). In addition, network metrics were calculated to further structurally characterise the network: (i) network density represents the number of relations in a network divided by the maximum possible number of relations (Newig et al., 2010), or in other words, the degree to which all actors are connected to other actors in the network; (ii) degree centrality is a measure of the number of edges (connection) each node (actors) has and relates to the importance or power that each actor has (Newig et al., 2010); and (iii) betweenness centrality measure the shortest path between every pair of nodes and allows for the identification of brokers i.e. actors that links two of more otherwise disconnected clusters (Freeman, 2002). The network is visualised using the Fruchterman-Reingold Algorithm (Fruchterman and Reingold, 1991).

4.4.2.4. Data collection and analysis limitations

The data collection process required adjustments and adaptations throughout the data collection period in navigating several challenges. Various COVID-19 outbreaks occurring during the year 2021 impacted the geographical coverage of communities around the island. Further, targeted communities experienced a "survey fatigue" due to the volume of surveys and projects implemented in the country since Hurricane Maria in 2017 that impacted the diverse representation of the sample. As a result, the number of women willing to respond and participate in the present research was low and represented only 30% of all respondents.

Designing an intersectional research protocol that effectively captures the nuanced and differential identities of people is challenging (Bowleg, 2008b). Doing so while respecting and upholding the rights and dignity of individuals and communities was an essential component of this research but presented important ethical issues. This required adjusting the line of questioning on people's own identities (i) using "traditional" demographic questions and (ii) measuring actors trust in information emerging from people who share specific identities such as gender, ethnicity, migration status, religion, sexual orientation, and political affiliation. These categories were agreed upon following discussions with the key informants. This approach may have limited the nuance of social identities captured in the research.

4.5. Results and discussion

The goal of the research was to explore the structural and functional elements of DRG networks in Dominica and examine the impact of actors' identities on information sharing dynamics. This section presents some results and insights on the capabilities of social networks to act as barriers and enablers of intersectional DRG opportunities in small islands and discusses their practical relevance in the context of DRR governance.

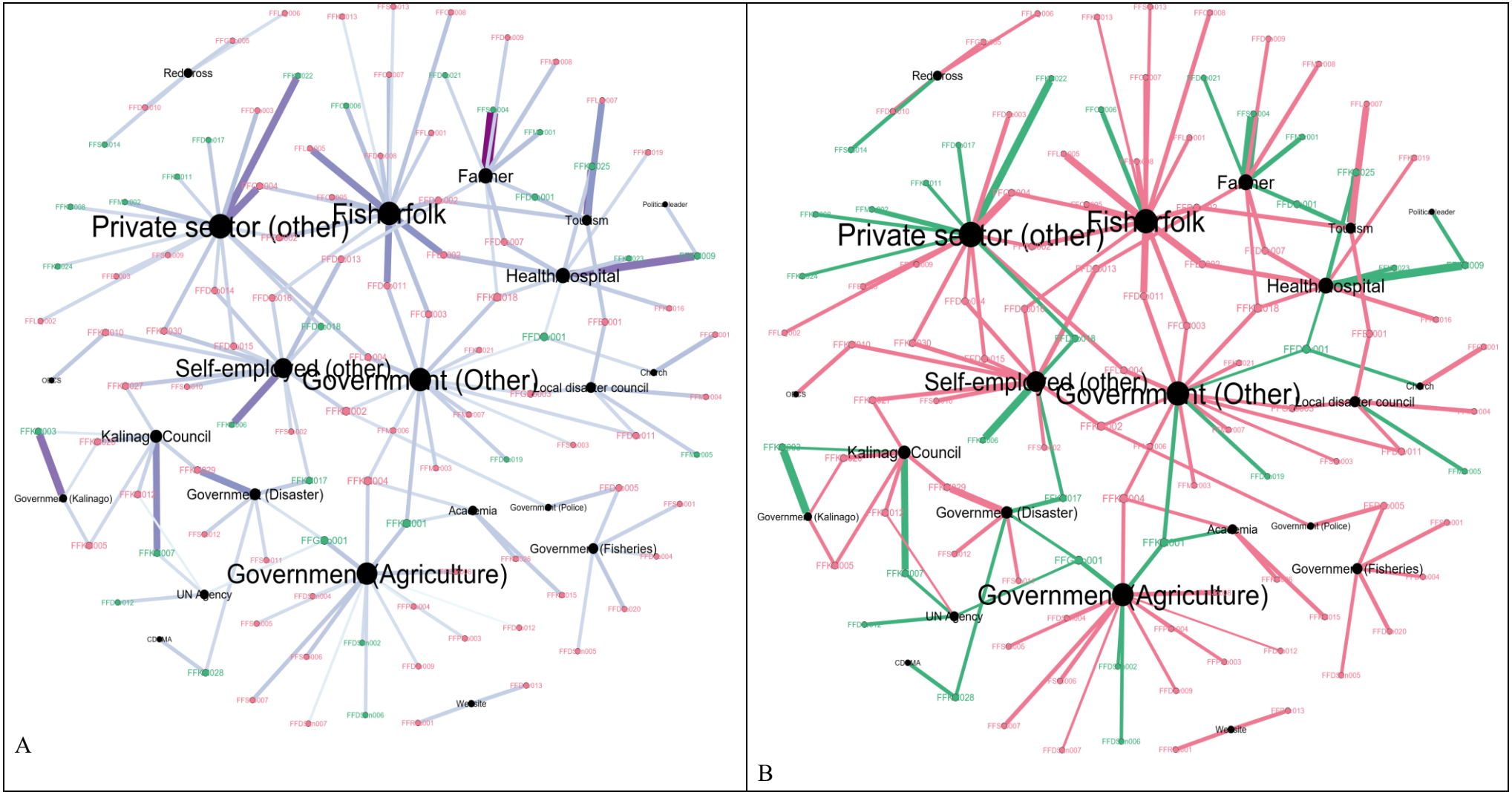

Figure 4.1: Overview of Dominica's disaster information sharing social network using the degree analysis (a) showing the differences by gender (b) (Pink=Male; Green=Female). The layout has been created using the Fruchterman-Reingold Algorithm. This information sharing networks displays both sources of information (black nodes) and the level of trust in these sources (edges/line thickness).

4.5.1. Information sharing network and its key features

Results from the sociometric surveys suggest that individual identities of network governance actors are a key determinant of their position within the networks (figure 4.1). The main identities explored within this research are Indigenous status, gender, livelihood (fishing and/or farming) and sexuality, to a lesser extent. It is important to acknowledge that the SNA utilised in this study employed a simplified binary model for gender. There are significant limitations to this binary approach (as extensively described by Arora-Jonsson, 2011 and Fletcher, 2018 for instance), particularly when applying an intersectional framework. As mentioned in the research limitations, other questions, on trust notably, were used to capture the dynamics of gender and sexual identities as well as Indigenous status and livelihood choices, in order to avoid perpetuating biases and assumptions about the research participants.

Structural patterns of collaboration, inclusion and margination, as well as power differentials have emerged between the different actors that are part of DRG networks. Further, this research has demonstrated that informal DRG networks are complementing more formal ones with some actors solely relying on informal networks for their disaster information. For instance, as shown in figure 4.1, fisherfolks trusted mainly other fisherfolks and in general, most actors preferred to receive their disaster information from individuals that are not formally part of any DRG network (referring to people who work in private sector or who are self employed or have a similar occupation). In this particular case, while network density is not necessarily high (see table 4.1), research has shown that individuals involved in non-routine situations such as disasters tends to rely on their informal network for support rather than their formal ones (Hurlbert et al., 2000; Varda et al., 2017). This is especially important as members of the network have revealed a high level of positional diversity (in terms of age, occupation, Indigenous status and gender – see Appendix 3). The informal pathways between actors displayed here are consistent with the patterns of information sharing identified during Hurricane Andrew (Hurlbert et al., 2000) and Hurricane Katrina (Varda et al., 2017). The study of individual actor identities, and the use of an intersectional approach, is particularly relevant in this context. Thus, this type of analysis can facilitate the capture of nuances in the expression of personal identities and their effect on network characteristics and structure. While it was difficult to obtain a holistic representation of an actor's identity in this research (see section on data collection and analysis limitations), here, we draw a particular attention on gender, Indigenous status and occupation through a reflection on scale-crossing brokers, glocalization and marginalisation.

Social network measure	Value
Network density	0.019
Degree distribution	2.33 (average)
Brokerage centralisation (i.e., betweenness centrality	4.768

Table 4.1.: Main network statistics

4.5.2. Type of network and influence of scale-crossing brokers

Findings from the sociometric surveys reveal that DRG networks occurring in Dominica display both centralised and brokerage network characteristics as there are a number of core centres of information (in black) linked by information brokers (see figure 4.1 and table 4.1). The core centres of information range from relevant government institutions i.e., the Department of Agriculture as well as the Department of Fisheries within the Ministry of Agriculture, Fisheries Blue and Green Economy; the Office of Disaster Management (Government (disasters)); Ministry of Kalinago Affairs (Government (Kalinago)) and the hospital, to individuals working in tourism, farming, fishing, and other economic sectors. Organisations such as churches, the Red Cross, UN agencies and the Organisation of Eastern Caribbean States (OECS) are also represented in the network. The characteristics of information brokers are discussed in more detail below. Centralised networks are characterised by a single centralised actor that connect to a large number of actors in the network (Nowell et al., 2018). On the other hand, brokered /decentralised networks are characterised by the presence of multiple subgroups that are linked together by brokers (Nowell et al., 2018). The low centralisation score presented in table 4.1 is also an important characteristic of a brokered /decentralised network (Nowell et al., 2018; Varda, 2017).

The network density and degree distribution presented in Table 4.1 offer valuable insights into the structure and dynamics of the DRG networks in Dominica. The methodology employed in this research primarily measures sources of information and trust. Therefore, the relatively low network density indicates that actors rely on a limited number of trusted sources for their disaster-related information. The specific sources of information are detailed in figure 3.3 (in Chapter 3) and the reasons their were chosen are shown in figure 4.2. It's important to note that the reciprocity of these relationships is not necessarily represented here, which also explains the observed low network density.

The hybrid nature of these DRG networks is further reemphasized the average degree distribution presented in table 4.1. While the methodological approach used in this research captures a limited number of relationships within the SNA, the current degree distribution emphasizes the coexistence of both formal and informal governance networks (table 4.3 and figure 4.1). Informal networks are those where information sharing takes place outside of formal structures and protocols and are influenced by relational, contextual, historical factors (Roy, 2010; 2011; Duda, 2020). As shown in table 4.2, the most important sources of information are largely informal and occur between fisherfolks (16 connections), actors employed in private sector (17 connections) and independently employed actors (13 connections). While government agencies and their formal networks are essential sources of information, they are mainly influential for farmers (15 connections). Other actors involved in government services that are not related to fisheries, agriculture and disasters are also a significant source of information (16 connections). Informality within DRG disasters has been shown to reflect individual choices and power differentials, which affect network structure and ultimately, influence DRG outcomes and norms (Duda, 2020). Informal networks are the result of implicit patterns of human behaviour and identity construction

and are particularly relevant for renegotiating power and influencing cross-scale dynamics (Kwon, 2017; Duda, 2020).

The networks here display strong "solidarity ties", with actors attracted to people with similar identities, shared experiences, frequent interaction and reciprocity (Faas & Jones, 2017; McPherson et al., 2001; Kwon, 2017). For example, FFKal009, a community respondent from the Kalinago territory, mentioned that:

> *[…] if a person has no experience of living here, then they wouldn't understand what we go through. Or, they may not be able to understand the problems that the people are faced with, and then the advice they give may not be the advice that we need based on where we live […].*

The solidarity ties are particularly apparent within Kalinago and fisherfolk communities, with actors sharing these intersecting identities sorely relying on their informal fisherfolk networks for disaster information across the island (FFKal019, FFSJo001, FFLay001, FFSJo013, and FFLay006). These solidarity ties are associated with trust, bridging and brokering ties (i.e. Faas & Jones, 2017). Because of the size of the Dominican population, it is expected that formal ties blend with informal ones, creating overlapping formal and informal networks, as it is the case here. In fact, about 25 % of respondents cited a close family member within the government, as their sources of information (figure 4.2).

Sample name	Location	Indigenous status	Occupation	Gender	Broker between	Betweenness centrality (normalised)
FFDav001	Castle Bruce	No	Farmer	Female	Government (other), hospitals and Church	0.060
FFGHo001	Good Hope	No	Farmer	Female	Government (agriculture), UN agency and Government (disaster-related)	0.074
FFKal001	Kalinago territory	Yes	Other	Female	Government (other), Government (agriculture), Academia	0.105

FFKal002	Kalinago territory	Yes	Farmer	Male	Government (other), Self-employed, Government (police)	0.166
FFKal004	Kalinago territory	Yes	Other	Male	Government (other), Government (agriculture), Academia	0.105
FFKal018	Kalinago territory	Yes	Other	Male	Government (other), hospitals and Farmer	0.084

Table 4.2.: Main boundary brokers characteristics (Degree centrality = 3). People who have listed "other" as their occupation represent people who have identified fishing or farming as their secondary income source, not as the main one. Self-employed people are people that were identified as sources of information but have no affiliation with fishing, farming, or the government. Government (other) encompasses all services not related to fishing, farming, Indigenous affairs or disasters.

Main type trusted sources of disaster information	Node size (>10)	Description
Self employed	13	Includes people who are working independently, outside of fishing, farming, tourism and disaster related fields. The people in this category were mostly chosen because of kinship as well as their leadership capabilities (figure 2 - they are trusted within their respective communities).
Government (agriculture)	15	Includes people who work at the Ministry of Agriculture. Farmers mostly obtained their disaster information from their assigned extension/field officer and other personnel from the Ministry of Agriculture, Fisheries, Blue and Green Economy (Department of Agriculture).

Fisherfolks	16	Most fisherfolks obtained their disaster information from fellow fisherfolks in their respective communities that shared the same issues. Most of this information was shared via social media channels (WhatsApp and Facebook)
Government (other)	16	Includes all governmental services that are not related to fisheries, agriculture, and disasters. Also includes parliamentary representatives.
Private sector	17	Includes people who work in the private sector, outside of fishing, farming, tourism, and disaster related fields. Most of the people listed here were also part of kinship networks (see fig 2)

Table 4.3: Summary of the main types trusted sources of disaster information.

The role and power of actors within a decentralized network depend on whether actors can influence other actors or whether they can leverage their positions through different forms of brokerage. The arrangement of nodes (actors) and ties (connections) ultimately determine brokerage power (Ernstson et al., 2010). These actors are individuals that are engaged in practices to connect actors across institutional scales. The six scale-crossing brokers listed in table 4.2 have shown their ability to "scale jump" between local individuals, peripheral organisations, and national entities, entirely bypassing local disaster management councils. They are equally distributed between genders and occupation, with four of them identifying as Kalinago (table 4.2). As mentioned by Blackburn (2014), this scale jump can be attributed to a political move to decentralised power over DRR project implementation. Here, these scale jumps occur between formal and informal networks, specifically between government bodies and individual not formally involved in any DRG processes. On the other hand, connecting to higher levels of governance (i.e., actors partnering directly with national/international institutions rather that their local representatives) can potentially weaken community cohesion and local institutions (see for instance Armitage et al., 2017 for examples in coastal resources management). This is particularly important as most of these brokers are from the indigenous Kalinago community, community that has been historically marginalised in the country (Rock et al. 2018). Indigenous Kalinago people, whose occupation of the island predates European colonisation, have been politically sidelined due to this violent colonial past (Rock et al. 2018; Scarlett et al., 2022).

The findings also suggest that scale-crossing brokers are at a unique position within the network where they both receive and share information at all the levels that they broker knowledge to, and often between formal and informal networks (figure 4.1). They represent an institutional pathway for local issues, challenges, and knowledge to be shared within their communities but also to be represented at higher institutional scales. For instance, FFKal002 has been known in the Kalinago community to use their networks and involvement with various development projects implemented in their community to share goods and information with other members. This individual has

learned to "navigate partisan politics" (FFKal002) to be able to coordinate and share relevant disaster information locally within the community and nationally with government stakeholders. Here again, this scale jump is facilitated by the fact that Dominica's population is particularly small with kinship relationships emerging as an important enabler to engage in higher governance processes.

The identities and power of the diverse actors involved within these formal and informal governance processes can facilitate – or hinder – the engagement of these actors at different scales. Scale-crossing brokers have the ability to display adaptive implementation capabilities (i.e. the ability to initiate and coordinate action for novel situations) by knowing the identities of actors that are key to the networks (in terms of power particularly) as well as how and when to connect with them (Burt, 2002; Ernstson et al., 2010). In this research, Kalinago scale-crossing brokers have demonstrated that they can mobilise information and trust within both their formal and informal networks and capitalise on their unique position within said networks to coordinate actions aiming as reducing risks within their community. The identities of these scale-crossing brokers are potentially a reflection of the level of marginalisation within these governance networks, without reducing their presence within the network to a form of victimisation and oppression. As this research is a first step toward providing an intersectional perspective of DRG networks, future research can expand the intersectional understanding of the mechanisms and practices through which scale-crossing brokers capitalise on their identities to strengthen or weaken the formal and informal governance networks within which they evolve.

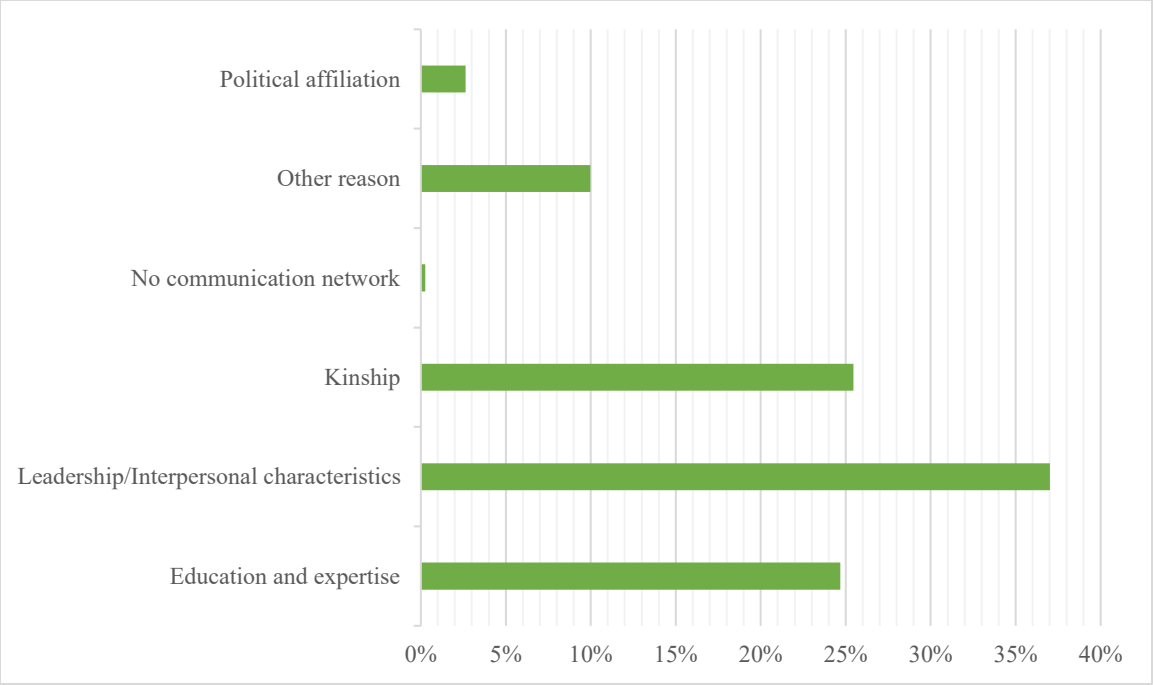

Figure 4.2: Reason for network choice and trust in disaster information

4.5.3. Evidence of glocalization and siloisation

The results reveal some clear power asymmetries, polarity, and silos within the network. The network here can provide some evidence of this process occurring in Dominica as it seems that both international organisations and local fisherfolk groups are disconnected from government agencies (figure 4.1).

Only six people surveyed directly trusted information coming from people working at the Office of Disaster Management (ODM). Fisherfolks have mentioned that they are all exchanging information through their local WhatsApp groups which typically form their informal networks. These groups are used to not only exchange general fishing information but also to coordinate activities before, during and after the occurrence of the natural hazards and other problematic situations. These groups do not usually have a leader; rather, everyone contributes equally when they believe they have information that can help other members of the groups to address the risk that they are facing. These groups were particularly active in Saint Joseph and in the Kalinago community. Many community members have shared that despite having a direct kinship link to a government body that can provide them with official disaster information, they prefer to rely on and trust their fisherfolks groups as the information coming through this channel might be more relevant and less politicised. For instance, despite having a close family member directly involved with national disaster governance processes, one of the Kalinago fisherfolks (FFKal013) mentioned relying primarily on their local fisherfolks WhatsApp and only then, corroborating the information received with their family member. A similar observation was made by a female farmer in Mero (FFMer002): they preferred to rely on their own local and informal networks for disaster information as a way to avoid the politicisation of information occurring in the country. While individuals working within government agencies are a central component of formal disaster networks, the information, power, and resources vacuum currently occurring within these formal networks have created an environment where these informal networks directly undertake and coordinate actions aiming at reducing disaster risks, especially in areas without direct political support. The Koud'min mentality – "giving a hand" in Antillean Créole, is an important feature in Dominica's community life and means that community members tend help each other in disaster situations in spite of their individual identities (Hill et al., 2023). This mentality is an important underlying principle for the construction and maintenance of these informal networks. Actors also communicate directly with international organisations through projects (i.e., UNDP, the World Bank and the Red Cross, among others) when their needs have not been met by the government.

Likewise, it can be noted that there is a disconnect between international organisations and some government bodies. UNDP, OECS and CDEMA, while part of the network, are not directly linked to any other organisation, governmental or otherwise. However, all these organisations are directly linked to the country's Office of Disaster Management (ODM) through official channels and for coordination in the response phase of a disaster (ODM, personal communication). Another key informant in the government did mention that they are collaborating with said organisations on a project basis. The most visible case of glocalisation is related to the Red Cross. While this

organization has been involved within the communities for a long time through various projects, its actions seem to be detached from those of government bodies and linked directly to local communities. In this model, the Red Cross operate at the confluence of global principles and local realities. The organisation directly influences DRR processes at local levels (through the creation of local disaster committees for instance) with seemingly limited inputs from government entities. This situation can be a major obstacle for coordinating actions before, during and after a disaster: for instance, several studies conducted in Haiti in the aftermath of the 7.0 earthquake in 2010 and subsequently for the Hurricane Matthew in 2016, noted that the lack of coordination between NGOs and public entities led to severe inefficiencies but also undermined the authority and capacity of government to lead and coordinate disaster preparation and response activities (Marcelin et al., 2016; Zanotti, 2010). Further, some community members in Saint Joseph mentioned that they preferred to consult their local Red Cross representatives (often a member of the local disaster group), rather than relying on their government representative for disaster information. These four (4) community members were located in the parishes of Saint David (2) and Saint Joseph (2). This is also clear evidence of scale jumping, which has been identified as a mechanism for political strategies targeting community empowerment (McCarthy, 2005, Blackburn, 2014; Grove, 2013; Armitage et al., 2017, Chapter 13).

Interviews with community members across the island clearly demonstrated the risks linked to the politicisation of information. While not directly measured within the present research, political affiliation plays an important role in defining access to information and resources within the country (KI #002). At the time of data collection, and through informal discussions, it appears that the community members who are most likely to rely on nongovernmental sources of information (local or international sources) are from one of the political opposition parties. This was particularly apparent for members of the main opposition party, in this case the United Workers' Party. This politicisation of information is a process that can accentuate the power asymmetries, apparent disconnect, and the glocalisation that is emerging from the network. The pathways to this disconnect are both institutional and structural, creating communities that resort to “take the matter into their own hands” (FFMe005). Similar issues with politics have been observed in Jamaica (Blackburn, 2014) and seem to be a common feature within the region (Cashman, 2017). This is a reflection of the power asymmetries that occur within the network; addressing these issues will require substantial transformative changes at the core of the country’s disaster risk governance processes.

4.5.4. Identities, network marginalisation and social exclusion

Intersectionality highlights the power dynamics and structural inequalities that shape social relationships and networks (Hill et al., 2023). Here, the analysis of networks’ structural characteristics and patterns of ties brought to light the underlying power dynamics that occur within these formal and informal networks, with actors’ characteristics and identities potentially mediating their position within the networks. The approach used here relies on SNA, weight calculations, betweenness centrality and degree centrality to quantify information trust and

information access asymmetries. Research on SNA and power have associated network central position with higher levels of power (see for instance Faas & Jones, 2017; Jones & Faas, 2017; Varda et al., 2017; Vallet et al., 2020). The study of identities explores the underlying root causes of these power asymmetries leading to network marginalisation and social exclusion.

Several of the Kalinago women who participated in this research have emerged as leaders within their own community; one of them emerged as a scale-crossing broker (table 4.2). As shown in section 4.5.2, network brokers appear as particularly influential in the control of information trust and access. Further, two respondents, located at the periphery of the networks indicated that they do not discuss nor trust disaster information with anyone within their respective communities. Rather, they prefer to rely on national television and on international weather websites (notably the US National Oceanic and Atmospheric Administration website) for their disaster information. One of the peripheral figures is a known gender and sexual minority individual. The other peripheral figure is a member of a village council who has mentioned not being entirely satisfied with the way disaster risks are addressed in their community. During the discussion, this community member indicated that *[…] the cooperation of the government or the people in government should come together, unite a bit more […] (FFDav013)* to facilitate how information is disseminated and used regarding disaster risks.

Because of the limitations within the research design and the constraints associated with COVID-19 (see data limitations section for more details), the approach used here cannot directly establish the identities of actors or their social characteristics as the primary factors contributing to marginalization and power asymmetries within DRG networks. However, since actors' identities are intertwined with their capacity to take action and their access to resources and enable them to locate themselves vis-à-vis others and their social environment (Tajfel, 1974; Adger et al., 2011; Frank et al., 2011; Schneider & Sachs, 2017; Hill et al., 2023), their social characteristics may inadvertently perpetuate or strengthen pre-existing power dynamics, subsequently influencing the extent of their marginalization within these networks. Nevertheless, the results of this research provided some significant insights regarding marginalisation and identity-based exclusion occurring within Dominica's DRG networks. An extensive analysis of the experiences of gender and sexual minorities in the country has been conducted and revealed that the nuanced and multifaceted nature of identity and power dynamics in Dominica's society created a paradox where individuals must navigate the delicate balance between authenticity and social integration to access information and improve their position within both formal and informal DRG networks (see chapter 3). The exclusionary pattern is consistent with the conclusion that some community members need to hide some aspects of their gender and sexual identities in order to foster trust and social cohesion. Similarly, the data available cannot necessarily demonstrate that the gender identity of Kalinago women has affected (or motivated) their willingness to act as leaders and/or information brokers within their respective communities. However, building on existing gender and disaster research (i.e. Arora-Jonsson, 2011; Enarson et al., 2007; Fletcher, 2018; Gaillard, Sanz, et al., 2017 among others), it is plausible that being women and Kalinago played a role in enabling

them to leverage their identities for the purpose of building trust and enhancing social cohesion within their community. However, more research is needed to further understand the mechanisms behind the effect of actors' identities on their position within DRG networks.

4.6. Conclusion and Implications for DRG policy making

The analysis of networks proved to be a valuable analytical and practical approach to advance knowledge on the value of identities in shaping social relationships within a DRG context and provide insights on the capabilities of said networks to act as barriers and enablers of intersectional risk reduction opportunities. In this study, SNA guided the exploration of the patterns of information sharing, structural gaps, clusters, and key information brokers. We offer some perspectives to reframe existing governance systems and approaches that can help capitalise on the identities of DRG actors and could prove to be valuable for decision making and overall improving risk reduction outcomes.

As formulated by Zwitter & Hazenberg (2020), "a network of actors does not become a governance-relevant policy network because of their individual salient positions, but because of their interactions, the identity they portray in specific policy circles, and the respective leverage they have vis-à-vis other actors, depending on the subject matter." The scale-crossing brokers highlighted in this research emerge as key positions to address structural holes and power imbalances that form the structure of both formal and informal networks. They can be leveraged to facilitate actions that will achieve the desired risk reduction and governance outcomes. As the results demonstrated, these scale-crossing brokers were able to capitalise on their unique position to influence both local and national DRG processes and actions. Hence, expanding in the knowledge on the identity of these scale-crossing brokers can guide actions to avoid less desirable DRG pathways. These scale-crossing brokers can occupy various roles within the networks; notably, they can (i) coordinate and mediate between and within groups, (ii) hinder or facilitate access to said groups and communities; and (iii) act as group or community representative (i.e. Zwitter & Hazenberg 2020).

The hybrid nature of the governance arrangements existing in the island (figure 4.1) is a combination of both hierarchical, command-and-control governance and decentralised, collaborative governance systems that emphasise cross-scales and multilevel interaction. These governance arrangements reflect the complex institutional arrangements that are present in the Region. This hybrid governance system further displays elements of both formal and informal information sharing processes that is also particularly relevant to address "wicked problems" such as disasters. This type of governance arrangement raises several key insights that can either facilitate or hinder DRG processes. For instance, this research listed Hurricane Maria as an example of natural hazard for which the governance arrangements are studied. However, to incorporate the all-hazard vision promoted by both the national government (IFRC, 2020) and the Sendai Framework for Disaster Risk Reduction (UNSDR, 2015), it is important to consider whether current DRG processes are suitable to achieve this vision. Further, the current combination of governance arrangements, particularly the decentralised aspects, operate under the assumption

of being a model of good governance, with their implementation necessarily leading to more effective and inclusive risk reduction outcomes (Folke et al., 2005; Tierney, 2012). Still, while decentralised networks and multiple centers of power do not guarantee better collaboration, efficiency and success, the overlapping of both formal and informal networks can improve the overall effectiveness of local DRG processes. Local DRG actors, especially knowledge brokers have learned to better navigate power differentials, which in turn, can reinforce their ability to use their identities and power to coordinate collective action and in the process, enhance their own agency to devise more pertinent solutions. This agency can potentially be constrained and/or mediated through the network structure itself (Ernstson et al., 2010); although the presence of numerous scale-crossing brokers with various intersecting identities further enhances information sharing capabilities of these DRG networks.

Nonetheless, the glocalization and marginalisation present in the current disaster networks are evidence of network fragmentation and asymmetric power dynamics that need to be addressed with the goal of achieving better risk reduction outcomes. It will be important for decision-makers and communities to capitalise on the opportunities given by both formal and informal DRG networks in terms of enabling environment and space for flexibility, learning and innovation, to address some of the gaps that have been identified in this research.

While intersectionality is not the primary focus of this analysis, it serves as an epistemological foundation for situating and contextualizing actors and their range of choices and actions—referred to as their agency (Rebughini, 2021) – within DRG networks. As discussed by Crenshaw (1990), actors, irrespective of their social intersections, possess individual and collective agency and power guiding their actions. In this context, agency becomes entwined with power dynamics, as individuals and groups navigate, negotiate, and challenge their positions within various systems of privilege and oppression. The intersectional perspectives presented in this research specifically address the levels of marginality or centrality within formal or informal DRG networks. This perspective is particularly relevant in light of the complexity and uncertainty associated with disaster risks, including impacts related to climate change. The current research also highlighted several avenues of thought regarding the value of intersectionality for understanding DRG networks and provided two critical insights regarding the ways that intersectionality can improve the understanding of governance networks, namely through:

- analysing the network positions of actors: different combinations of identities can affect actors' position within networks, their pattern of relationships and access to resources and information.
- understanding network dynamics: intersectionality can shed some lights on how power, privilege, and marginalisation manifest within networks.

The individual identities of the scale-crossing brokers (predominantly Indigenous actors) and of the marginalised members of the networks (gender and sexual minority individual) have emerged as key determinants of their position within their network and a reflection of their relative power

and ability to influence the way information is shared within these networks. Indeed, the identities of the actors involved in networks determine the nature of relationships across scales, which in turn, will limit, disqualify, promote, modify, or reinforce various forms of knowledge (Grove, 2013), and ultimately affect the type of emerging responses, actions and policy decisions. These intersecting identities as well as their reinforcing or contradicting linkages can affect the way actions are suggested, discussed, designed, and implemented. In particular, Kalinago men and women have learned to capitalise on the "geometries of power" at play within the Dominica society at large – political affiliation and history of marginalisation emerging from the colonial past for instance – to improve their agency and navigate cross-scale power dynamics. This research is a first step into examining DRG network disparities: intersectionality can help uncover structural barriers, information bottlenecks as well as disparities in information access that can affect individuals with specific combinations of identities. In this context, DRG networks emerge as a reflection of levels of marginalization, power relations but more widely whose values and knowledge are represented as well as the scope and scale of their power and agency in supporting equitable risk reduction outcomes.

Chapter 5: Conclusion and contributions

The purpose of this chapter is to summarise the findings of the previous analysis conducted in Chapters 2, 3 and 4, and to synthesise the overall contributions and outcomes of this research. First, this chapter will revisit the purpose and objectives guiding the present research and present its major findings. The next section will explain the theoretical, empirical, and applied contribution the advancement of knowledge on disaster risk governance and intersectionality. Finally, this chapter will present some of the research limitations, and direction of future research.

5.1. Research purpose and objectives

The purpose of this research was to advance knowledge on intersectional disaster risk governance, and specifically, to understand how social networks influence the development and effectiveness of island-wide, intersectional disaster risk governance in Caribbean small islands. Using the island of the Commonwealth of Dominica as a national case study, this research aimed to achieve the following specific objectives:

1. To develop an integrated framework for the consideration of intersectionality in place-based disaster risk governance in islands (theoretical objective).
2. To reposition disaster risk governance within an island-wide, intersectional approach through the analysis of actor identities within their social networks (empirical objective).
3. To identify intersectional opportunities to strengthen existing governance processes and achieve better disaster risk reduction outcomes (applied objective).

Each of these objectives was addressed as separate manuscripts and presented as chapters within this thesis. Chapter 2 presented a conceptual framework that incorporated elements of intersectionality and place-based thinking for DRG that centres inclusive and contextualised governance processes, and that challenges existing notions of social difference. Chapter 3 presented an empirical investigation of the experience of gender and sexual minorities within DRG processes through the application of the framework presented in Chapter 2. Finally, Chapter 4 discussed how the processes described in Chapter 2 & 3 can be harnessed to foster improved and relevant risk reduction outcomes in Dominica, and more widely, in small islands, while capitalising on the identities of DRG actors. The section below goes into more details regarding each finding.

5.2. Key research findings

This research introduced the concept of place-based, intersectional DRG, with specific applications in small island contexts. Contextualising DRG specifically within island geographies (see for instance Kelman, 2018b; Kelman & Khan, 2013; Singh et al., 2018) was helpful to address entrenched social-ecological complexities and uncertainties, but more importantly, it can reveal the gaps in current governance systems. Further, this research has entrenched intersectional factors and power dynamics to create a narrative where individuals and bodies are at the centre of governance processes. An intersectional DRG regime through networks has a strong potential to identify the structures that create and reinforce marginalisation and answer the questions of "who dominates?', "who benefits?" and "who gets left behind?", and "why" these processes emerge. In

this section, I discuss the key findings in relation to each research objective. Table 5.1 presents a summary of these findings.

Research objective	Research questions	Key findings	Chapter
To develop an integrated framework for the consideration of intersectionality in place-based disaster risk governance in islands (Theoretical objective).	What does an intersectional perspective reveal about disasters and governance in the context of small islands?	This chapter described six guiding principles for the operationalisation of intersectional DRG. The six principles are as follows: (i) individuals are multi-dimensional and complex; (ii) identities and vulnerability are not predefined; (iii) spatial and temporal differences influence the expression of identities; (iv) materiality of ecological systems influences intersectionality; (v) power relations are central the emergence of social processes and epistemologies; and (vi) positionality plays an important role in defining risk reduction agendas and choices.	2
To reposition disaster risk governance within an island-wide, intersectional approach through the analysis of actor identities within their social networks (Empirical objective).	What role do local and institutional actors' social identities play in defining their involvement and power in shaping risk reduction processes and network?	This chapter proposed a clear definition of intersectional DRG: the place-based and intersecting dimensions of identities and power within decision-making processes that ensure that policies, strategies and actions aiming at reducing disaster risks centre the individual, collective vulnerabilities and social/relational inequalities. Through an intersectional analysis of both the experiences of GSM and the communities within which they live, this research constitutes a stocktaking that brings visibility to the concerns and contributions of GSM within local DRG processes.	3
To identify opportunities to strengthen existing governance processes and achieve better disaster risk reduction outcomes through an intersectional lens (applied objective)	What are the structural and functional characteristics of formal and informal governance networks that act as barriers and enablers of risk reduction opportunities in small island states? And how can these networks be harnessed for the co-creation of intersectional, island specific governance arrangements for better risk reduction outcomes?	Using a SNA, this chapter delved into the structural and functional elements of DRG networks in Dominica. It also investigated how actors' identities influence the dynamics of information sharing and trust. The research guided the exploration of the patterns of information sharing, structural gaps, clusters, and key information brokers. With both formal and informal DRG networks overlapping within the study sites, the examination of identities – specifically focusing on gender, Indigenous status, and occupation – and power differentials, becomes essential in comprehending the	4

		positions of actors within these hybrid networks. This research marks an initial step toward comprehending how actors' identities involved in networks can shape social relationships across scales and can further support the examination of disparities within DRG networks. Here, intersectionality can help in uncovering structural barriers, identifying information bottlenecks, and highlighting disparities in information access, all of which can impact individuals with specific combinations of identities.	

Table 5.1: Summary of key findings per objectives.

5.2.1. Theoretical objective: to develop an integrated framework for the consideration of intersectionality in place-based disaster risk governance in islands.

Chapter two expended DRG theory to highlight the place- and context-based nature of human identities by incorporating elements of intersectionality and place-based thinking. This manuscript presented a novel intersectional framework and an approach for DRG that centres inclusive and contextualised governance processes. This framework addressed a specific knowledge gap related to the importance of identities within DRG processes. In particular, this framework interrogated the diversity of actors and perspectives involved in DRG processes in islands. The framework drew upon and synthesised several strands of literature on intersectionality (i.e. Crenshaw, 1989, 1990), DRR (i.e. Adger, 2006; Blaikie et al., 2004; Hewitt, 1983; Kelman, 2018) and governance (i.e. Armitage & Plummer, 2010; Folke et al., 2005; Rhodes, 1996; Tierney, 2012). Examples emerging from islands in the Caribbean and around the world were used to further situate and ground these ideas.

The framework presented six principles that reflect a more intentional intersectional and place-based focus within disaster risk governance. These principles evolved from an analysis of how intersectionality is applicable to DRG. Here, the frameworks built a nuanced understanding of social processes, vulnerabilities and adaptive capacities linked to activities aiming at addressing risks. The principles are as follow:

- Principle 1: individuals are multi- dimensional and complex.
- Principle 2: identities and vulnerability are not predefined.
- Principle 3: spatial and temporal differences influence the expression of identities.
- Principle 4: materiality of ecological systems influences intersectionality.
- Principle 5: power relations are central the emergence of social processes and epistemologies; and
- Principle 6: positionality plays an important role in defining risk reduction agendas and choices.

While an intersectional framework can be difficult to implement, it is an important tool for understanding how social identities and power play an important role in defining the type of actors that will be involves in the risk reduction processes and governance networks. The framework is a response to the limited research currently available regarding the influence of the actors' identities within DRG networks, beyond their essentialized group identities and associated vulnerabilities (Arora-Jonsson, 2011; Djoudi et al., 2016; Fletcher, 2018; Kaijser & Kronsell, 2014).

5.2.2. Empirical objective: To reposition disaster risk governance within an island-wide, intersectional approach through the analysis of actor identities within their social networks.

Chapter 3 applied of the framework developed in Chapter 2 by examining how marginalised identities, specifically gender and sexual minorities fit within Dominica's DRG systems. Research on the experience of GSM in disaster contexts mainly focus on stories from the US, Europe and Australia (Dominey-Howes et al., 2014; Goldsmith et al., 2022; Gorman-Murray et al., 2017), with a few stories in Haiti (IGLHRC and SEROvie, 2011), Brazil (Haworth et al., 2022) and Japan (Yamashita et al., 2017). The qualitative analysis conducted within this provided an understanding of the information sharing dynamics of the local DRG networks in nine (9) selected communities as well as across the Caribbean. Four main themes have emerged:

a. Navigating identities: the data suggest structural inequalities and identity processes are fundamental to navigate disaster risk governance in Dominica. Hence, thinking beyond the binary implies working beyond the essentialist definition of gender and sexual identities to address issues for the society as a whole (i.e. Djoudi et al., 2016; Fletcher, 2018; Haworth, et al., 2022; Jacobs, 2019; Rushton et al., 2019). This research revealed a key paradox in regard to the way GSM navigate the expression of their identities: Dominica, as a society, has shown a complex multidimensionality where individuals are allowed to assert their unique identities, attributes and experiences, but only within certain (often arguably flexible) community norms and values.
b. Victimisation and vulnerability: including alternative framings within disaster risk governance processes is important, as these framings limit the process of victimisation while actively addressing identity-specific vulnerabilities and supporting agency (Agard-Jones, 2009; Haworth, et al., 2022). Fostering these alternative framings require a pluralisation of voices, specifically (i) creating a space where people can express their identity-specific vulnerabilities and (ii) draft concrete and measurable outcomes within an intersectional place-based governance framework that promote accountability and incorporate a diversity of thoughts and ways of doing.
c. The importance of place and scale. Here, the analysis was used to (i) contextualise identities at scale; (ii) understand the scale at which decisions are made versus the one at which risk is experienced and (iii) highlight the decisions (individual and institutional) that result from these considerations. As such, results emerging from this research suggest that it is necessary to support and capitalise on the knowledge and lived experiences emerging from these networks and conceptualise practical pathways to include GSM contributions into disaster research, policy and practice. The concept of place also played an important role that transcended social identities (as described by Fresque-Baxter & Armitage, 2012; Hill et al., 2023): the Koud'min mentality created a framework that enabled community members to evaluate the validity of information and is a central element of adaptation and risk reduction capacities.
d. Power defines access and agency: despite the fact the fact that long-term discrimination against GSM does exist in Dominica and the rest of the Caribbean, they use their power and agency to exert meaningful influence within their governance networks. Further, the analysis of positionality also provided some insights regarding the social position and

perception of GSM within the island (see chapter 2). Dominant community narratives are often put forward while more nuanced, progressive viewpoints are silenced.

This analysis demonstrated that neglecting to incorporate GSM within DRG processes can result in the development and implementation of inadequate policies and actions, impacting the society as a whole and reinforcing existing social inequalities. As such, the use of an intersectional DRG framework like the one presented in Chapter 2 is essential for devising effective, relevant, just and sustainable actions aiming at addressing disaster risks.

5.2.3. Applied objective: To identify opportunities to strengthen existing governance processes and achieve better disaster risk reduction outcomes through an intersectional lens.

The final aspect of this research capitalised on both the framework that developed in Chapter 2 and its application in Chapter 3 to contribute to the science-policy nexus by discussing structural and functional elements of DRG networks in Dominica and examine the impact of actors' identities on information sharing dynamics. This research offered some perspectives regarding the structural pattern of collaboration, inclusion and margination, as well as power differentials have emerged between the different actors that are part of DRG networks. The intersection of gender, Indigenous status and occupation provided key insights on DRG networks in Dominica that can be summarised in three points.

First, Dominica displays a hybrid from of governance system with both command-and-control and brokered/decentralised characteristics and where formal and informal DRG networks are overlapping and complementing each other (i.e. Jones & Faas, 2017; Kwon, 2017; McPherson et al., 2001; Duda, 2020). This situation has created scale-crossing individuals that capitalise on their intersecting identities to both receive and share information at all the levels that they broker knowledge to and often between formal and informal networks. These positions can be leveraged to facilitate actions that will achieve the desired risk reduction and governance outcomes. Second, this research has shown evidence of clear power asymmetries, glocalisation and silos within networks with a clear disconnect within and between institutional scales. This structural disconnect is a reflection of the power asymmetries that occur within formal DRG networks. Finally, marginalisation and social exclusion were apparent within the networks for individuals who already suffer from societal marginalisation (GSM; Kalinago). In this context, DRG networks have emerged as a reflection of levels of marginalization, agency and ability to navigate cross-scale power dynamics to support risk reduction outcomes.

5.3. Drawing the strands together: research contributions to knowledge

This thesis has revealed a number of key insights regarding DRG processes in Dominica that could be applied in other islands in the Caribbean, to a certain extent. This research has utilised different theoretical and applied tools across disciplinary boundaries to advance reflections about intersectional DRG processes in islands. The framework presented in Chapter 2 broadened the

conceptual scope of DRG and presented a practical way to include a place-based, intersectional thinking to support inclusive and contextualised actions to reduce disaster risks. Here, intersectionality (Crenshaw, 1989, 1990; Fletcher, 2018; Hankivsky, 2014; Kaijser & Kronsell, 2014) embodies the complexity and dynamics of identities, power and bodies that are at the center of governance networks (Bakker & Bridge, 2006) and DRG processes more widely. In addition, the relation to "place" (Adger et al., 2011; Fresque-Baxter & Armitage, 2012; Masuda & Garvin, 2006; Swyngedouw, 2004b) has been revealed to be particularly relevant in island geographies and social ecological systems (Foley et al., 2023; Kelman, 2018b; UNESCO, 2011). When incorporated to the DRG conceptual framework, intersectionality is viewed as a complex web of social categories that form one's identities and that takes place within and influenced by one's geographical and ecological realities (A.E. Kings, 2017; Thompson, 2016).

The usefulness of the intersectional, place-based DRG framework developed in Chapter 2 was further demonstrated in Chapter 3 through its application to gender and sexual minorities, one of the most marginalised group globally (i.e. Dominey-Howes et al., 2014; Gorman-Murray et al., 2017; King, 2022; Rushton et al., 2019; Yamashita et al., 2017). Here, the qualitative analysis conducted within this research was a first step toward an explicit stock taking that brings visibility to the concerns and contributions of GSM within local DRG processes in the Caribbean. Further, this chapter advanced a clear definition of intersectional DRG as the place-based and interacting dimensions of identities and power within decision-making processes to ensure that policies, strategies and actions to reduce disaster risk centre the individual and collective vulnerabilities and social/relational inequalities. This forward-looking perspective is particularly relevant from a CCA angle as climate change can exacerbate existing vulnerabilities, making GSM and other marginalised identities more susceptible to the adverse effects of disasters. Further, this perspective acknowledges that individuals are not homogenous and that their experience within DRG structures are influenced by multiple identity-related factors.

Finally, the research took a broader perspective of the island-wide formal and informal DRG networks and offered some perspectives on how intersectionality can improve the understanding of place-based DRG networks. The insights provided related to: (i) analysing the network positions of actors: different combinations of identities can affect actors' position within networks, their pattern of relationships and access to resources and information and (ii) understanding network dynamics: intersectionality can shed some lights on how power, privilege and marginalisation manifest within networks. This research is a first step into examining DRG network disparities in Dominica. Here, intersectionality can help uncover structural barriers, information bottlenecks as well as disparities in information access that can affect individuals with specific combinations of identities.

It is important to mention that this research does not take a deterministic approach i.e. that identities solely determine actor's position within both formal and informal DRG networks. Rather, actors' social identities are potentially a reflection of the level of marginalisation within these DRG networks but should not be used as a justification of their victimisation. Evidence suggests that

actors have learned to use their agency and capitalise on their identities to strengthen or weaken the formal and informal governance networks within which they evolve.

5.4. Future research directions

Three main areas have emerged as future research directions: stakeholder engagement, disaster justice and DRR/CCA resilience building. First, results emerging from this research showed that people with certain identities can be situated in the margin of governance networks. Future research can further investigate how incorporating an intersectional lens to stakeholder engagement can reach people at the margin of these networks. Stakeholder engagement is a critical component of good governance (Djalante et al., 2013; Tierney, 2012) as it fosters shared commitment and shared values, encourages participation, and provides the enabling environment of the creation of "by/for solutions", solutions created by impacted communities, for themselves. These considerations are particularly important in high hazard, high uncertainty, and dynamic social-ecological systems like islands, within a decolonial research framework as advocated at the beginning of this research. Such governance practices build flexibility and create a pathway for the emergence of high impact solutions. The focus on stakeholder engagement within intersectional disaster risk governance approaches (including adaptation efforts) is extremely relevant as these approaches provide a voice to the "governed" within the policy making process. Future research can (i) investigate the unique forms and challenges for stakeholder engagement for improved intersectional disaster risk governance in small islands and (ii) reflect on the consideration of stakeholder identities to support demonstrable impacts on policy and practices linked to DRG.

Second, disaster justice is becoming a central conundrum of disaster studies. Particularly, the power differentials that manifest at different spatial, temporal and institutional scales are key elements that emerge within complex disasters (i.e. Lavell & Maskrey, 2014; Singh et al., 2018; Tierney, 2012). Here, an intersectional DRG frameworks can bring attention to the process of risk creation (including climate-related risks). Disasters are seen as manifestations of unresolved development problems and as outcomes of existing governance failures (Lavell & Maskrey, 2014; Maskrey et al., 2022). The processes have been partly discussed in Chapter 3, when discussing about policies that do consider certain subsets of the population and in the process, can create risks that affect the population as a whole. Future research can (i) investigate the underlying cause of risk creation, within an intersectional and disaster/climate justice lens and (ii) its manifestation within governance networks. Pushing it a step further, research should focus on the characteristics of governance failure and providing concrete tools that support the dismantling structures and narratives that hinder effective adaptation and perpetuate risk creation, and inequalities.

Finally, expanding to climate change adaptation research: as articulated in chapter 1, CCA is construed here as a subset of DRR. However, it is important to explicitly acknowledge the interconnectedness of social, ecological, and climatic factors in shaping vulnerability and resilience. Moreover, integrating island-wide SES theory within a DRG research framework can

contribute to the understanding of vulnerabilities and resilience in the face of changing climatic conditions. An intersectional lens is particularly relevant to understanding differential vulnerabilities and adaptive capacities (as discussed in chapter 2). Future research within this framework can take various forms. For instance, future research can (i) undertake a network analysis to understand the relationships and power dynamics among various actors involved in DRR and CCA initiatives; (ii) investigate how social networks influence the effectiveness of adaptation and risk reduction measures; and (iii) analyse how these approaches can lead to more effective and sustainable adaptation strategies.

5.5. Reflection on study limitations

As highlighted in chapter 4, further reflection is needed regarding the intersectionality aspect of this research. Several authors have highlighted some methodological and practical challenges in conducting intersectional research (see Bowleg, 2008b; Bauer & Scheim, 2019; Bauer et al., 2021) and applying the insights from that research. These challenges range from (i) capturing power differentials; (ii) ethical uncertainties, (iii) institutional barriers, (iv) practitioners' expertise and overall actionability of intersectional research.

Capturing power differentials

Power is a central tenet of intersectionality. As discussed in Chapter 4, power differentials affect actors' position within DRG networks. However, effectively capturing these power differentials and structural inequalities throughout the research has been challenging. Bowleg, (2008b) and Bowleg & Bauer (2016) discussed the key dilemma of conducting intersectional research: identity-related oppression and marginalisation are not additive but intersecting, interdependent and mutually constitutive. To put in plainly (and using a similar example as Bowleg (2008b)), *Kalinago + Woman* is different from *Kalinago woman.* This separation requires to first isolate identity (which is theoretically contrary to the intersectionality theory) and second to rank sources of oppression, which is difficult (see Bowleg, 2008b). Capturing the intersectional dimensions of vulnerability and risk, and more widely power, is challenging, and can hamper effective policy-making and targeted interventions.

Ethical uncertainties

Conducting this research has brought to light several ethical questionings: as mentioned in Chapter 4, the initial questionnaire developed involved collecting sensitive and personal information related to participants' intersecting identities. Even with confidentiality and privacy guaranteed by research protocols, asking these personal questions made participants of the initial trial feel dehumanised and essentialized i.e. oversimplifying and reducing their complex identities and lives to a narrow set of traits or characteristics that are captured through the demographic questions. Navigating this ethical dilemma and its potential impact on the research outcome as well as preventing potential harm to future research participants required an active reflexivity from the researcher (see Positionality statement) to maintain transparency and promote accountability in the research.

Institutional barriers

Existing institutional structures may not be suited to incorporate intersectionality within their plans and strategies. Discussions with various disaster institutions in the Caribbean Region and internationally brought forward the difficulties for these institutions to incorporate intersectional perspectives holistically and effectively into policy development and implementation. Beyond the fact that some of these identities might be illegal in specific locations (Chapter 3), excluding marginalized groups from decision-making processes and failing to address the underlying structural inequalities may not lead to equitable and effective disaster risk governance outcomes (Chapter 4). Further, the siloed nature of institutions, the hierarchy of knowledge and limited recognition and uptake of intersectional principles can hinder its potential for creating meaningful social change and promoting equity.

Practitioners' expertise

Actors and practitioners have a limited understanding of intersectionality and its relevance in DRG. While this research has provided targeted principles and recommendations for the application of an intersectional DRG frameworks, actors and institutions can potentially lack the nuanced understanding that is necessary in order to adopt an intersectional lens. As demonstrated in this research, overlooking the complex ways in which multiple identities intersect and interact can lead to inadequate consideration of the specific needs, risks, and capacities of diverse groups involved within these processes (see Chapter 3) and potentially perpetuate the structural inequalities that have caused marginality in the first place.

Actionability of intersectional research

Building on the work of numerous authors (e.g., Bowleg, 2008; Bowleg & Bauer, 2016; Fletcher, 2018; Osborne, 2013; Walker et al., 2021, among others), this research provided some insights on the improvement of existing approaches and contributed to the implementation of intersectional DRG, aiming to advance equity, social justice, and climate and disaster justice. As noted by Hankivsky and Jordan-Zachery (2019), the practical application of intersectionality remains largely underexplored, particularly in the realm of policymaking. Policies often rely on single identity categories, assuming a uniform set of experiences and resulting inequalities based on an additive approach rather than recognizing the multidimensionality and complexity of identities (Hankivsky and Cormier, 2011). Research findings have the potential to inform the development of CCA and DRR policies that effectively address the specific needs and challenges faced by diverse populations. Further, there is a need to establish metrics and indicators to monitor the effectiveness and relevance of intersectional approaches in various contexts, particularly in regard of disaster and climate change policies. This includes consideration of how these measures can be effectively evaluated for continuous learning.

Reflection on these points is essential for researchers, policymakers, practitioners, and advocates to ensure that intersectional research significantly contributes to positive climate and disaster action, fostering more inclusive and equitable outcomes.

5.6. Final reflections and way forward: was this research truly intersectional?

On a more personal level, this research has been a remarkable undertaking, one that not only deepened my understanding of the intersectionality, disasters and governance processes but also expanded my appreciation for the complexities of Caribbean islands societies. This journey has revealed the power of intersectionality in shedding light on not only on the multifaceted experiences and vulnerabilities of people who often remain marginalized and overlooked but also on their resilience, capacity and ability to capitalise on these limitations to improve their overall prospects in life. More so, this research has challenged some of my own views and widened my understanding that each individual carries a unique blend of social identities that shape their world in distinctive ways.

Hence, was this research truly intersectional? Yes, to a certain extent.

Intersectionality, the key tenet underlying the research presented in this thesis constitutes an essential component of disaster risk governance in small islands but more generally across the board. Adopting a decolonial transdisciplinary research practice (section 1.5.2.) and a disaster justice perspective (Chapter 3), this research added to the knowledge and scientific literature on DRG, addressing an important gap in intersectional research applied to Caribbean small islands. At a time where governance bodies and DRR frameworks and plans both nationality and internationally are stressing for the need to devise effective and equitable DRR actions, this research provided some key insights into how different individuals experience marginalisation and inclusion within DRG networks in islands and established clear set of core directions that can guide future reflections and research.

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Appendices

Appendix 1: Recruitment posters for the online survey in English and French


VOS CONNAISSANCES COMPTENT!
Participer à une recherche sur les réseaux de personnes LGBTQ+ face aux aléas naturels dans les Caraïbes
Cette recherche vise à comprendre comment des les réseaux de personnes dans les Caraïbes, en particulier l'expérience des lesbiennes, gays, bisexuels, transgenres et queer caribéens, face aux ouragans, tremblements de terre et autres risques naturels.
POUR PARTICIPER, VOUS DEVEZ:
• Avoir 18 ans ou plus
• Être originaire de la Caraïbes (pays indépendants et non indépendants) et idéalement vivre dans la Région
• Idéalement, s'identifier comme lesbienne, gay, bisexuel, transgenre ou autre orientation sexuelle non-conformiste
• Être capable de communiquer en anglais, français ou espagnol
• Et avoir 15min de libre!
La participation à cette recherche est anonyme et volontaire
Veuillez scanner le code QR suivant pour remplir le sondage de manière anonyme. Vous pouvez aussi utiliser le lien suivant: https://uwaterloo.ca1.qualtrics.com/jfe/form/SV_a4YsiUomfH2sjps
Cette étude a été examinée et a reçu l'autorisation du comité d'éthique de la recherche de l'Université de Waterloo (ORE no 42692). Si vous avez des questions concernant cette recherche, veuillez communiquer avec Lowine Hill, candidate au doctorat, Université de Waterloo :
UNIVERSITY OF WATERLOO
Social Sciences and Humanities Research Council of Canada
Conseil de recherches en sciences humaines du Canada
Canada
IDRC · CRDI
Canada

Appendix 2: Template for Sociometric survey (for the community) and online survey (for GSM)

Understanding disaster risk governance (DRG) from ridge to reef: the place of social networks in Dominica

Introduction

Version: 2021-07-08

Description of study

Experiences in disaster risk reduction (DRR) have shown that there is sometimes a disconnect between international discussions, national-level policies and their translation into local, citizen level actions to reduce disaster risks. My research aims to look at social interactions and networks addressing disaster risks and see how they influence the way people face disasters in Dominica. This study looks particularly at how marginalised individuals are connected to their social networks around the island. Your participation in this survey will help to capture the structures, dynamics, and interpersonal relationships within social groups, help mapping the social networks occurring around the islands. This information will provide some insights on the characteristics of people influencing decisions. How to participate: The survey takes between 45-60min to complete. Participation is voluntary and anonymous. Benefits of Participation:

the possible indirect benefits you may experience from participating in this study include an opportunity to reflect on your social networks and support system around the island or abroad. Risks of Participation: This study is anticipated to include minimal risks.

Contact information

This study has been designed by Lowine Hill from the University of Waterloo's Faculty of Environment. If you have any questions or concerns about the study, you may contact the principal investigator, Lowine Hill. This study has been reviewed and received ethics clearance through a University of Waterloo Research Ethics Committee (ORE# 42692). If you have questions for the Committee, contact the Office of Research Ethics, at 1-519-888-4567 ext. 36005 or ore-ceo [at] uwaterloo.ca. Notice of collection of personal information: at the end of this survey, you will be asked to provide some demographic information. You will be asked to provide information about your age, sexual identity/orientation, income and immigration status. This information is collected to help mapping the people's and organisation networks and potential power, however, if you are not comfortable to answer any of these questions, you can skip them at any time. This information is coded and protected, and only the research principal investigator has access to this information. Your participation to this study is voluntary and

confidential. You can choose to not participate, and you have the right to withdraw at any time with no consequences.

Navigating the form

This application form can be navigated using the "next" and "back" buttons present near the bottom of each page. At the top right of the page, you will find three horizontal bars (near the print button) that allow you to select various parts of the form. To begin the questionnaire, press "next" to proceed.

Part A: Organisation [if applicable]: organisation is referred here as company, union, association, cooperative, etc.

1. Name of organisation:
2. Job title/Position within the organisation
    a. How long have you been working in this organisation?
        i. Less than 6 months
        ii. 6 months – 1 year
        iii. 1 year – 5 years
        iv. 5-10 years
        v. More than 10 years
    b. What was your previous position?
3. Type of organisation:
    a. Government
    b. Non-governmental (i.e. International NGO, UN Agency)
    c. Private sector/business
    d. Civil society (i.e. local NGO, cooperative, etc.)
    e. Academia
4. What is the main focus area of your organisation?
    a. Natural hazards (i.e. Hurricanes, earthquakes, etc.)
        i. Hurricanes
        ii. Earthquakes
        iii. Volcano
        iv. Storm surges
        v. Landslide
        vi. Drought
        vii. Floods
        viii. Other (please specify)
    b. Fisheries/marine

c. Maritime
d. Forestry
e. Agriculture (Farming and livestock)
f. General environmental
g. Other (please specify)

5. Level of intervention of the organisation (check all that apply) – where do you operate?
    a. Local (village; city)
        i. Where?
    b. Sub-national (parish, etc.)
        i. Which one?
    c. Island-wide
    d. National
    e. Regional (Caribbean wide)
    f. International

Part B. Governance processes

6. What is the main environmental issue(s) you are facing?
    a. Storm surge
    b. Fisheries degradation
    c. Sedimentation
    d. Litter
    e. Soil degradation
    f. Other (please specify)
7. What do you consider as a disaster?
8. Where do you get information about hazards and disasters?
    a. Word of mouth/People you know
    b. Social media (Facebook, Whatsapp, etc)
    c. Television/radio/other telecommunication network
    d. Internet
    e. School
    f. Organisation
    g. Seminar
    h. Office announcement/posting or other internal communication channel
    i. Other (please specify)
9. How do you to reduce the risk of damage due hazards? (select all that apply)
    a. Make sure that your house is strong
    b. Cut the branches of the trees that are close to your house
    c. Secure your belongings (car, boat, etc.)
    d. Plant resisting crops
    e. Listen the radio to receive the alert
    f. Talk to people

g. Know a safe place to evacuate
h. Stock up on non-perishable and drinkable water
i. Other (please specify)

10. What help you to cope before, during or after a hazard?
11. In the aftermath of a hazard (ex. Maria), did you receive support from:
    a. the Government
    b. Family
    c. NGOs?
        i. Please specify
    d. Other (please specify)
12. What support did you receive?
13. How do you improve your ability to face natural hazards in your household or livelihood?
14. What do you or your organisation do to reduce disaster risks?
15. From your perspective, what other organisations/people are involved in disasters and overall risk reduction? At what level?
16. How do you interact with these people/organisations?
17. Does your organization jointly implement projects with these organisations? (N/A if not applicable)
    a. Please describe the nature of this collaboration with each organization.
    b. Were these endeavours successful? Yes/No, Why?
18. Do you and/or does your organization coordinate its actions (on disaster, resilience, prevention, response, rebuilding, environmental management) with other people/organisations? (N/A if not applicable)
    a. Please describe the nature of this collaboration.
    b. Were these endeavours successful? Yes/No, Why?
19. Are you involved in other organisations/networks? In what capacity?
    a. Are you satisfied with how you're involved?
    b. Yes/No; Why?
20. How has the existence of these organisations/networks have impacted your work?
21. Do you think these organisations/networks help with disaster risks or with your livelihood? How? Why do you think so?

Part C: Network mapping

22. Please identify up to five people who are relevant for your work on disaster risk reduction. Please indicate if they are part of your organisation or not.

Person#	Name (not mandatory)	Organisation	Type of organisation	Level of intervention	Position	How do you know this person?	How do you communicate usually?

						<1year	<5years	<10 years	>10 years	
1										
2										
3										
4										
5										

23. For each person identified, please indicate

	1 - Never	2	3	4	5 – Very/often	Comments
How often do you go to this person for advice?						
How often does this person come to you for advice?						
What type of advice do you give/receive? (check all that apply)	Capacity building Technical support Project implementation Financial support Political support/endorsement			Networking Informal advice Other (please specify):		
	1 - Never	2	3	4	5 – Very/often	
How valuable is this information/person for your work?						
Do you trust this person?						

For matters related to disasters and resilience,

24. What makes you want to work with these people? Why do you interact with them?
    a. Personality
    b. Leadership
    c. Interpersonal characteristics

    d. Similar position as yourself
25. Why did you approach these people and not others?
26. Are there any challenges when working with them?
27. Who is typically involved in decisions? Or consulted? Who is in charge? Why?
28. Who is typically not involved in decisions? Or consulted? Why?
29. Should others be involved in decisions? Who? Why?
30. Should others be removed from decisions? Who? Why?

Part C: Future of DRR in the island (specifically for key informants)

31. How do you envision the future of DRR on the island?
32. What can be done to improve the way you/your organisation/the country address disaster risks? Probe: people involved, regulations, incentives, awareness, power, authority, legislation, planning
33. What would be some short- and long-term goals that have to be out in place in order to improve your resilience?
34. What organisation/who do you think will be the most influential in shaping the future?

Part D: Demographic information

The demographic information collected in the following section will help establish the characteristics of actors and their relative power within networks. The information collected in this section is entirely optional and you can skip any of the questions.

1. Age bracket:
    a. 18-30
    b. 31-40
    c. 41-50
    d. 51-60
    e. Over 60
2. Indigenous: Yes / No
3. Religion:
4. Nationality/status in country:
    a. Citizen
    b. Permanent resident
    c. Work permit
    d. Student
    e. Other (please specify)
5. Gender:
    a. Woman
    b. Man
    c. Other (please specify)
    d. Prefer not to say
6. Sex assigned at birth:

a. Female
b. Male
c. Prefer not to say

7. Sexual orientation:
    a. Heterosexual
    b. Lesbian/woman who sleep/has slept with women
    c. Gay/ man who sleep/has slept with men
    d. Bisexual
    e. Other (Please specify)
    f. Prefer not to say
8. Marital status:
    a. Single
    b. Married
    c. Divorced
    d. Widowed
    e. Separated
    f. Unmarried cohabitation
    g. Prefer not to say
9. Total household yearly income:
    a. Less than 10k
    b. Between 10 and 50k
    c. Between 50 and 80k
    d. More than 80k
    e. Prefer not to say

[end of the survey]

Appendix 3: Chapter 4 supplementary material

Sample name	*Gender*	*Marital status*	*Location*	*Age bracket*	*Occupation*	*Indigenous status*
FFKal002	Male	Unmarried cohabitation	Kalinago Territory	31-40	Farmer	Yes
FFKal003	Female	Married	Kalinago Territory	Over 60	Farmer	Yes
FFKal004	Male	Unmarried cohabitation	Kalinago Territory	41-50	Other	Yes
FFKal005	Male	Married	Kalinago Territory	Over 60	Farmer	Yes
FFKal006	Female	Single	Kalinago Territory	51-60	Farmer	Yes
FFKal007	Female	Single	Kalinago Territory	18-30	Other	Yes
FFKal008	Female	Married	Kalinago Territory	51-60	Farmer	Yes
FFKal009	Female	Married	Kalinago Territory	31-40	Farmer	Yes
FFKal010	Male	Married	Kalinago Territory	41-50	Other	Yes
FFKal011	Female	Married	Kalinago Territory	51-60	Farmer	Yes
FFKal012	Male	Married	Kalinago Territory	41-50	Other	Yes
FFKal013	Male	Married	Kalinago Territory	51-60	Fishing/Farming	Yes
FFKal015	Male	Married	Kalinago Territory	41-50	Farmer	Yes
FFKal016	Male	Married	Kalinago Territory	Over 60	Farmer	Yes
FFKal017	Female	Married	Kalinago Territory	Over 60	Farmer	Yes
FFKal018	Male	Married	Kalinago Territory	51-60	Other	Yes
FFKal019	Male	Single	Kalinago Territory	41-50	Fisherfolk	Yes
FFKal020	Male	Married	Kalinago Territory	51-60	Other	Yes

FFKal021	Male	Widowed	Kalinago Territory	Over 60	Farmer	Yes
FFKal022	Female	Married	Kalinago Territory	41-50	Other	Yes
FFKal023	Female	Single	Kalinago Territory	31-40	Other	Yes
FFKal024	Female	Unmarried cohabitation	Kalinago Territory	51-60	Other	Yes
FFKal025	Female	Married	Kalinago Territory	51-60	Farmer	Yes
FFKal026	Male	Unmarried cohabitation	Kalinago Territory	Over 60	Farmer	Yes
FFKal027	Male	Single	Kalinago Territory	41-50	Farmer	Yes
FFKal028	Female	Single	Kalinago Territory	51-60	Other	Yes
FFKal029	Male	Unmarried cohabitation	Kalinago Territory	Over 60	Other	Yes
FFKal030	Male	Married	Kalinago Territory	41-50	Farmer	Yes
FFDav001	Female	Unmarried cohabitation	Castle Bruce	Over 60	Farmer	No
FFGHo001	Female	Married	Good Hope	51-60	Farmer	No
FFGHo003	Male	Unmarried cohabitation	Good Hope	51-60	Farmer	No
FFDav009	Male	Unmarried cohabitation	Castle Bruce	41-50	Fisherfolk	No
FFDav010	Male	Single	Castle Bruce	Over 60	Farmer	No
FFKal001	Female	Single	Kalinago Territory	31-40	Other	Yes
FFRos001	Male	Single	Roseau	51-60	Farmer	No
FFCol001	Male	Single	Colihaut	31-40	Fishing/Farming	No
FFCol002	Male	Single	Colihaut	31-40	Fisherfolk	No
FFCol003	Male	Single	Colihaut	18-30	Fisherfolk	No

FFCol004	Male	Single	Colihaut	18-30	Fisherfolk	No
FFCol005	Male	Unmarried cohabitation	Colihaut	51-60	Fisherfolk	No
FFCol006	Female	Unmarried cohabitation	Colihaut	41-50	Other	Yes
FFCol007	Male	Unmarried cohabitation	Colihaut	51-60	Other	No
FFCol008	Male	Single	Colihaut	41-50	Other	No
FFBri001	Male	Married	Bioche	51-60	Other	No
FFBri002	Male	Unmarried cohabitation	Bioche	41-50	Other	No
FFBri003	Male	Unmarried cohabitation	Bioche	41-50	Farmer	No
FFMer001	Female	Single	Mero	Over 60	Farmer	No
FFMer002	Female	Single	Mero	51-60	Farmer	No
FFMer003	Male	Single	Mero	41-50	Farmer	No
FFMer004	Male	Divorced	Mero	Over 60	Fisherfolk	No
FFMer005	Female	Single	Mero	51-60	Farmer	No
FFMer006	Male	Single	Mero	Over 60	Fishing/Farming	No
FFDub001	Female	Widowed	Dublanc	Over 60	Fishing/Farming	No
FFDub002	Male	Unmarried cohabitation	Dublanc	31-40	Fisherfolk	No
FFDub003	Male	Divorced	Dublanc	51-60	Fisherfolk	No
FFDub004	Male	Single	Dublanc	41-50	Fisherfolk	No
FFDub005	Male	Married	Dublanc	51-60	Fishing/Farming	No
FFSJo001	Male	Single	St Joseph	31-40	Fisherfolk	Yes

FFSJo002	Male	Single	St Joseph	18-30	Other	Yes
FFSJo003	Male	Single	St Joseph	41-50	Fisherfolk	No
FFSJo004	Female	Married	St Joseph	Over 60	Farmer	No
FFLay001	Male	Single	Layou	31-40	Fisherfolk	Yes
FFLay002	Male	Single	Layou	18-30	Fishing/Farming	No
FFMer007	Male	Single	Mero	51-60	Farmer	Yes
FFMer008	Male	Single	Mero	51-60	Farmer	No
FFSJo005	Male	Single	St Joseph	31-40	Farmer	No
FFSJo006	Male	Single	St Joseph	51-60	Farmer	Yes
FFSJo007	Male	Single	St Joseph	18-30	Fishing/Farming	Yes
FFSJo008	Male	Married	St Joseph	51-60	Farmer	No
FFSJo009	Male	Single	St Joseph	31-40	Fisherfolk	No
FFSJo010	Male	Single	St Joseph	31-40	Fisherfolk	No
FFSJo011	Male	Single	St Joseph	Over 60	Farmer	No
FFSJo012	Male	Widowed	St Joseph	Over 60	Farmer	Yes
FFSJo013	Male	Single	St Joseph	31-40	Fisherfolk	Yes
FFSJo014	Female	Married	St Joseph	41-50	Other	No
FFLay004	Male	Unmarried cohabitation	Layou	41-50	Fisherfolk	No
FFLay005	Male	Married	Layou	41-50	Fisherfolk	No
FFLay006	Male	Single	Layou	18-30	Fisherfolk	Yes

FFLay007	Male	Unmarried cohabitation	Layou	31-40	Fisherfolk	No
FFDub007	Male	Single	Dublanc	31-40	Farmer	No
FFDub008	Male	Single	Dublanc	31-40	Fisherfolk	No
FFDub009	Male	Unmarried cohabitation	Dublanc	31-40	Farmer	No
FFDub011	Male	Single	Dublanc	18-30	Fisherfolk	No
FFDub012	Male	Divorced	Dublanc	Over 60	Farmer	No
FFDub013	Male	Widowed	Dublanc	51-60	Farmer	No
FFDub014	Male	Single	Dublanc	31-40	Fisherfolk	No
FFDub015	Male	Married	Dublanc	Over 60	Farmer	No
FFDub016	Male	Unmarried cohabitation	Dublanc	51-60	Fisherfolk	No
FFDub017	Female	Single	Dublanc	Over 60	Farmer	No
FFDub018	Female	Widowed	Dublanc	Over 60	Farmer	No
FFDub019	Female	Widowed	Dublanc	Over 60	Farmer	No
FFDub020	Male	Single	Dublanc	Over 60	Other	No
FFDub021	Female	Single	Dublanc	31-40	Other	No
FFDav011	Male	Single	Castle Bruce	Over 60	Farmer	No
FFDav012	Female	Single	Castle Bruce	Over 60	Farmer	No
FFDav013	Male	Married	Castle Bruce	Over 60	Farmer	No
FFDSan002	Female	Unmarried cohabitation	Saint Sauveur	51-60	Farmer	No
FFGHo005	Male	Single	Good Hope	41-50	Farmer	No

FFDSan004	Male	Single	Saint Sauveur	Over 60	Farmer	No
FFDSan005	Male	Single	Saint Sauveur	51-60	Fisherfolk	No
FFDSan006	Female	Widowed	Saint Sauveur	Over 60	Farmer	No
FFDSan007	Male	Single	Saint Sauveur	51-60	Other	No
FFPSo003	Male	Married	Petite Soufriere	31-40	Farmer	No
FFPSo004	Male	Single	Petite Soufriere	51-60	Farmer	No

Table 6.1: Sociometric survey sample overview

Appendix 4: Ethics protocols and supporting documents.

PROTOCOLS

UNIVERSITY OF WATERLOO

#42692 - Understanding disaster risk governance from ridge to reef: the place of social networks in Caribbean islands

Protocol Information

Review Type	Status	Approval Date	Renewal Date
Expedited	Approved	Feb 14, 2023	Feb 28, 2024

Expiration Date	Initial Approval Date	Initial Review Type
Mar 23, 2024	Mar 22, 2021	Expedited

Feedback

Approval Comment

Renewal approved. Study may continue for another 12 months.—Karen Pieters

Protocol Renewal Form

Renewal form

What kind of application are you renewing?
Standard Application/Imported Record

COMMONWEALTH OF DOMINICA

MINISTRY OF BLUE AND GREEN ECONOMY, AGRICULTURE AND NATIONAL FOOD SECURITY

FISHERIES DIVISION

Tel: (767) 266 5291 / 448 0140
Fax: (767) 448 0140
E-mail: fisheriesdivision@dominica.gov.dm
Website: www.dominica.gov.dm

Roseau Fisheries Complex Bldg.
Dame Mary Eugenia Charles Blvd.
Roseau
Commonwealth of Dominica

June 8, 2020

Subject: Letter of affiliation Lowine Hill

The Fisheries Division of the Ministry of Blue and Green Economy, Agriculture and National Food Security of the Commonwealth of Dominica is pleased to support Ms. Lowine Hill's application to the IDRC Doctoral Research Awards 2020.

We confirm our institution direct affiliation with Ms. Hill's doctoral research titled: "Understanding disaster risk governance from ridge to reef: the place of networks in the Caribbean." conducted at the School of Environment, Resources and Sustainability, Faculty of Environment, University of Waterloo, Canada.

Through this partnership, the Division will benefit from the following; 1.Clarify uncertainties linked to disaster on SIDs. 2. Understand how individuals and groups at various scales interact in reducing disaster risks. Ms. Hill's doctoral research is aligned with our government priorities and the research outcomes can contribute to our resilience building efforts. As such, we are interested in and looking forward to working with Ms. Hill during her fieldwork period in Dominica.

We are willing to provide guidance and facilitate her research as needed to ensure successful completion of her fieldwork. We can connect her with the local community leaders and other organisations we are working with. Furthermore, we can arrange support during her fieldworks by providing access to resources, materials and/or desk space, as needed.

Sincerely,

.....

RIVIERE SEBASTIEN
CHIEF FISHERIES OFFICER (AG)