

Social Disaster Vulnerabilities: a Study of Gender and Foreign Residents in Japan

“Unless everyone is protected, no one is ever truly safe”

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I. Executive Summary

The current UN definition of disaster vulnerabilities is “the conditions determined by physical, *social*, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards” (UNISDR, 2009, p. 30 *emphasis added*). The concept of social vulnerabilities in disaster has been included under Priority 1 of the Sendai Framework 2015-2030 on “understanding risk” (UNISDR, 2015, p. 14), gaining prominence in academic and policy fields as a crucial tool to identify vulnerable populations and increase community resilience (Flanagan et al., 2011; Spielman et al., 2020). However, the analysis of social vulnerabilities is rarely considered in developed countries. The study of social vulnerabilities in Japan, a country highly exposed to disaster hazards and with an advanced level of disaster preparedness, started relatively late. The unequal impact of the Great East Japan Earthquake and Tsunami (2011) and Kumamoto Earthquakes (2016) on female and foreign residents highlighted that more information on vulnerable populations and effective disaster preparedness strategies are needed (Gender Equality Bureau, 2012; Leelawat et al., 2017; Ranghieri & Ishiwatari, 2014; Yang et al., 2017). These events highlighted social vulnerabilities in Japan, created by inequalities in economic status, social class, prejudices and prescribed cultural norms. This doctoral study proposes the analysis of social vulnerabilities in disaster preparedness to address risks and improve community resilience before a disaster happens.

This study addresses three main objectives, aligned with Sustainable Development Goals 5 (Gender Equality), 11(Sustainable Cities and Communities), and 13 (Climate Action):

- O1: to understand the general perception of risk with regards to the social vulnerabilities of gender-based disaster risks and risks for foreign residents in Japan
- O2: to explore if and how risk perceptions of gender-based disaster risks and risks for foreign residents in Japan are influenced by demographic and experiential factors
- O3: to analyse the socio-cultural context of disaster vulnerabilities of gender-based disaster risks and risks for foreign residents in Japan

Between Spring 2019 and Fall 2021, the author conducted two case-studies in the regions Kyushu and Kansai to investigate, respectively, gender-based disaster risk and disaster risk of foreign residents in Japan. The author researched social vulnerabilities of women and foreign residents in Japan through a literature review and fieldwork study. The

literature review focused on studies, reports, and local documents on the topics of gender-based disaster vulnerabilities and vulnerabilities of foreign communities, with a specific attention to Japanese case-studies. The fieldwork comprised of two steps: 1) a quantitative study based on survey data, and 2) a qualitative study based on participant observations and semi-structured interviews. The author analysed the quantitative data through the Situational Theory of Problem-Solving and the data from the literature and the field work through Grounded Theory and Critical Discourse Analysis.

The first step of the study examined the concept of *risk perceptions* for vulnerable categories. Risk perceptions were analysed using the Situational Theory of Problem Solving (STOPS) model, which allowed to identify the relationship between awareness of risk, identification with risk, notions of self-efficacy and interest in engaging in disaster preparedness initiatives. The quantitative analysis focused on survey data collected among Japanese and foreign residents.

In terms of gender-based disaster risks, the results showed that Japanese respondents are interested in disaster preparedness initiatives and that identification with risk is the main predictor of their interest in preventive actions. Quantitative analysis also showed that gender, age, and previous experience have a positive correlation with interest in disaster preparedness. The first analysis for foreign residents showed that they are also interested in disaster preparedness initiatives, but their perceived lack of self-efficacy has a negative effect on interest in disaster preparedness. The study also showed that men and people with low confidence in disaster information have lower interest in disaster preparedness initiatives.

The second step of the study focused on understanding the context around perceptions of disaster risk and discourses of gender and culture that might make the categories of women and foreign residents vulnerable to disaster. Through the analysis of participant observation and interview data using Grounded Theory, the author identified the main factors of vulnerability for women and foreign residents. To understand the importance and impacts of public discourses, the qualitative data from participant observations and interviews was evaluated using Critical Discourse Analysis.

With regards to gender-based disaster risks, the study found that existing discourses of women as vulnerable and domestic are still predominant; even in more gender-sensitive disaster initiatives aiming to empower women in Japan. The study also found that men are often excluded from discourses of gender, which could explain their lower levels of identification with gender-based disaster risk. Foreign residents' social vulnerabilities are found to be originated in social isolation from local communities, stereotypes of foreign residents as a homogeneous group, and different cultural understandings of disaster, all influencing their level of preparedness and vulnerability. Moreover, Japan's disaster preparedness system is somewhat ill-equipped to cater for foreign residents' needs during disasters and in evacuation shelters. Foreign residents often have no access to relevant disaster information because of language barriers and their unawareness of materials.

This study contributes to the literature on social vulnerability of gender-based disaster risk and foreign residents in Japan. The study is unique as it introduces a novel tool to analyse disaster preparedness, using a structure applied in the policy field but never been formalised in the literature. This framework is composed of five elements (resources, procedures, risk, context, formation and information) and used to connect academic research with the everyday politic and management of disasters. The study concludes with some policy recommendations to further improve disaster preparedness initiatives targeting gender-based disaster risks and foreign residents in Japan. The study aims to illustrate the necessity of inclusivity and diversity in disaster preparedness.

Key words: Disaster Risk Reduction (DRR), Social Vulnerabilities, Disaster Preparedness, Japan, Foreign residents, Gender.

II. Contents

I. Executive Summary	3
II. Contents.....	6
III. List of Figures and Tables.....	12
Figures.....	12
Tables	13
IV. Acronyms and Abbreviations.....	16
V. Acknowledgments.....	17
Prior Publications	18
Chapter 1 Introduction	19
1.1 Main themes	19
1.1.1 Social vulnerabilities in DRR.....	19
1.1.2 Risk perception in disaster preparedness.....	24
1.1.3 Disaster preparedness in Japan.....	24
1.2 Problem Statement, Objectives and Relevance of this Study.....	26
1.2.1 Problem Statement	26
1.2.2 Study Objectives	27
1.2.3 Relevance of the Study.....	30
1.3 Structure.....	31
1.3.1 From Risk to Practice	31
1.3.2 Structure of the study	33
Chapter 2 Literature Review	36
2.1 Context.....	37
2.1.1 Productive Power of Disasters	37
2.1.2 “New values” of Japaneseness	40

2.2 Resources and Procedures: Disaster preparedness and training in Japan.....	41
2.2.1 Disaster legislation and procedure development.....	42
2.2.2 Informal and formal disaster preparedness and education in Japan	44
2.3 Social vulnerabilities and risk perception	46
2.3.1 Social vulnerabilities, diversity and inclusion.....	46
2.3.2 Gender in DRR: Mainstreaming gender, vulnerabilities and capabilities	47
2.3.3 Social vulnerabilities: Foreign residents	52
2.4 Summary	56
Chapter 3 Methodology.....	57
3.1 Research Sites	57
3.1.1 Kyushu – Fukuoka Prefecture, Kumamoto City	58
3.1.2 Kansai – Kyoto, Osaka, Kobe City, Minoo City.....	59
3.2 Data collection and analysis.....	61
3.2.1 Risk perception and the Survey.....	62
3.2.2 Socio-Cultural Context, interviews and participant observations	65
3.3 Positionality and ethical concerns.....	67
Chapter 4 General Perception of Gender-based Disaster Risk in Kyushu, Japan	69
4.1 Introduction.....	69
4.2 Research Design.....	69
4.2.1 Site and Participants	69
4.2.2 Survey Design and Data Collection	70
4.2.3 Data Analysis	73
4.3 Results.....	73
4.3.1 General perceptions of gender-based disaster risks	73

4.3.2 Main predictor of public interest: involvement recognition	75
4.4 Discussion	76
4.4.1 General interest in gender-based disaster preparedness	76
4.4.2 Disaster risk communication and involvement recognition	77
4.5 Only half of the story	78
Chapter 5 Demographic and Experiential Factors Influencing the Perception of Gender-Based Disaster Risk	79
5.1 Introduction	79
5.2 Research Design	80
5.2.1 Data Collection	80
5.2.2 Hypotheses and Data Analysis	83
5.3 Results	84
5.4 Discussion	93
Chapter 6 General Perception of Disaster Risk among Foreign Residents in Kansai, Japan.....	95
6.1 Introduction	95
6.2 Research Design	96
6.2.1 Background on foreigners' risk perception in disaster preparedness	96
6.2.2 Site and Participants	96
6.2.3 Survey Design and Data Collection	97
6.2.4 Analysis	99
6.3 Results and Discussion	99
6.3.1 General perception of risk	99
6.3.2 Predictors of risk perception	101
6.4 Summary	104

Chapter 7 Demographic, Language, and Experiential Factors Influencing the Perception of Disaster Risk among Foreign Residents in Kansai, Japan	105
7.1 Introduction.....	105
7.2 Research Design.....	106
7.2.1 Background and hypotheses.....	106
7.2.2 Survey Design and Data Collection	107
7.2.3 Analysis.....	109
7.3 Results.....	109
7.4 Discussion	118
Chapter 8 Disaster Vulnerabilities and Gendered Discourses in Disaster Preparedness in Kyushu, Japan.....	122
8.1 Introduction.....	122
8.2 Research Design.....	123
8.3 Overview of disaster vulnerability and gendered discourses: quantitative results.....	129
8.3.1 Factors of gendered disaster vulnerability in disaster preparedness.....	129
8.3.2 Impacts of gendered discourses on disaster vulnerabilities.....	129
8.4 Qualitative discussion on gendered discourses and disaster vulnerability for women 131	
8.4.1 Disaster education	132
8.4.2 Protection measures.....	136
8.4.3 Cultural issues	139
8.4.4 Women’s strengths and capabilities.....	142
8.5 Summary	143
Chapter 9 General Disaster Preparedness Challenges and Risk Vulnerabilities for Foreign Residents in Japan.....	145
9.1 Introduction.....	145

9.2 Research Design.....	146
9.2.1 Background: building a bridge between gender and disaster studies.....	146
9.2.2 Data Collection.....	147
9.3 Results and Discussion.....	150
9.3.1 Cultural issues	151
9.3.2 Protection measures.....	160
9.3.3 Disaster management and education	165
9.4 Summary	169
Chapter 10 Conclusion.....	171
10.1 Introduction.....	171
10.2 Conclusions to Study Objectives.....	172
10.2.1 Public risk perception and social vulnerabilities	172
10.2.2 Factors of risk perception.....	174
10.2.3 Impact of socio-cultural context on risk perception and disaster preparedness	177
10.3 Policy Recommendations.....	179
10.3.1 Reformation of disaster education to include gender-based disaster risks.....	180
10.3.2 Adaptation of disaster preparedness contents for gender and cultural minorities ..	180
10.3.3 New strategies to reach foreign residents.....	181
10.3.4 Gender inclusivity of disaster management	181
10.3.5 Safety measures during evacuation for vulnerable groups.....	182
10.4 Limitations of the Study.....	183
10.4.1 Participants.....	183
10.4.2 Location.....	183
10.5 Future Research.....	183

Appendices	185
Appendix 1 Surveys	185
Appendix 1.1a Survey details for gender-based disaster risks (Ch. 4-5)- EN.....	185
Appendix 1.1b Survey details for gender-based disaster risks (Ch. 4-5) - JP	186
Appendix 1.2 Survey details STOPS model for foreign residents’ social disaster vulnerabilities (Ch. 6-7)	187
Appendix 1.3 Socio-economic frequency tables for foreign residents’ survey.....	189
Appendix 2 Interviews’ overview	191
Appendix 2.1 Overview of the interviews of (Chapter 5 and 8)	191
Appendix 2.2 Overview of the interviews of (Chapter 9).....	192
Appendix 3	193
Appendix 3.1 List of Disaster Preparedness Challenges (complete)	193
Appendix 4.....	194
Appendix 4.1 Distribution plots for gender-based disaster risks	194
Appendix 4.2 Distribution plots for foreign residents’ disaster risks.....	195
References.....	196

III. List of Figures and Tables

Figures

Figure 1.1 Cumulative SVI framework and Social Vulnerabilities of the study

Figure 1.2 Four forms of support during disaster and focus of the study

Figure 1.3 Relevant SDGs and SFDRR priorities and focus of the study

Figure 1.4 Study objectives (SO) and research questions (RQ) on gender-based disaster risks and foreign residents' vulnerabilities

Figure 1.5 Relevance and focus of the study

Figure 1.6 Structure of Disaster Risk Process

Figure 1.7 Organisation of dissertation chapters based on study framework

Figure 1.8 Thesis structure

Figure 2.1 Structure and focus of Chapter 2

Figure 3.1 Research data and methods outline

Figure 3.2 Map of Fukuoka and Kumamoto

Figure 3.3 Map of Kansai region

Figure 3.4 Overview of study's methodologies and main objectives

Figure 3.5 STOPS Model and focus of this study

Figure 3.6 Qualitative methods research interests

Figure 4.1 Structure and focus of Chapter 4

Figure 4.2 Problem-solving behaviour and involvement

Figure 4.3. Results of Confirmatory Factor Analysis

Figure 4.4 SEM Results of Gender-based disaster risk

Figure 5.1 Structure and focus of Chapter 5

Figure 6.1 Structure and focus of Chapter 6

Figure 6.2 SEM Results for foreign resident’s disaster risk

Figure 7.1 Structure and focus of Chapter 7

Figure 8.1 Structure and focus of Chapter 8

Figure 8.2 Mini-Booklet emergency backpack instructions

Figure 8.3 Mini-Booklet “Rolling Stock” instructions

Figure 8.4 Picture of cooking station at Enogaikai Simulation

Figure 8.5 Gender-sensitive evacuation map, Mini-Booklet

Figure 8.6 Picture of tent at Enogaikai Simulation

Figure 9.1 Structure and focus of Chapter 9

Figure 9.2 Earthquake Memorial Museum in Kobe

Figure 9.3 Picture of toilet from carton board at Enogaikai Simulation

Figure 9.4 Picture of training of local volunteers in evacuation simulation at Osaka International House

Figure 9.5 Picture of Group discussion at KOKOKA Disaster Prevention event

Figure 9.6 Picture of simulator of flooded door

Figure 9.7 Picture of simulator of flooded car

Figure 10.1 Structure and Study Objectives

Figure 10.2 Overview of recommendations in formation and information

Tables

Table 1.1 Outline of Disaster Management System in Japan and targeted group of the research

Table 1.2 Dissertation overview with focus on location, issue/target, methods

Table 2.1 Timeline of DDR legislation in Japan

Table 2.2 Outline of Japan DM system and focus of this study

Table 2.3 Timeline of gender and DRR legislation and system development in Japan

Table 2.4 Comparison of gender gap indicators

Table 3.1 Census of foreign residents and total population of field work sites (2020)

Table 4.1 Overview of the survey and focus of Chapter 4

Table 4.2 STOPS Variables' Responses: Valid and Missing entries, Mean, Standard Deviation

Table 5.1 Overview of the survey and focus of Chapter 5

Table 5.2 Methodology overview of Chapter 5

Table 5.3 Age grouping and living social generations in Japan

Table 5.4 Overview of the survey and focus of Chapter 5

Table 5.5 Significant Correlations (Bold), Mean and Standard Deviation

Table 5.6a Descriptive Statistics of involvement recognition and interest by gender

Table 5.6b ANOVA testing of involvement recognition and interest by gender

Table 5.6c ANOVA Post Hoc Comparisons of gender

Table 5.7a Descriptive Statistics of risk perception model by age groups

Table 5.7b ANOVA testing of risk perception variables by age groups

Table 5.7c ANOVA Post Hoc Comparisons of age groups

Table 5.8 Multiple regression of experiential variables and significant relationships (in bold)

Table 6.1 Survey questions overview and focus of Chapter 6

Table 6.2 Descriptive statistics of survey responses of foreign residents' disaster risk

Table 6.3a Chi-square test of confirmatory factor analysis

Table 6.3b CFA factor covariances and statistical correlations

Table 6.3c Fit indices

Table 6.4a ANOVA model summary

Table 6.4b ANOVA testing results

Table 6.5 Multiple regression coefficients and predictors of SM

Table 7.1 Overview of the survey

Table 7.2 Descriptive Statistics – Gender

Table 7.3 Significant Correlations (Bold), Mean and Standard Deviation

Table 7.4a ANOVA testing – Gender and statistical significance

Table 7.4b ANOVA Post Hoc Comparisons

Table 7.5 Characteristics of individualistic and communitarian societies

Table 7.6 Descriptive Statistics - Society Model of the Country of Origin (SCOO)

Table 7.7a ANOVA testing for Society Model of the Country of origin and statistical significance

Table 7.7b ANOVA Post Hoc Comparisons

Table 7.8 Regression analysis of language level

Table 7.9 Multiple regression analysis of experiential variables

Table 8.1 Overview of the PO settings, Fukuoka (Japan)

Table 8.2 Overview of the interviews of chapter 8 (Date, Role, Gender, Age)

Table 8.3 Example of coding transcripts

Table 8.4 Factors of disaster vulnerability for women

Table 8.5 Coding of gender discourses by factor of vulnerability

Table 9.1 Overview of participant observation sites

Table 9.2 Coding results and significant results

IV. Acronyms and Abbreviations

CDA: Critical Discourse Analysis

CDPC: Citizens' Disaster Prevention Center

CR: Constrain Recognition

DRR: Disaster Risk Reduction

DRM: Disaster Risk Management

GEAD: Gender Equality Affairs Department, Fukuoka City

GT: Grounded Theory

IR: Involvement Recognition

JICA: Japan International Cooperation Agency

NPO: Non-Profit Organisation

PFND: People with Functional Needs at times of Disaster

POs: Participant Observations

PR: Problem Recognition

SCOO: Societal model of the Country of Origin

SM: Situational Motivation

STOPS: Situational Theory of Problem Solving

UNISDR: United Nations International Strategy for Disaster Reduction

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Prior Publications

2. Publication Method and Date

1. Chapters 4-5

Petraroli, I., Singer, J. (2020) *(Gender In Japan: The Unseen Aspect Of Natural Disaster Risks) [日本におけるジェンダー観 -自然災害リスクのなかに潜在する一側面からの考察-]

doi:10.34190/IGR.20.058.

Date published: Peer-reviewed and published in 07, 2020

Proceedings of the 3rd International Conference on Gender Research, ACPI, pp. 284 – 293

2. Chapters 6-7

Petraroli, I. Baars, R. (in Press) *(Disaster Preparedness Communication and Perception of Foreign Residents in Kansai, Japan: A Socio-cultural Study) [関西における外国人住民の防災コミュニケーションと防災に対する認識に関する社会文化的研究]

Date published: Publication is peer-reviewed and accepted for publication in 04, 2022

Australian Journal of Emergency Management

Chapter 1 Introduction

Disaster management and studies can focus on disaster mitigation, preparedness, response or recovery (Flanagan et al., 2011). This study focuses on the gender and cultural inequalities in disaster preparedness in the contexts of Kyushu and Kansai, Japan. This chapter will introduce the main themes of the thesis: 1) social disaster vulnerabilities related to gender and culture; 2) risk perception affecting individual disaster resilience; and 3) disaster preparedness in Japan. The literature has substantially contributed to these themes individually, though the link between them has emerged recently in informal discussions, there is insufficient systematic academic analysis on the topic. This study aims to fill this gap, to better understand how social vulnerabilities are perceived and created in disaster preparedness in the Japanese context, and how they can be addressed in the future.

In order to do so, this chapter will also outline the 4) problem statement and objectives of the study, and 5) the structure of this study.

1.1 Main themes

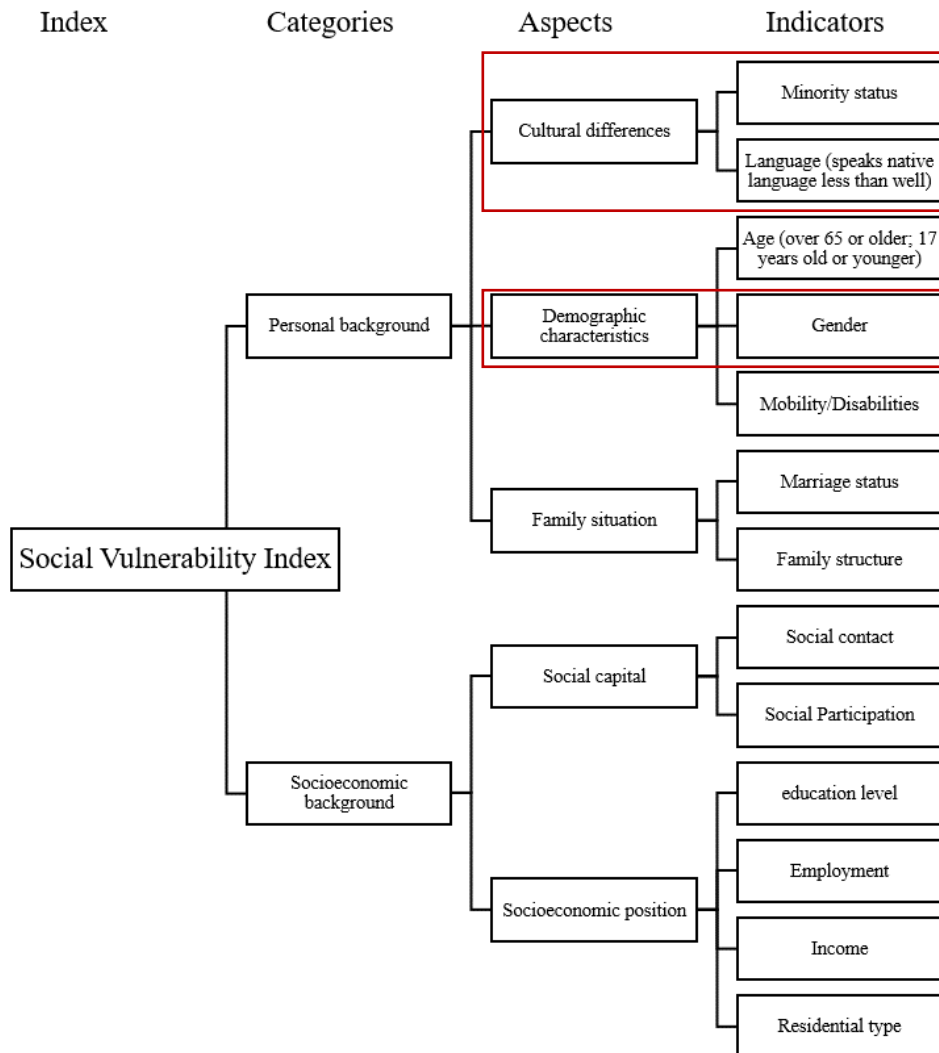
1.1.1 Social vulnerabilities in DRR

Recent DRR scholarship and policy agree that in the wake of increasing natural hazards, the notion of risk and vulnerabilities requires further analysis from a social perspective to fully understand the nuances of disaster risk and the differing impact of disaster and risk on different populations (Adams et al., 2019; Krüger, 2015; UNISDR, UNDP and IUCN, 2009). This concept, known as “social vulnerabilities”, has therefore become an important focus for many international discussions and agreements to reduce disaster risks. UNISDR defines vulnerabilities in Disaster Risk Reduction (DRR) as “the conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards” (UNISDR, 2009, p. 30). It is widely understood that “disaster vulnerability is socially constructed and arises out of the social and economic circumstances of everyday living” (Lin & Hung, 2016, p. 1660). Then, social vulnerability can be defined as “the extent to which an area’s social

conditions affect the response and prevention of disasters” (*Social Vulnerability Index – My Healthy Community – State of Delaware, n.d.*).

Evidence of the endorsement of social vulnerability in disaster studies is the widespread use of social vulnerability indexes (SVI), applied by scholars and policy-makers in the modelling of climate change risks (Adams et al., 2019; Fatemi et al., 2017; Lin & Hung, 2016). Although there is not a unitary approach to SVI, Figure 1.1 shows a cumulative overview of categories, aspects and indicators widely considered. This study focuses in particular on 1) gender-based vulnerabilities and disaster risks as well as 2) social vulnerabilities of foreign residents in Japan.

Figure 1.1 Cumulative SVI framework and Social Vulnerabilities of the study (in red)
 © modified from Lin and Hung (2016) and CDC¹



1.1.1.1 Gender-based disaster vulnerabilities

The international community has recognised gender as an important factor in DRR since the 2009 Beijing Declaration and Platform for Action (IFCR, 2011; UNDP, 2016; UNISDR, UNDP and IUCN, 2009). The overlook of gender issues in the past often contributed to women being particular vulnerable during the evacuation period, often in

¹ https://www.atsdr.cdc.gov/placeandhealth/svi/documentation/SVI_documentation_2018.html

relation to gendered cultural norms and roles (Hamidazada et al., 2019; Hyndman, 2008), the rise in domestic violence and abuse against women following a disaster (Parkinson, 2019; Parkinson & Zara, 2013; K. Sakurai et al., 2017), as well as an increased substance and alcohol abuse linked to stress and anxiety, and other mental health issues (Goto et al., 2015; Kuroda et al., 2017; Yabe et al., 2014).

Higher mortality rates of women during and in the aftermath of a disaster are mainly linked to social and economic factors in the literature. It was found that the vulnerability of women “depends not only on disaster strength itself but also on the *socioeconomic* status of women in the affected country...where the socioeconomic status of women is high, men and women will die in roughly equal numbers during and after natural disasters, whereas when the socioeconomic status of women is low, more women than men die (or women die at a younger age)” (Neumayer & Plümper, 2007, p. 552). Another example of gender-based disaster vulnerability grounded in social and cultural dynamics in Japan is the systematic overlook or disregard of women’s needs and capabilities in disaster and post-disaster management (DM) and reconstruction (Kondo & Kuzunishi, 2008; Masai et al., 2009). Therefore, a gender-sensitive approach to DRR has been advocated as part of the solution (FAO; Enarson and Morrow, 1998; APEC, 2008; Jayarathne and Babu, 2017). The Japanese Government has shown progressive commitment to the inclusion of gender equality in DRR policy briefs and official commitments (Cabinet Office, 2016; Gender Equality Bureau, 2012). Currently, the main concern of policymakers and other stakeholders in DRR in Japan is to identify factors of disaster vulnerability for women and target them through disaster preparedness strategies (Takeuchi & Shaw, 2008).

This research therefore argues that when considering gender-based risk, it is useful to think of gender not as biological sex of the individual, but as social structures (Pease, 2021; Risman, 2004). Pease aptly defines gender as the “set of practices involved in the reproduction of institutions and an attribute of social structures” (Pease, 2021). By this definition, it is possible to identify a gap in the majority of Japanese disaster initiatives that focus on data about women’s vulnerabilities but fail to recognise and address the social structures and cultural derivatives of those vulnerabilities for women.

1.1.1.2 Social vulnerabilities of foreign residents

Another social group considered highly vulnerable to disasters are foreign residents. The overlook of foreign resident issues in disasters often contributed to heightened disaster risks and vulnerabilities. For example, it was found that foreign residents in Japan are more likely to experience disorientation and panic in case of a disaster (Yang et al., 2017), due to their lack of familiarity with the area and an underdeveloped support network (Bisri & Sakurai, 2014; Ohtomo et al., 2017). Furthermore, non-Japanese speaking foreign residents and tourists experience specific challenges due to language barriers (Aliperti et al., 2019; Uekusa, 2019). The fact that foreigners are disproportionately affected by disasters, in combination with an expected increase in Japan's foreign population requires an urgent assessment of their social vulnerabilities (Nagy, 2009; Takuma, 2021).

Research on disaster vulnerabilities of foreign residents often focuses on linguistic barriers and pays less attention to other social and cultural aspects, such as disaster risk perceptions of foreign populations (Uekusa, 2019). This study explores foreign residents' perceptions of disaster risks and social vulnerabilities from a socio-cultural approach going beyond the usual linguistic focus. To do so, social and cultural factors established in the literature will be taken into account: cultural backgrounds, age, gender, and social class (Hamidazada et al., 2019; Jayarathne & Babu, 2017).

1.1.1.3 Social vulnerabilities and discourses

This study analyses the link between socio-cultural structures and social vulnerabilities in disaster preparedness. Although it is widely accepted that socio-cultural structures of gender and cultural identity shape disaster preparedness and education, little is known on how these structures affect disaster vulnerabilities even before a disaster happens. To uncover these structures, this study investigates cultural discourses around gender and ethnicity in Japan. This study argues that social disaster vulnerabilities are shaped by these existing socio-cultural structures. Disaster preparedness does not occur outside societal notions of gender and identity but is deeply embedded within these.

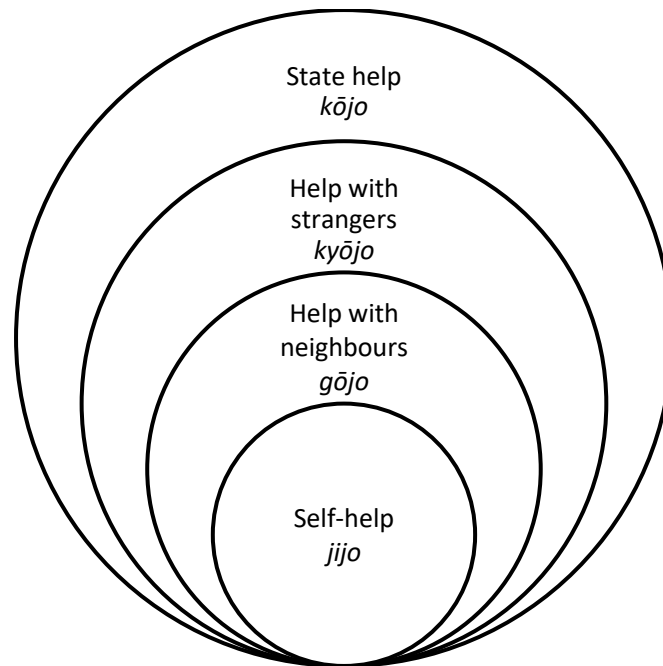
1.1.2 Risk perception in disaster preparedness

To minimise social disaster vulnerabilities, orthodox disaster preparedness relies on the strengthening of disaster management procedures, the improvement of infrastructure safety measures, and incremental public information strategies. Little attention has been given to the role that non-expert public *perceptions* of disaster risk play in minimising social vulnerabilities, despite the literature suggesting an important link between risk perception and disaster preparedness (Boret, 2020; Oliver-Smith, 1999). This project aims to fill this gap by investigating *disaster risk perceptions* of vulnerable groups from the perspective of the non-expert public.

1.1.3 Disaster preparedness in Japan

Disaster preparedness and management in Japan was often shaped from the experience and lessons of great catastrophic events. Following the Great Hanshin earthquake in 1995, notions of self-help (*jijo*), and mutual help (*gōjo-kyōjo*) became more ingrained into DRR education in Japan (Sakaue & Murata, 2019). The particular importance of localised help was emphasised after the Great East Japan Earthquake and Tsunami (GEJET) disaster, also known as 3.11. The GEJET experience highlighted the limitations of state help (*kōjo*) in case of extensive disasters. Learning from that experience, a new disaster preparedness and disaster management system was established. Central to this new system was the promotion of self-help (*jijo*), neighbourhood aid (*gōjo*), and community help (*kyōjo*) in addition to state help (*kōjo*) (Koikari, 2019): (see Figure 1.2).

Figure 1.2 Four forms of support during disaster and focus of the study (in grey) © author



These changes were formalised in disaster management policy through the Amendment to the Basic Disaster Management Act in 2013(災害対策基本法) (Cabinet Office, 2014). Based on the current disaster management system, the first and most important dimension of disaster preparedness is the Local Disaster Management Plan (地区防災計画) in the hands of local district governments (Cabinet Office, 2017). Based on current regulations, local governments have to work with local residents and businesses to create a plan for disaster management activities, the Community Disaster Management Plans (CDMP). These localised strategies focus on having a specific set of emergency procedures in place by which local residents and business are expected not only to be able to prepare materials and food for themselves, but also to be of mutual support with other disaster management stakeholders (Cabinet Office, 2016). In terms of self-help, disaster preparedness strategies focus on compulsory drills and simulations to further prepare the adult population.

Table 1.1 Outline of Disaster Management System in Japan and targeted group of the research (grey boxes) © Cabinet Office, Japan 2017 (modified)

Disaster Management level	Stakeholders	Tasks
National level	Prime Minister	Formulation and Implementation of Basic Disaster Management Plan
	Central Disaster Management Council	
	Ministries	Formulation and Implementation of Disaster Management Operations Plans
Prefectural level	Governor	Formulation and Implementation of Prefectural Disaster Management Operations Plan
	Prefectural Disaster Management Council	
	Designated Public Entities (Bank of Japan, NHK, NTT etc.)	Formulation and Implementation of Disaster Management Operations Plan
Municipal level	Mayors	Formulation and Implementation of Municipal Disaster Management Plan
	Municipal Disaster Management Council	
Local residents level	Residents and Enterprises	Formulation and Implementation of Community Disaster Management Plan (CDMP)

After 3.11, formal and informal strategies to prepare for and address social vulnerabilities in Japan focused in particular on gender issues and disabilities in disasters (Tatsuki, 2007). Under the umbrella of formal strategies fall the works of governmental bodies like Fire departments and Prefectures (Gender Equality Bureau, 2012). Informal strategies are often community-based initiatives tackling specific gender vulnerabilities and community concerns, and are managed by local stakeholders, NGOs or NPOs (*White Paper: Disaster Management in Japan 2018*).

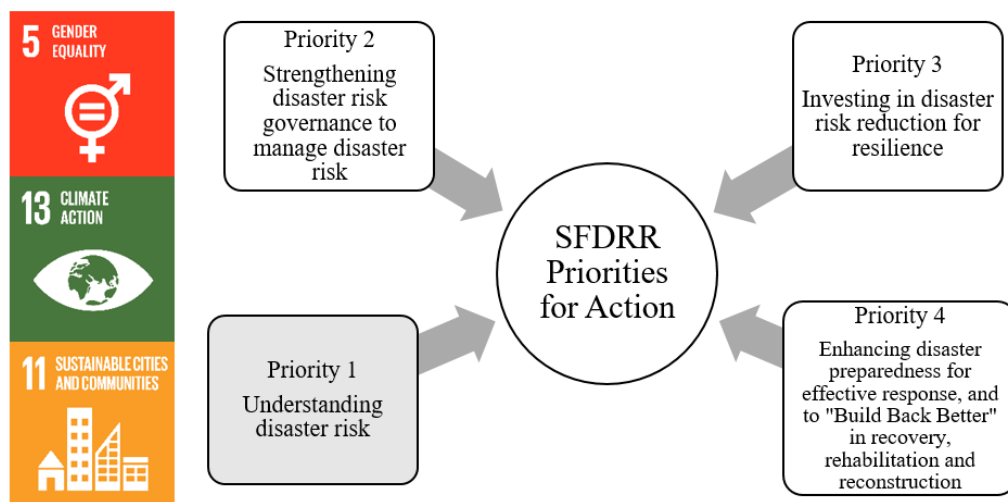
1.2 Problem Statement, Objectives and Relevance of this Study

1.2.1 Problem Statement

Japan is one of the countries with the highest exposure to natural hazards in the world. In recent years, in addition to increasing numbers of typhoons, heavy rain, and earthquakes, important social challenges are posed to DRR governance by the aging population, gender inequality issues and an increasing foreign population. Given the link between social challenges and increased hazard exposure, it is crucial to investigate and reduce social vulnerabilities of all communities in Japan.

In the past, the lack of consideration for social vulnerabilities during and after a disaster led to so-called secondary disasters (Gender Equality Bureau, 2012). For example, gender unjust relief-strategies and neglected emotional patterns after a disaster often lead to secondary disasters that could be prevented (Ariyabandu, 2009; Enarson & Pease, 2016). Social vulnerability assessments fall under Priority 1 of the Sendai Framework 2015-2030 on “understanding of disaster risk” to achieve community resilience (SFDRR, UNISDR, 2015, p. 14), and are aligned with SDG 5 (Gender Equality), 11 (Sustainable Cities and Communities), and 13 (Climate Action).

Figure 1.3 Relevant SDGs and SFDRR priorities and focus of the study (grey box) © SFDRR (modified)



Currently, both the public and policy-makers seem not to have sufficient awareness and information about social vulnerabilities, creating systematic gaps in disaster preparedness and unequal levels of disaster resilience within local communities (Puppim de Oliveira & Fra.Paleo, 2016).

1.2.2 Study Objectives

Based on the problem statement and identified gaps in policy and academic literature, this study addresses how policymakers, rescue workers, and the general public identify social disaster vulnerabilities in the context of disaster preparedness in Kyushu and Kansai, Japan. The aspects of disaster preparedness considered are household preparedness,

emergency, evacuation shelters, and disaster management. In defining these factors of disaster vulnerabilities for women and foreign residents, this study aims to offer insights to discourses on gender and culture and their effects on social disaster vulnerabilities and risk perceptions.

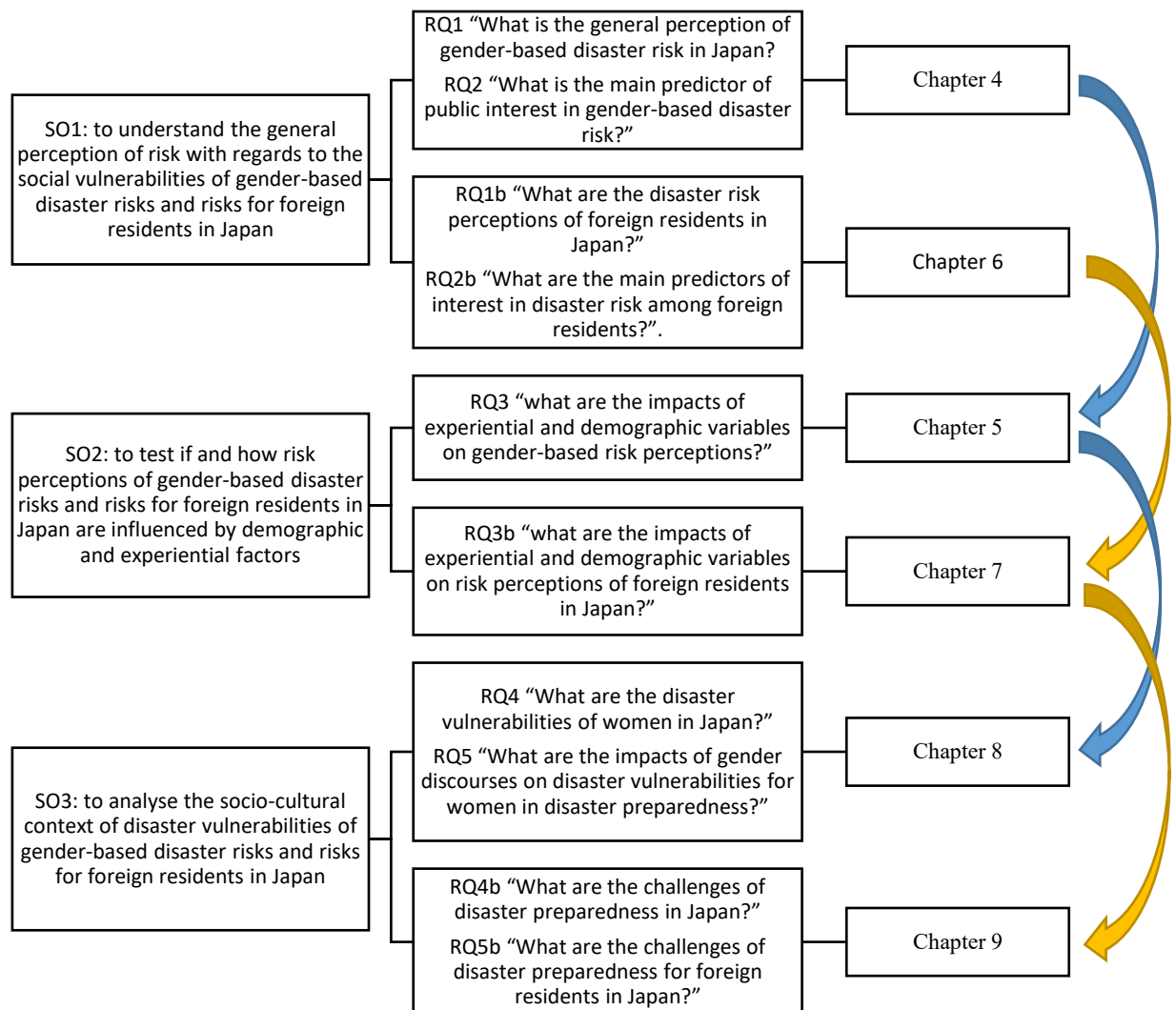
The study prioritised three aspects of social vulnerabilities and disaster risk: 1- the general perception of disaster risk from the perspective of Japanese residents in Kyushu as well as foreign residents in Kansai; 2- the impact of various individual variables on these risk perceptions, and finally 3- the socio-cultural contexts in which challenges in risk awareness and preparedness manifest. The objectives and corresponding research questions of this study are:

- O1: to understand the **general perception of risk** with regards to the social vulnerabilities of gender-based disaster risks and risks for foreign residents in Japan
 - RQ1a “What is the general perception of gender-based disaster risk in Kyushu, Japan?”
 - RQ1b “What are the disaster risk perceptions of foreign residents in Kansai, Japan?”
 - RQ2a “What is the main predictor of public interest in gender-based disaster risk?”
 - RQ2b “What are the main predictors of interest in disaster risk among foreign residents?”.
- O2: to explore if and how risk perceptions of gender-based disaster risks and risks for foreign residents in Japan are influenced by **demographic and experiential factors**
 - RQ3a “what are the impacts of experiential and demographic variables on gender-based risk perceptions?”
 - RQ3b “what are the impacts of experiential and demographic variables on risk perceptions of foreign residents in Kansai, Japan?”
- O3: to analyse the **socio-cultural context** of disaster vulnerabilities of gender-based disaster risks and risks for foreign residents in Japan
 - RQ4a “What are the disaster vulnerabilities of women in Kyushu, Japan?”
 - RQ4b “What are the challenges of disaster preparedness in Kansai, Japan?”
 - RQ5a “What are the impacts of gender discourses on disaster vulnerabilities for women in disaster preparedness?”
 - RQ5b “What are the challenges of disaster preparedness for foreign residents in Kansai, Japan?”

This study is based on the unique context of two regions in Japan (Kyushu and Kansai) and does not represent Japan as a whole. However, this study offers useful insights on the localities of Kyushu and Kansai and a unique facet of gender and cultural issues in DRR in Japan.

Figure 1.4 below shows how the three research objectives are connected to research questions on gender-based disaster risk and foreign residents' disaster vulnerabilities.

Figure 1.4 Study objectives (SO) and research questions (RQ) on gender-based disaster risks (blue) and foreign residents' vulnerabilities (yellow) © author



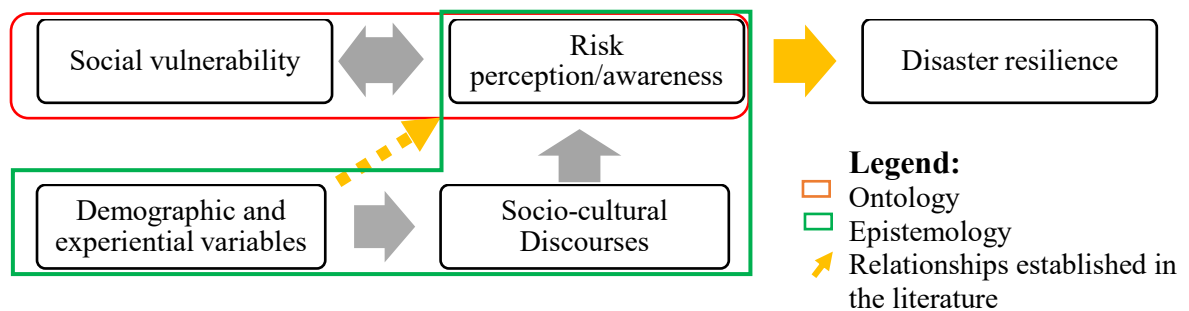
1.2.3 Relevance of the Study

This study contributes to a better understanding of the nature of disaster vulnerability and disaster preparedness (ontology) and illustrates new approaches in testing and measuring complex relationships between the two (epistemology).

Various studies have found differences in risk perception based on demographic and experiential variables (Flynn et al., 1994; Y. Kim et al., 2018). Epistemologically, this study is relevant because 1) it explores a quantitative approach to measure risk perception and 2) establishes a new link between demographic and experiential variables and socio-cultural discourses (see Green Square in Figure 1.5).

Ontologically, this study is relevant because it tests the relationships between social vulnerability and risk perception. It is known that risk perception can increase resilience and reduces reliance on external help during a crisis (Arce et al., 2017; Huurne & Gutteling, 2008; Kunz-Plapp & Werner, 2006). However, social vulnerabilities and risk perception have been analysed largely separately and only during and after disasters. Then, this study is relevant for two reasons. Firstly, it focuses on the mutual relationships between perceptions of risk and vulnerabilities (see red square in Figure 1.5). Secondly, the analysis of risk perceptions and social vulnerabilities focuses on disaster *preparedness*.

Figure 1.5 Relevance and focus of the study © author

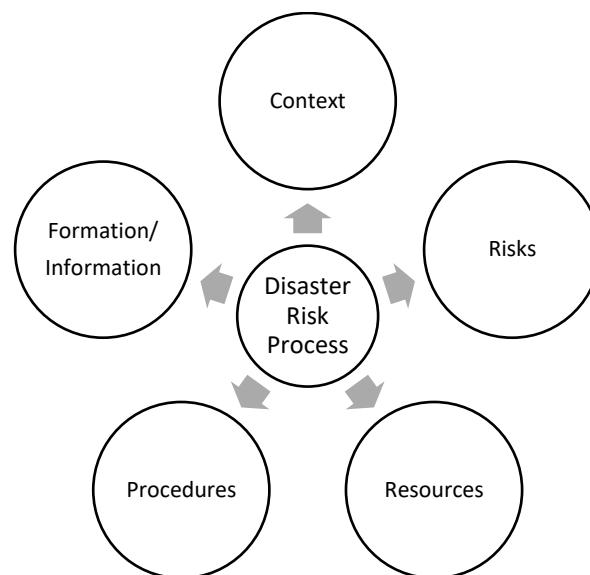


1.3 Structure

1.3.1 From Risk to Practice

The structure of this research is based on common elements implemented in disaster emergency and disaster training in Italy by the *Protezione Civile* (Civil Protection Department - PC²). Started by Dr Mario Moiraghi, Regional PC Director of Lombardy and member of the National PC Committee, the model was informally used and shared among DRR practitioners from the 1970s to the 1990s, until his retirement. These elements were mostly used to create disaster procedures for private companies and local governments and have also been used in school-based disaster education activities in Italy. The structure identifies five elements (see Figure 1.6).

Figure 1.6 Structure of Disaster Risk Process © author



The first element of the structure is the **context (1)**. In order to correctly assess and reduce risk before a disaster, it is important to understand the context in which to operate. Context here means the local context, to be analysed through bottom-up learning with social groups. The second element is identification of **risks (2)** in that context. Risks are

² <https://www.protezionecivile.gov.it/en/>

generally identified as the intersection between three factors: a hazard (the probability of an event leading to human losses or damages to infrastructure or services), vulnerability (extent of the damage or loss caused by the event), and exposure (probability of that geographical area or social community to experience the event) (UNISDR, 2009). The third element is the examination of available **resources (3)** of any kind. Resources here are used in a very broad sense and include basic material resources (fire extinguishers, water, food, drugs), organisational resources (social groups, rescue operators, local groups), communication and infrastructure resources etc. The fourth element is the development, assessment and monitoring of old and new **procedures (4)**. Procedures are defined as the ways in which resources (3) can be applied to reduce risks (2) in a context (1). The fifth and final element is the training through **formation (5a)** of operators and **information (5b)** for potential victims.

This structure reflects real practice disaster risk management in Italy. Although this model is not an academic framework, it can be helpful tool to structure the complexities of this thesis. It helps to visualize the relationships between people's perceptions of **risk (2)** and their socio-cultural **context (1)**, also considering resources (3) and procedures (4). The study aims to demonstrate that better information about risks and context of social vulnerabilities in the context of Kyushu and Kansai can be used to improve **training** activities of stakeholders and **information** measures (5) of the public.

The main advantage of using this specific structure is its general applicability and its practical foundations. Firstly, the generalisability and flexibility of this structure makes it relevant to almost every context of disaster and emergency risks. In practice, it facilitates the logic categorisation of research data and literature about DRR strategies into five categories. Secondly, since the aim of the study is to provide specific suggestions to inform and improve formation and information strategies, the use of a practical model to inform a theoretical study is ideal. This model originated from the needs of disaster stakeholders and policy-makers, and therefore has a direct application not only for scholars but also for DRR practitioners and the public. The use of a practical model for an academic study also addresses the need for research and scholarship to inform DRR practice (ACEDRR, 2011; Weichselgartner & Pigeon, 2015).

1.3.2 Structure of the study

The dissertation is organised as follows (Table 1.2):

Table 1.2 Dissertation overview with focus on location, issue/target, methods © author

Dissertation	Location	Issue/Target	Methods
Chapter 2		Risk perception, Social Vulnerabilities and Disaster Preparedness in Japan	Literature Review
Chapter 4	Kyushu	Gender/Japanese residents	Survey
Chapter 5	Kyushu	Gender/Japanese residents	Survey
Chapter 6	Kansai	General issues (incl. gender)/Foreign residents	Survey
Chapter 7	Kansai	General issues (incl. gender)/Foreign residents	Survey
Chapter 8	Kyushu	Gender/Japanese residents	Interviews + Participant Observations
Chapter 9	Kansai	General issues (incl. gender)/Foreign residents	Interviews + Participant Observations
Chapter 10 (Conclusion)		Recommendations and limitations of the study	

Figure 1.7 below shows the organisation of chapters based on the study framework.

Figure 1.7 Organisation of dissertation chapters based on study framework © author

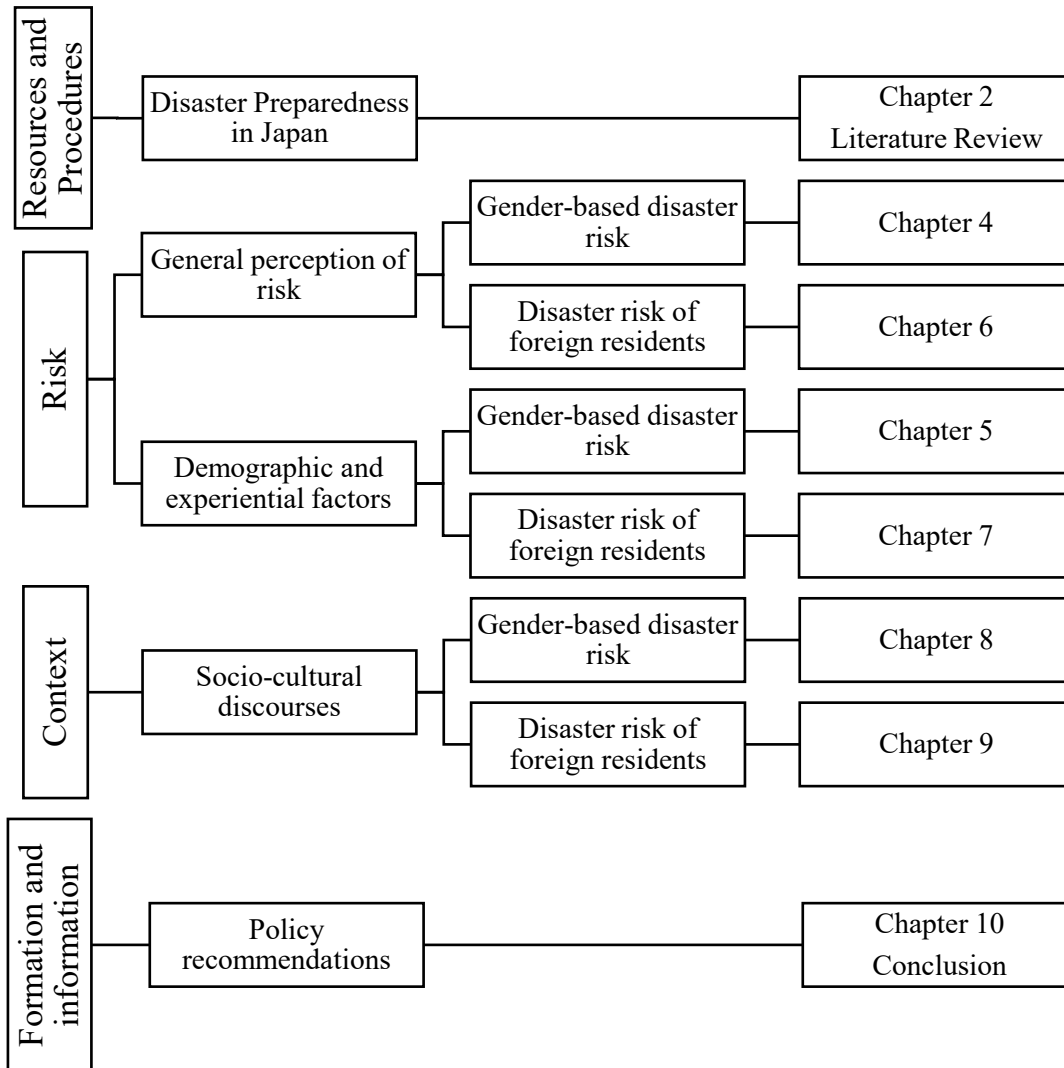
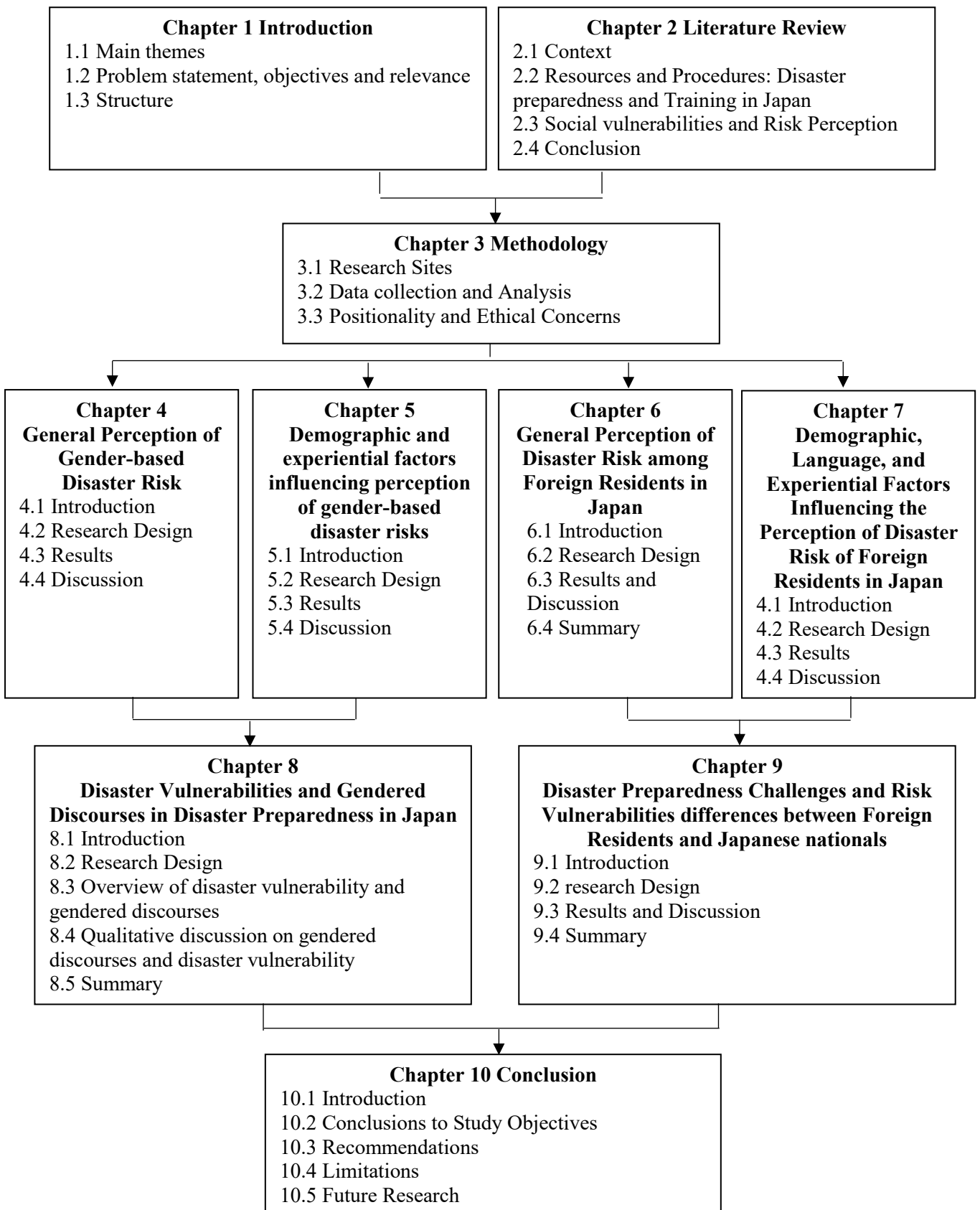


Figure 1.8 below shows the whole thesis structure.

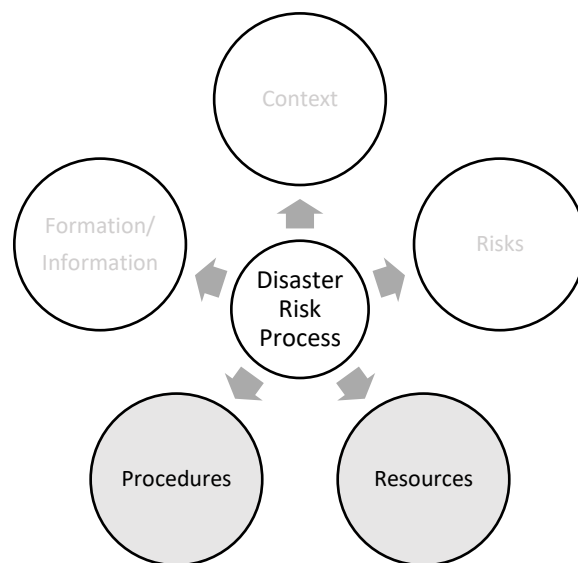
Figure 1.8 Thesis structure © author



Chapter 2 Literature Review

This chapter is based on the elements of *resources* and *procedures*, previously identified as the first two elements of the structure used in this study (see Introduction 1.3). Then, this chapter focuses on the resources and procedures of disaster preparedness in Japan with regards to gender-based disaster risks and vulnerabilities of foreign residents (Figure 2.1).

Figure 2.1 Structure and focus of Chapter 2 © author



In addition to outlining the disaster management (DM) *resources* and *procedures* strategies currently applied in Japan (Section 2.2), this chapter also explores the literature on the social and cultural *context* of Japan (Section 2.1), and the social vulnerabilities based on gender and ethnicity (Section 2.3). This review of *risk* and *context* literature will inform the rest of the study, composed of analyses of *risk* (Chapters 4 to 7), *context* (Chapters 8-9), and recommendations on *formation* and *information* strategies (Chapter 10). This chapter will point out the significance of this study by highlighting 1) the literature gap in the understanding of the public's disaster risk perceptions of social vulnerabilities in case of disasters in Japan and 2) the need for the inclusion of contextual socio-economic and cultural aspects into DRR approaches to adjust training, resources and procedures to eventually reduce disaster risks.

2.1 Context

2.1.1 *Productive Power of Disasters*

Disasters are by definition destructive events measured through “losses and damages to humans, the economy and society” (Kulatunga, 2010). However, disasters and crises also have an intrinsic “generative power in discursive terms” (Koikari, 2019). The reason is identified by Ekström and Kverndokk (2015) who argue that disasters stimulate the “cultural impulse... to metaphorically and discursively connect extreme events of different scale and character” (p. 356) and “work as catalysts for negotiations of cultural meaning, norms and values, and the patterns of social organization” (p. 357). This can be seen in the case of Japan, whose history and identity has been shaped through the representation and re imagination of its past disasters (Ekström & Kverndokk, 2015; Krüger, 2015).

A crucial point in the cultural production of post-WWII in Japan was the Great Kantō Earthquake (1923) that impacted Tokyo and the surrounding areas (Koikari, 2019). The disaster marked a significant shift in the understanding of Japanese values. It created, as Schencking argues, a “‘culture of catastrophe’ whereby a series of discourses and practices circulated to (re)define the meanings of Japan” (Schencking in Koikari, 2019, p. 146). Schencking (2008) argued, this catastrophe was used as a moral warning to organise the political and social developments of Japan’s society: “this [catastrophe] culture nurtured, amplified, and to many individuals legitimated ...the discourse of national regress and moral decline and the discourse of national reconstruction” (Schencking, 2008, p. 298). In other words, the aftermath of the Great Kantō Earthquake was characterised not only by the localised component of physical reconstruction, but also the emergence of the nation-wide cultural process of moral transformation through political and media discourses (Weisenfeld, 2012). The argument was that the people’s distancing from traditional Japanese values warranted a divine punishment which eventually took the form of the Earthquake, framing the necessity not only of reconstruction but of moral transformation (Borland, 2006). It can be argued that since then post-disaster reconstruction processes in Japan were imbued with cultural values and discourses that tapped into conservative values of “Japanese-ness”, deeply related to

ethnicity and gender (Koikari, 2019). Although the Japanese society has greatly changed since the Great Kanto earthquake in 1923, research suggests that disaster storytelling shaped the development of Japanese consciousness until today (Ono et al., 2021). Koikari (2019) suggests that the traditional glorification of the Japanese values of self-sacrifice for the nation, community and moral strength was a crucial motivator for recovery and reconstruction in the aftermath of the Great East Japan Earthquake and Tsunami (GEJET) in 2011 (Koikari, 2019).

2.1.1.1 “Old values” of Japanese-ness: Gendering and gendered disasters

Various accounts suggest that the return to Japanese values after great disasters advocated by media, institutions and politicians, is deeply linked to gender (Aikawa, 2006; Enarson & Morrow, 1998; Koikari, 2019; Tyler & Fairbrother, 2013). It can be argued that gender is essential in understanding the cultural and moral responses to both the Kanto and Tohoku disasters, because masculinity is essential to the organisation of Japanese society. The fate of the Japanese Nation has always been in the hands of men: warriors during the Empire, soldiers until the end of WWII, and “economic warriors”, the *salarymen*, in post-WWII Japan (Koikari, 2019; Mikanagi, 2011). The perceived economic crisis and moral decadence in Japan at the time of the GEJET was linked to a parallel crisis of masculinity in Japan. Koikari (2019) states that the “persistent anxiety over manhood” in Japan during that time is the result of rising unemployment, issues of poverty and homelessness, and the worsening of the social phenomena of suicides (*kodokushi*) and shut-ins (*hikikomori*).

The link between social and economic dimensions of masculinity and disaster response consolidates the notion that disasters are intrinsically masculine environments. The masculinisation of disaster is present at all stages of the disaster cycle, and is based on the idea that disasters are “men’s business” (Tyler & Fairbrother, 2013)._ This idea is grounded on the association of femininity with caring roles and masculinity with financial responsibility and is present in many cultures (Dasgupta, 2000, 2005; Hidaka, 2010; Steel, 2019b).

The pressure and expectation that all men should perform leading roles in disaster management is recognised during and immediately after an emergency. Dominelli (2000),

for example, reporting on research about the experience of men after the Indian Tsunami disaster 2004, highlighted on the social and cultural pressure experienced by the male victims, who thought it was their duty to be the providers of the family as well as community leaders. A similar discourse can be found in the post-GEJET situation in Japan. The reconstruction phase following the GEJET disaster was seen as an opportunity not only to rebuild the nation's economic situation through extensive infrastructure investments, part of the Abenomics program (named after 2012-elected Prime Minister Shinzo Abe), it was also an opportunity to rebuild the nation's morals through the promotion of the traditional values of "Japanese-ness": "courage", "bravery", "self-sacrifice". In other words, the masculine philosophy of the traditional warrior (*bushido*) was infused in the post-GEJET reconstruction rhetoric and embodied by politicians, athletes, bureaucrats and soldiers, true representatives of the masculine, charismatic male leader in Japan (Koikari, 2019; Mikanagi, 2011).

The masculinisation of national disaster preparedness, embodied in discourses of men as "life-savers and breadwinners", became progressively constructed since early 20th century together with the feminisation of crisis management at home (Koikari, 2019), emphasising women's roles as "victims and care-givers" (Aikawa, 2009; Enarson & Morrow, 1998; Enarson & Pease, 2016; Tyler & Fairbrother, 2013). In Japan, the feminisation of disaster preparedness and crisis management at home was achieved through an increased tailoring of discourses and marketing disaster preparedness products towards the female public (Koikari, 2019). Addressing gendered discourses in disaster preparedness that represent men as "saviours" and women as "victims" and "domestic" in the disaster context is complicated by the fact that these representations are a transposition of the societal discourses of men as "salarymen" (*sarariiman*) and women as "professional housewives" (*sengyou shufu*) (Charlebois, 2014; Dasgupta, 2005; Hidaka, 2010; Himuro, 2017; McLelland & Dasgupta, 2005; Steel, 2019b, 2019a). These current discourses around the duties of men and women have shaped Japanese society since the modernisation era in the late 19th century (Steel, 2019a, 2019b). Although the roles and duties associated with gender have been criticised as historically inaccurate (Dasgupta, 2000), they have been partially assimilated into contemporary Japanese society (Charlebois, 2014; Steel, 2019a). Steel (2019a) argues that for many women the

traditional role of the “Japanese woman”, although limiting, carries high moral values and promises well-being: “Even though [the Japanese social] system limits women’s lives, most women have not voiced opposition to it, in part because many people – not least women – still rely on, and find value in, the system” (Steel, 2019a, p. 5).

This duality has two important implications. Firstly, it prevents the representation of alternative realities at societal and individual level. Subject positions beyond the dualistic narrative of female-domestic and male-public are often misrepresented or made invisible in the Japanese society, such as single-parent families, working women, and stay-at-home fathers. Common examples of excluded and marginalised sexual minorities at times of disasters reinforce this point (Gaillard et al., 2017; McLelland & Dasgupta, 2005). Secondly, paired discourses of male-dominant and female-subject identities oversimplify the power dynamics within the couple, not taking into account how male and female power identities shift from dominant to subject and vice versa. Notably, the role of women as being solely responsible for the household curtails their ability to explore (public) other occupations, often dominated by men. However, their domestic role, at the same time, empowers them to exert main authority over household matters (Charlebois, 2014).

2.1.2 “New values” of Japaneseness

The previous section showed how disaster events in Japan are managed and understood based on traditional values of “Japaneseness”, which often overlap Japanese values with notions dominant-masculinity and subject-femininity (Lie, 2015). The other important power dynamic that influences disaster responses in Japan are the relationships between the individual, the community, and the state. These relationships were articulated in disaster resilience research, policies and initiatives referring to the “new” values of Japaneseness of volunteering and the notions of “self-help” and “mutual help”.

2.1.2.1 Great Hanshin Earthquake and Volunteerism

The 1995 Great Hanshin Earthquake was a watershed moment in disaster resilience in Japan. The reconstruction process in the aftermath of the 1995 Great Hanshin Earthquake strongly influenced the international standards of the “build back better” (BBB) model, later included in the UN Sendai Framework 2015-2030 (Saya et al., 2017).

Another result of the Great Hanshin disaster was a strong rise in volunteering activities in Japan. Due to the unprecedented mobilisation of people, funds and resources from volunteering groups from all over Japan in the face of the Great Hanshin disaster, 1995 became known as the “year 1 of volunteer era” (*borantia gannen*) and the beginning of a “volunteer revolution” (*boruntia kakumei*) (Avenell, 2013, p. 35).

Volunteering became part of Japanese culture as an increasingly common social activity for millions of people (Nakano, 2005). One could argue that volunteering became an integral part of the Japanese socio-cultural model “lifelong learning” (*shougai gakushuu*) (Kitagawa, 2016), defined as the “learning that takes place at all stages of life, whether formal learning at school or in daily life” (Ogden, 2010, p. 6).

2.1.2.2 GEJET and Revival of Self-help and Mutual help

The Great East Japan Earthquake and Tsunami (GEJET) showed the government’s limitations, leading the enhancement of volunteering associations and of a collaborative approach with the local stakeholders (Avenell, 2013; Kitagawa, 2016). After GEJET, most disaster preparedness and education measures focused on the development of the four capabilities of self-help (*jijo*), mutual aid in the form of neighbourhood aid (*gōjo*) and community help (*kyōjo*), and state or public help (*kōjo*) (Kitagawa, 2016; Koikari, 2019), first propagated after the Great Hanshin earthquake (1995). The notion of mutual help and self-help, in particular, were promoted by policy-makers and NPOs through information measures of the public at all levels, such as disaster drills and trainings organised by local neighbourhood associations, volunteer groups, local schools, or cultural groups (J. Lee & Fraser, 2019; Tatsuki, 2007). These activities helped to create deeper and more sustained support networks among residents and helped to increase overall disaster resilience in local communities.

2.2 Resources and Procedures: Disaster preparedness and training in Japan

With a disaster preparedness and response system based on “advanced technology R&D; directive management; technologically proficient emergency management staff; field training; single-hazard approach; volunteers’ integration”, Japan is arguably the country with the highest number of disaster mitigation practices and initiatives at the global level

(Greer, 2012). This section gives an overview of the legal and practical aspects of disaster preparedness and training in Japan, focusing on the unique developments of the volunteering system and the formalisations of self-help and mutual help in lifelong disaster learning identified above.

2.2.1 Disaster legislation and procedure development

As a result of the recognition of the importance of self-help and mutual help, the Cabinet Office included the Community Disaster Management Plan (CDMP) (地区防災計画 - *Chiku bōsai keikaku*) in the amended Basic Disaster Management Plan in 2013 (「災害対策基本法」一部改正 - *Saigai taisaku kihon-hō ichibu kaisei*). The CDPM is a disaster management (DM) plan that brings together residents and enterprises in local communities to co-develop inputs for the Municipal DM Plan (2014 Amendment Basic Act, 2014). In 2013, the National Resilience Promotion Headquarters (国土強靱化推進本部 - *Kokudo kyōjin-ka suishin honbu*) was established with the aim of “promoting initiatives for building national resilience with the aim of creating safe and secure national lands, regions, and economic society that have strength and flexibility, even in the event of any disasters” (National Resilience Promotion Office, 2021). Other main instruments of disaster resilience were the Fundamental Plan (2014)³ (国土強靱化基本計画 - *Kokudo kyōjin-ka kihon keikaku*) and the Action Plan (2014)⁴ (国土強靱化アクションプラン 2014 - *Kokudo kyōjin-ka akushon puran*) adopted on the same day at the National Resilience Promotion Headquarters. In the same year, the Association for Resilience Japan (レジリエンスジャパン推進協議会 - *Rejiriensu Japan suishin kyōgi-kai*) was established, a non-governmental organisation with the scope of creating a “national movement that would involve the government, academia, industry, and the populace” (Koikari, 2019, p. 149). Below the timeline of the main disasters triggering disaster management legislation in Japan and some main explanatory points (Table 2.1).

³ https://www.cas.go.jp/jp/seisaku/kokudo_kyoudjinka/index_en.html

⁴ https://www.cas.go.jp/jp/seisaku/kokudo_kyoudjinka/en/action_plan.html

Table 2.1 Timeline of DDR legislation in Japan © Greer, 2012 and Cabinet Office (modified)

Initiating Event	Disaster management <i>legislation</i> (Year) and explanation
Typhoon Vera (1959)	<p><i>Disaster Countermeasures Basic Act (1961)</i></p> <ul style="list-style-type: none"> • Template of Basic Plan for DM for local, municipal, prefectural and central government • Priority to recovery and less to preparedness (still vision of disasters as “acts of God”)
Reports on a possible Tokai Earthquake by the Seismological Society of Japan (1976)	<p><i>Special measures Law for Countermeasures Against Large Earthquakes (1978)</i></p> <ul style="list-style-type: none"> • Increase resilience measures to prepare for the Great Tokai Earthquake
Great Hanshin-Awaji Earthquake 1995	<p>Revision of <i>Basic Plan for Disaster Prevention (1995)</i></p> <ul style="list-style-type: none"> • Schools have yearly disaster drills • Private businesses and organisations run drills
	<p><i>Comprehensive National Development Plan (1998)</i></p> <ul style="list-style-type: none"> • Increase resilience of transportation and communications systems • Building standards for lifeline utilities • Earthquake-oriented research funding
GEJET Disaster (2011)	<p><i>Amendment to Basic Act (2013)</i></p> <ul style="list-style-type: none"> • Establishment of the: National Resilience Promotion Office • Amendment to include Community Disaster Management Plan (CDMP)
	<p><i>Fundamental Plan (2014) and Action Plan (2014)</i></p> <ul style="list-style-type: none"> • Establishment of the Association for Resilience Japan. A non-governmental organisation with the scope of bringing together the government, the industry, the academia and the people

Currently, the disaster management system in Japan decentralises power and responsibilities, giving great importance to municipalities and local residents. Table 2.2 below shows the different responsibilities of the disaster management system in Japan.

Table 2.2 Outline of Japan DM system and focus of this study (in grey) © Cabinet Office, 2017⁵ (modified)

National level	Prime Minister	Basic DM Plan
	Central DM Council	
	Ministries	DM Operations Plans
Prefectural level	Governor	Prefectural DM Operations Plan
	Prefectural DM Council	
	Designated Public Entities (Bank of Japan, NHK, NTT etc.)	DM Operations Plan
Municipal	Mayors	Municipal DM Plan
	Municipal DM Council	
Local resident	Residents and Enterprises	Local DM Plan (CDMP)

Table 2.2 shows that local and municipal offices have the primary responsibility for developing disaster management plans and are in charge of first response measures. Prefectural and central governments are supporting offices only if local governments are functioning beyond their capacities.

2.2.2 Informal and formal disaster preparedness and education in Japan

Basic formal disaster education and preparedness strategies are standard across Japan (Kitagawa, 2015; Shiwaku & Shaw, 2008). Formal disaster education in Japan starts in kindergarten in the form of compulsory school drills and continues in all parts of life. It includes periodical obligatory courses and drills in schools, universities, business and local communities. Formal disaster education focuses mainly on practical information, such as how to locate and evacuate to the nearest evacuation area, the dangers of debris and other hazards, and the importance of individual preparedness and mutual help (Fujioka, 2016; Kitagawa, 2016). In terms of evacuation resources and procedures, in Japan evacuation shelters are usually situated in schools and are equipped to meet the basic needs of the residents in the area (water, food, toilets, basic information etc.). Practice training are also held including staff, volunteers, and rescue operators. The

⁵ http://www.bousai.go.jp/en/documentation/reports/disaster_management_plan.html

training initiatives of the operators in Japan are often available only to local residents. Non-resident groups, such as tourists, are not targeted specifically and are only recently receiving more specific attention (Kinugasa et al., 2012).

Informal disaster preparedness, or “soft” measures, are also highly developed in Japan. Soft measures are defined by the United Nations Office for Disaster Risk Reduction (UNDRR) as: “measures not involving physical construction which use knowledge, practice or agreement to reduce disaster risks and impacts, in particular through policies and laws, public awareness raising, training and education” (UN General Assembly, 2016, p. 23). Soft measures include bottom-up initiatives that allow local communities and individuals to develop their own understanding of disaster risks based on their needs and values. Relevant examples of informal disaster preparedness measures are the disaster awareness events and courses organised by NPOs, community-based organisations⁶, and the Citizens’ Disaster Prevention Centres (CDPC) around the country. CDPC are establishments managed by the Fire and Emergency Department and offer free activities and courses to educate and inform about immediate reactions to emergencies through a participatory approach, such as basic fire escape training, typhoon and earthquake simulations, tsunami information, to more complex exercises, such as training children in calling 911 (emergency hotline) and using a fire extinguisher (Fukuoka City, 2013).

In terms of self-help and mutual help, since the GEJET, disaster preparedness education (*bosai kyoiku*) has been prioritised on the national agenda and is currently “part of the national curriculum and organised as lifelong learning programmes in communities” (Kitagawa, 2016, p. 629). One example of such community engagement in disaster preparedness are the “autonomous organisations for disaster risk reduction” (*jishubo*) (Bajek et al., 2008). Strong local social ties and inclusive participation are crucial in disaster preparedness (Matsuura, 2021). Yamamura (2016), for example, found that following a disaster, communities directly affected would recreate social capital through participation in social activities. Lee and Fraser (2019), on the other hand, suggested that not only the experience of disaster but also its perception plays a role and “*perceived* fear

⁶ <http://kyotobousai-c.com/english/program/index.html>

...may create social bonds, which implies an increase in social capital” (J. Lee & Fraser, 2019, p. 113).

2.3 Social vulnerabilities and risk perception

2.3.1 Social vulnerabilities, diversity and inclusion

With natural hazards commonly arising around the world, we currently live in a “modern risk society”, characterised by unequal exposure and vulnerability to disasters (Shimizu & L. Clark, 2019). Vulnerability is defined by the UN as “the conditions determined by physical, social, economic and environmental factors or processes which increase the susceptibility of an individual, a community, assets or systems to the impacts of hazards” (UN General Assembly, 2016, p. 24). Since individual vulnerability results from a unique combination of social, economic and cultural components, it is argued that overall community resilience depends on stakeholders’ capacity to identify and include these components in disaster preparedness and DM procedures (Donovan & Oppenheimer, 2015).

Crucial elements of social vulnerability are gender, disability (JDF, 2015; Tatsuki, 2012; Villeneuve et al., 2021), age, familiarity, living area, and pre-disaster social capital (Hamidazada et al., 2019; Jayarathne & Babu, 2017). People with physical disabilities, for example, were heavily affected during the GEJET disaster (Tatsuki, 2012). Dis-aggregate data from Miyagi prefecture on disaster fatalities in the coastal areas showed that 1,104 disabled people died as a result of the disaster (2% of the registered disabled people), compared to 0.8% of overall residents.

Individual vulnerabilities are intrinsically complex, derived from multiple overlapping social vulnerabilities, such as disabled, elderly, woman, foreigner. Therefore, categories of social vulnerabilities should not be considered as separate. However, in research practice they are often separated to accommodate limited time, resources, or framing of qualitative fieldwork. This study focuses on gender-based disaster risk and disaster risk of the foreign population in Japan.

2.3.2 Gender in DRR: Mainstreaming gender, vulnerabilities and capabilities

Among the factors affecting individuals' vulnerability and community resilience, the international community recognised the primary importance of *mainstreaming gender* in Disaster Risk Reduction (DRR) (International Recovery Platform, 2009; UNISDR, UNDP and IUCN, 2009; IFCR, 2011). The notion of “mainstreaming gender” was officially introduced to DRR after the Asia-Pacific Gender and Disaster Management Forum (2009), but first appeared in the Beijing Declaration and Platform for Action⁷, following the 1997 Fourth World Conference on Women. Mainstreaming gender is defined as:

“The process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in all areas and at all levels. It is a strategy for making women’s as well as men’s concerns and experiences an integral dimension of the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and societal spheres so that women and men benefit equally and inequality is not perpetuated. The ultimate goal is to achieve gender equality.”

(UN Economic and Social Council for 1997 (ECOSOC), 1997)

In Japan, gender perspectives started to be integrated in DRR management since the revision of the Disaster Prevention Basic Plan in 2005 (Aikawa, 2009). Furthermore, informal *ad hoc* organisations addressing gender issues appeared in the aftermath of great disasters, such as the Women Support Network in the aftermath of the Great Hanshin disaster (1995) and the Japan Women’s Network for Disaster Risk Reduction and the East Japan Earthquake Disaster Women Support Network in the aftermath of Great East Japan Earthquake and Tsunami (GEJET). Both were originally established to provide gender perspectives and support to recovery and reconstruction efforts, but were merged in 2014 into the Training Centre for Gender and Disaster Risk Reduction⁸.

⁷ <https://beijing20.unwomen.org/en/about>

⁸ <http://gdr.org/>

From a legal perspective, gender equality was first codified in the Basic Act of Gender Equity Society (1999) and later started to appear in relevant disaster-related legislations, such as the Disaster Basic Act (2005), which stressed the importance of gender perspectives being included in DRR legislation. Of great relevance were the “Guidelines for Disaster Management and Reconstruction from a Gender Equity Perspective” (2012) based on the experiences of the GEJET disaster. The most recent development in gender mainstreaming has been the establishment of the Gender Equity Bureau Cabinet Office⁹ (2020). The Table below gives an overview of the relevant changes in legislation and institutions in Japan since the 1990s (Table 2.3).

Table 2.3 Timeline of gender and DRR legislation and system development in Japan © Cabinet Office (modified)

Initiating Event	Gender-related <i>legislation</i> and organisation (Year)
Great Hanshin-Awaji Earthquake (1995)	Women support Network (1995) <ul style="list-style-type: none"> • Schools have yearly disaster drills • Private businesses and organisations run drills
	<i>Basic Act of Gender Equity Society (1999)</i> <ul style="list-style-type: none"> • Increase resilience of transportation and communications systems. • Building standards for lifeline utilities • Earthquake-oriented research funding
	<i>Disaster Basic Act (2005)</i> <ul style="list-style-type: none"> • Highlighted importance of gender equity perspectives
GEJET Disaster (2011)	Japan Women’s Network for Disaster Risk Reduction (2011)
	East Japan Earthquake Disaster Women Support Network (2011) <ul style="list-style-type: none"> • ater Training Centre for Gender and DRR (2014)
Kumamoto Earthquakes (2016)	Gender Equity Bureau established by the Cabinet Office (2020) <ul style="list-style-type: none"> • Guidelines for Disaster Management and Reconstruction from a Gender Equity Perspective

In general, gender in DRR has been exclusively promoted through soft and *ad hoc* DRR disaster preparedness initiatives in Japan, often in the form of local governments and NPOs compiling and distributing information material about gender aspects of disasters (Selby et al., 2012). At the municipal level, these measures usually comprise leaflets and booklets about privacy and safety in evacuation shelters¹⁰, and preparedness for mothers

⁹ <https://www.gender.go.jp/index.html>

¹⁰ <https://www.gender.go.jp/policy/sokushin/ouen/safe/disaster/>

with infants and young children (Matsunaga, 2019). The central government is responsible for the development of “disaster prevention and reconstruction guidelines following the principles of gender equality”¹¹, annual guidelines summarising the issues local governments should work on in responding to disasters¹², reports¹³, sponsored programs, and training courses from the point of view of gender equality¹⁴.

The mainstreaming of gender targeting women includes two main issues: the discourse of “vulnerability” of women, and the promotion of women’s capabilities in management and leadership positions.

Regarding the issue of women’s lack of presence in leadership and management positions, women are rarely involved in DRR discussions in Japan (see Global Gender Gap Report by the World Economic Forum, Table 2.4).

Table 2.4 Comparison of gender gap indicators © World Economic Forum, 2019

	Overall	Economic Participation and Opportunity	Education Attainment	Health and Survival	Political Empowerment
Sweden	4	16	59	117	9
Rwanda	9	79	114	90	4
Philippines	16	14	37	41	29
U.S.A.	53	26	34	70	86
Japan	121	115	91	40	144

Only six of the thirty-one members in the Cabinet Office Central Disaster Management Committee, are women (2021). A slightly better ratio that the single woman member of the advisory panel for Governments, named Reconstruction Design Council, that was established in response to the Great East Japan Earthquake (2011). At the local level, the average female representation in Regional Disaster Management Meetings at the prefectural level is 9.6% (5,000 women over a total of 48,397 members). The prefecture with the highest ratio is Tottori (18.9%), while Hokkaido Prefecture has the lowest (3.2%) (Cabinet Office, 2020). A similar situation presented itself during the GEJET Disaster

¹¹ https://www.gender.go.jp/policy/chihou_renkei/torikumi/map.html

¹² <https://www.gender.go.jp/policy/saigai/fukkou/guideline.html>

¹³ <http://www.city.yatsushiro.lg.jp/kiji00311749/index.html>

¹⁴ https://www.gender.go.jp/policy/saigai/bosai_kenshu.html

(2011). The gender ratio of the reconstruction Committee members in the affected local governments was 85.4% (men) to 14.6% (women). During the Kumamoto Disaster (2016), the gender ratio was: men 96%, women 5.4% (Cabinet Office Gender Equity Bureau 2013 – 2017). More women are needed in leadership roles to foster gender-inclusive disaster content and policies, and thus addressing the lack of female representation in DM is considered a crucial goal of disaster resilience (UNISDR, UNDP and IUCN, 2009). This concept was expressed in the International Strategy for Disaster Reduction Report (ISDR, 2008): “without the full participation and contribution of women in decision-making and leadership, real community resilience to climate change and disasters simply cannot be achieved” (p. iii).

Women have unique capabilities during and after disasters. In particular, women usually are shown to have strong social ties, strong organisational and leadership skills, empathy and other valuable skills that can improve disaster resilience in the phases of emergency and recovery (Cavaliere, 2015; Ear, 2017; Enarson & Morrow, 1998; Takeuchi & Shaw, 2008; UNITAR, 2017). “Women are often the drivers, strong networkers, managers, organizers, caretakers in the community. However, when you talk about disasters at the highest level, the ones who are talking – and making the decisions – tend to be men” (UNISDR, 2015: v). The lack of acknowledgement and inclusion of female capabilities at the higher levels of disaster management prevents a more inclusive view of disaster vulnerabilities and capabilities and also creates a division between female-local and male-national efforts.

2.3.2.1 Risk perception and Gender

The fact that women are disproportionately higher affected by natural disasters often leads to the perception that women are intrinsically vulnerable and that “gender in disaster” revolves around their vulnerabilities. There is a wide scholarship suggesting that women are more likely to get injured during disaster. For example, during the 2011 GEJET Disaster, 188,877 people died, 8,693 men (46%) and 10,184 women (54%) (MHLW, 2012). While the data shows that women are impacted more severely by disasters, these outcomes must be understood not in pure physical or biological contexts but in terms of policy and culture. This argument is supported by recent research on the experience of

relief teams and disaster victims, revealing that socio-cultural roles and expectations make disasters a highly gendered experience for both men and women (Neumayer and Plümper, 2007; Crawford, 2013; Enarson and Pease, 2016).

Gender has been found to have ambivalent effects on risk perception depending on the risk considered. For example, a study on the perception of health-related risks among adolescents in Korea (Kim, Park & Kang, 2018) showed that “females perceived their chances as significantly lower than those of males in the same age group at almost all health risks” (Y. Kim et al., 2018, p. 57). Although somewhat counterintuitive, the authors suggest that women underestimate their risks (e.g. for lung cancer) because they were found to be less likely to engage in risky behaviours (e.g. smoking), leading to complications (Y. Kim et al., 2018). In terms of less “preventable” risks, a study on road-mortality in Sweden found that women tend to have higher perception to risk than men (Andersson, 2011).

A study on environmental health risks perceptions conducted in the United States, indicated that gender has a significant impact on risk perception among respondents, with white males having a significantly lower risk perception compared to white female individuals (Flynn et al., 1994). The study also found that, in the US, gender was not a significant predictor for disaster risk perception among non-white respondents. This could suggest that other socio-political factors are the relevant factors for individual risk perception in the US. The authors identified ethnicity, gender and trust in government and authorities to be significant. “The subgroup of white males who perceive risks to be quite low can be characterized by trust in institutions and authorities and a disinclination toward giving decision-making power to citizens in areas of risk management” (Flynn et al., 1994, p. 13).

In the context of **disaster risk**, risk perception seems to play a motivating role in preventive actions and information seeking behaviour. Huurne and Gutteling (2008), for example, illustrated that information sufficiency, *risk perception*, and current knowledge are good predictors of information seeking behaviour (Huurne & Gutteling, 2008). Studies of risk perception have been carried out through the lenses of psychological, sociological, economic, and communication. Studies on risk perception in DRR focus

predominantly on evacuation behaviour and post-disaster risk perception. However, an investigation of socio-cultural features in risk perception and disaster preparedness are largely missing. A study on flood risk perception and post-flood mitigation behaviours in the Republic of Ireland found that female, compared to male respondents, had lower perception of risk, insufficient information and lower self-efficacy (McDowell *et al.*, 2020). The authors suggest that societal aspects can be considered as shaping risk perceptions. “Social roles, in addition to biological differences, tend to drive the types of behaviours that people perform (i.e., lower levels of risk perception among female respondents may be due to private well knowledge and/or maintenance being perceived as “male-typical”)”. (McDowell *et al.*, 2020, p. 11). Maybe one sentence to wrap up your point that gender is important in DRR?

2.3.3 Social vulnerabilities: Foreign residents

Ethnic minorities and non-citizens are also vulnerable at times of disasters. Non-citizens include both short-term tourists and foreign residents with the latter being distinguished further based on socioeconomic factors such as economic status, visa status, cultural background, and social integration. In Japan, foreign residents are disproportionately affected during disasters (Bisri & Sakurai, 2014; Kinugasa *et al.*, 2012). In 2019, the foreign population in Japan was 2.83 million people (e-Stat Japan, 2021). With the steady increase in international tourist and migrant numbers, the foreign population In Japan is expected to increase significantly in the future, making it even more urgent to address the disaster vulnerabilities of non-Japanese residents.

A common social vulnerability of foreign residents in Japan is the **linguistic barrier** at the time of an emergency (Aliperti *et al.*, 2019; Uekusa, 2019). Linguistic barriers might decrease the chances of understanding emergency warnings and instructions (M. Sakurai & Adu-Gyamfi, 2020), but are also linked to deeper social vulnerabilities based on underdeveloped connections to local communities and a limited access to disaster management infrastructures and services (Davidson *et al.*, 2013).

A related factor of social vulnerability at times of a disaster is **social isolation**. Yang *et al.* (2017), analysed the emergency evacuation and shelter-seeking behaviour of foreign

residents during the Kumamoto earthquake in 2016. Although focusing on a limited number of interviewees, the study highlighted, in addition to language, the importance of socio-cultural issues, such as isolation and loneliness, during evacuation. Different cultural norms can impact on how ethnic groups interact with **provided support services** during and after an emergency. A study on help-seeking behaviour and received support at the time of Hurricane Andrew, conducted by Kaniasty and Norris (2000), compared the experiences of three ethnic groups - European-Americans (EA), African-Americans (AA) and Latinos. Results indicate that cultural differences between Latino, EA and AA respondents affected their predisposition to seek help. While AA and EA respondents are regularly seeking help in case of a disaster or emergency, Latino respondents did not. An interpretation proposed by the authors was that “Latinos believe that one can turn to others for help at any time” in line with what they call the “collectivist Hispanic values of in-group solidarity, loyalty and inter-personal obligation” (Kaniasty & Norris, 2000, p. 572). There are other ways in which the **nation of origin** can be a factor of vulnerability in disaster preparedness. For example, in a study on household preparedness of foreign residents in Nagoya, Green *et al.* found that the main factors affecting disaster preparedness were “*national origin*, experience with disaster training, and exposure to disaster information [while] Japanese language proficiency, perhaps surprisingly, was of minor importance” (Green et al., 2021, p. 185).

Hence, **different cultural norms and unfamiliarity with the Japanese culture** might cause vulnerabilities at the time of emergency evacuation. Although not many studies have been conducted in this field, it is possible to find various anecdotal accounts of how cultural differences can lead to stress and confrontation during emergency evacuations. The Japan Times, for example, reported on a Vietnamese resident who experienced the Great Hanshin earthquake, describing how tensions between different ethnic groups could be traced back to different cultural backgrounds and expectations: “On the first day, we had nothing to eat and the children were crying, so we began cooking on an outdoor stove, which angered the Japanese. The Japanese thought if you wait, the government will come to your aid, but as Vietnamese who had experienced the war we had learned not to expect much from the government and to do things for ourselves” (Singer, 2010).

Another important aspect of social vulnerability in a disaster is the **socio-economic background** of affected individuals. Davidson *et al.* (2013) investigated the effects of social and economic factors on disaster vulnerabilities among Latino and African communities in the US. The study showed that lower economic status and lower living conditions of immigrant communities made them more vulnerable and more exposed to disaster risks and resulted in higher rates of negative mental health impacts.

In general, disaster policy-makers struggle to inform foreigners about disaster preparedness because they are often unable to access the formal compulsory disaster education in Japan due to age, employment, or language barriers. Because of these reasons, disaster education of foreign residents often relies on informal disaster education. In Japan, policy-makers and non-profit organisations (NPO) offer various disaster preparedness initiatives for foreign residents, like disaster drills in foreign languages, disaster courses (*bousai kyoushitsu*) and online information. However, foreign residents rarely participate. Matsuura (2021) suggests that foreigner nationals appear to have lower interest to engage in disaster preparedness initiatives (Matsuura, 2021). The reasons behind this lack of participation and interest are rarely investigated in the scholarship.

2.3.3.1 Risk perceptions of foreign residents

When predicting evacuation behaviour and participation in preventive disaster measures, it is crucial to consider **risk perception**. Recent studies on risk behaviour showed that cultural background can influence risk-seeking or risk-averse behaviours (Park *et al.*, 2016; Renn & Rohrman, 2000). Park and colleagues (2016), for example, analysed the risk behaviour of Chinese (identified as culturally collectivistic) and Australian students (identified as culturally individualistic). Findings indicate that the former are more risk averse than the latter. If the individualistic and collectivistic society structures can influence risk behaviours in general, it is worth investigating how these factors play out in the context of disaster risk.

Personal experience of disaster is a relevant component of individual risk perception (ref?). People of different ethnicities are exposed to disasters differently in their lives, influencing their risk perception in multiple ways. In a study conducted in Germany

(Kunz-Plapp & Werner, 2006), personal experience was identified as a relevant factor in risk awareness and perception. However, “respondents mentioned that there are too little possibilities to prepare and to respond to a hazard event... disasters are conceived as inevitable events, in spite of the understanding of disasters as a consequence of inappropriate land use planning and human-made climate change.” (Kunz-Plapp & Werner, 2006, p. 107). Personal experience was also found as a relevant predictor of disaster risk in a study conducted on hurricane risk perceptions among residents in the US Gulf Coast, before and after hurricanes Katrina and Rita (Trumbo et al., 2014).

Often related to personal experience, **trust** in the managing capabilities of local authorities and central government is an important factor of risk perceptions (Basolo et al., 2009). For example, a study on the risk perception of citizens living in an area subject to high hydro-geological risk in Southern Italy, found that lack of trust and lack of communication and information procedures in disaster preparedness are main drivers of risk perception of disaster (Antronico et al., 2019).

Another relevant component of risk perception is the **social support network**. Most policies and research have focused on language but not on social integration. However, social bonds are important in the disaster preparedness phase. Bisri and Sakurai (2014) reiterate this concept of “not only providing translation to overcome language barrier[s]” (Bisri & Sakurai, 2014, p. 49) in a study on risk perception and disaster preparedness of foreign residents in Kobe, Japan. Based on their understanding of risk perception, awareness and disaster knowledge, the authors stressed how the integration of foreigners in the local framework of disaster preparedness often goes hand in hand with their social integration in the community. It was stressed that “as [a] disaster is part of history of a place, foreign residents as newcomer must be informed about it; thus organizing continuous activities in order not to forget about the past disasters as well as future risk are very important.” (Bisri & Sakurai, 2014, p. 49).

Similarly, Ohtomo *et al.* (2017) show that risk perceptions and evacuation behaviours *during* the Kumamoto earthquake in Japan were connected to **neighbourhood relationships** and interpersonal communication among residents. Social networks are also crucial during the disaster recovery phase. In a study on North-eastern Japan, Gerster

(2019) recognised the impact of social bonds (*kizuna*) on perception of loss and trauma among the people affected by the GEJET disaster. One could argue then that a lack of social relations, or *kizuna*, can result in higher vulnerabilities for both Japanese and foreign residents, with the latter, however, being more at risk due to their underdeveloped social networks in Japan.

While these studies focus on the social isolation and language barrier of foreign residents affecting their disaster preparedness, there are other socio-cultural factors that might also impact risk perception, such as different cultural backgrounds (societies), gender and socio-economic status. It is worth noting that there is a variation in the relevance of socio-economic aspects based on different cultural contexts. For example, in a comparative review of 50 studies on disaster risk perception, Lechowska (2018) found that the relevance of gender in disaster risk perception is dependent on the country's cultural and historical background. It seems that "an influence of gender on risk perception stems from cultural and social factors... [and] the significance of gender is greater in countries where legal and cultural gender differences are stronger" (Lechowska, 2018, p. 1354).

2.4 Summary

The literature highlights that the lack of information regarding the public's perception of disaster risks is a concern for the risk adaptation of foreign nationals and the identification and minimisation of gender-based disaster risk at the disaster preparedness phase. Also, this literature suggests that more attention should be given to the socio-economic and cultural elements of both Japanese and non-Japanese residents in Japan.

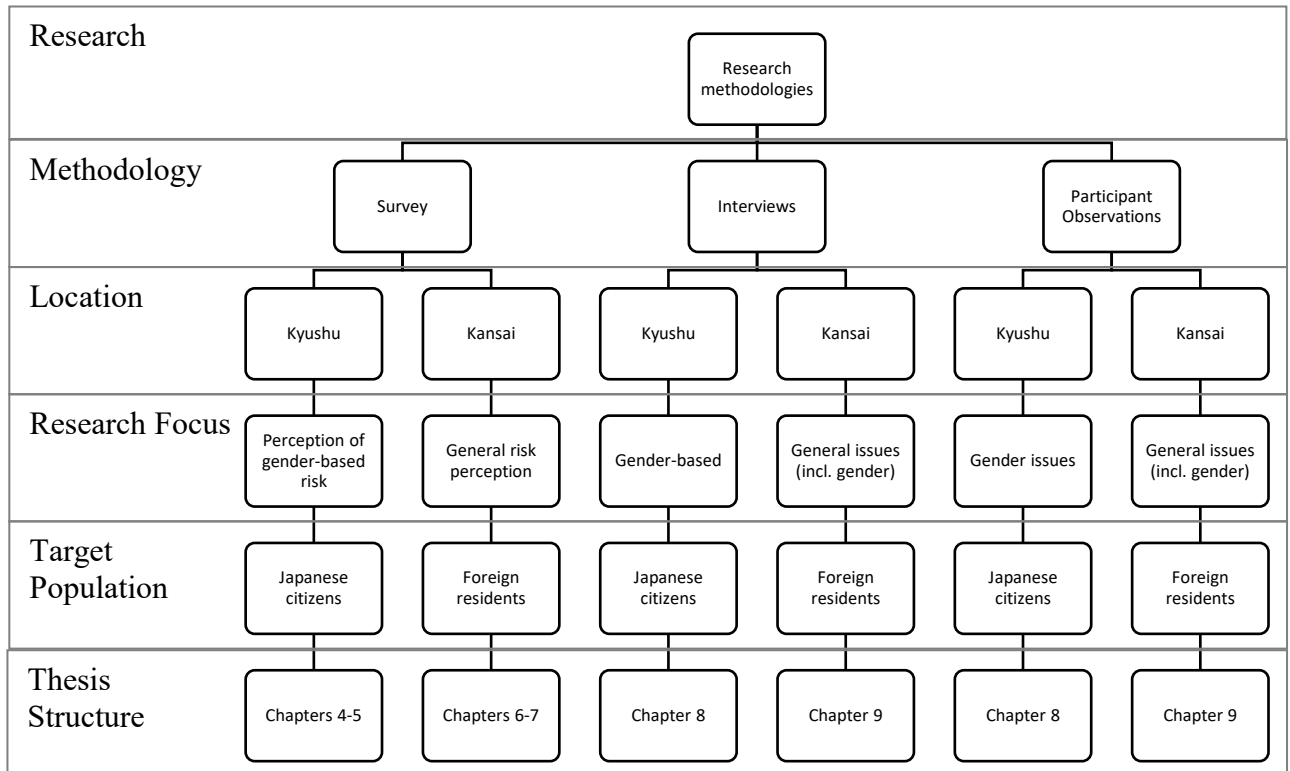
Chapter 3 Methodology

This chapter provides the background information about the sites of research for this study and the analytical framework used to collect and analyse the data, before ethical and positionality concerns associated with the project will be discussed.

3.1 Research Sites

The research project was conducted in two regions of Japan: Kyushu (Fukuoka, Kumamoto) and Kansai (Kyoto City, Osaka City, Kobe City, Minoo City). The case-studies in Kyushu focused on gender-based vulnerabilities, where the case-studies in the Kansai region were concerned with the vulnerabilities of foreign residents in Japan. Figure 3.1 below outlined data collection methods, research sites, research foci and target populations, as well as the corresponding thesis chapter(s).

Figure 3.1 Research data and methods outline © author

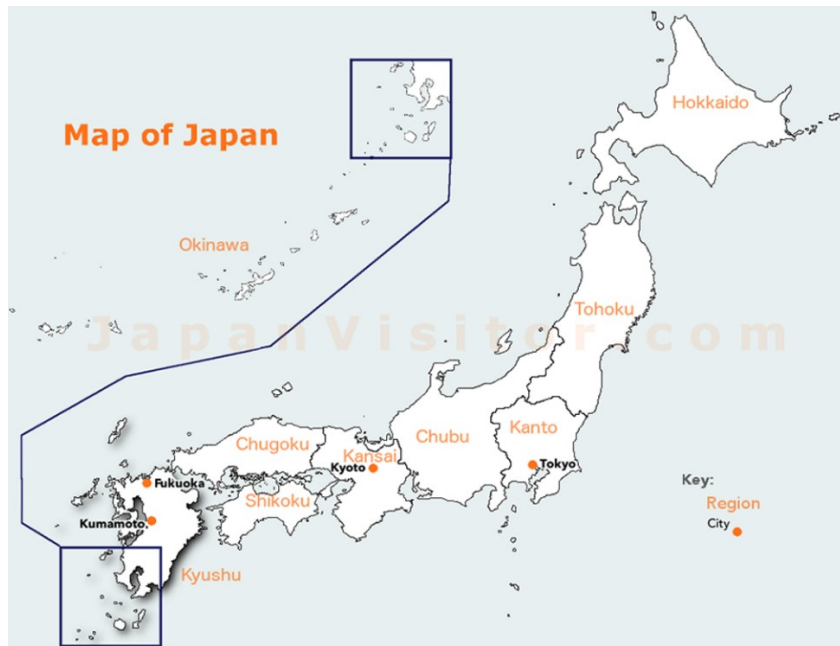


3.1.1 Kyushu – Fukuoka Prefecture, Kumamoto City

The research was conducted in various parts of Kyushu, Southwest Japan. The two main case-studies were Fukuoka City and Kumamoto City (see Figure 3.2). Fukuoka City was the principal fieldwork site of the study on gender and disaster risk, chosen for the innovative strategies in disaster management (Takashima, 2016) and public campaigns on gender-related disaster prevention following the Kumamoto earthquakes in 2016. In terms of disaster management, although the city has not experienced any major disasters since 2005, the municipal offices of Fukuoka City played a crucial role in the relief activities following the 7.0 magnitude earthquake that struck the near city of Kumamoto in 2016. After promptly declaring a state of emergency, Fukuoka City was ready to initiate relief operations only two days after the strongest tremor, which happened on the morning of April 16. The Kumamoto earthquake was a turning point for Fukuoka City in terms of DRR management and gender strategies. Here, in particular the creation of the “Mini-Book from a women perspective” by the Gender Equality Affairs Department (GEAD) in 2018 needs to be mentioned. The booklet was created in response to the perceived lack of disaster information by and for women and parenting families during the Kumamoto earthquake.

Fieldwork also took place in Kumamoto City, to analyse the cascading vulnerabilities of gender and cultural issues for foreign residents in the evacuation shelter. The data was obtained through informal discussions with Kumamoto University (KU) Professor Miwa Abe, manager of an informal shelter for international students and non-Japanese speakers after the Kumamoto earthquake in the KU gym. Through her experience, the study includes the information about the direct experience and concrete challenges that can arise in case of disasters.

Figure 3.2 Map of Fukuoka and Kumamoto © Japan Tourist Info, 2021



3.1.2 Kansai – Kyoto, Osaka, Kobe City, Minoo City

For the analysis of disaster risks and vulnerabilities of foreign residents, the chosen fieldwork sites were the cities of Kobe, Osaka, Kyoto, and Minoo, in the central region of Kansai, Japan (see Figure 3.3).

Figure 3.3 Map of Kansai region © 2012 International Tourism Center of Japan (modified)



Kobe City is of special significance for the history of disaster in Japan. The city was heavily affected by the Great Hanshin earthquake in 1995. Kobe is an important centre of global research on disaster risk reduction hosting the Disaster Reduction and Human Renovation Institution of the Great Hanshin-Awaji Earthquake Memorial Museum. It is also leading efforts in international DRR governance, with the United Nations Disaster Risk Reduction (UNDRR) liaison office located in the city. Kobe city has a high rate of foreign residents (3.2%) compared to the national average (see Table 3.2), and its residents have high disaster awareness due to the local memory of the Hanshin earthquake (Yamamura, 2016).

Due to safety concerns after the outbreak of the COVID-19 pandemic, I could not travel from Kyoto to the Tohoku area to include the Great East Japan Earthquake and Tsunami case-study. Instead, I decided to focus in this research on the two local case-studies of Kyoto and Osaka city instead. Both cities have a large number of diverse foreign communities. In 2020, 2.8% of the total population in Osaka prefecture was composed of foreign residents, making it the third highest percentage of foreign residents in Japan (see Table 2). The foreign community in Osaka is mostly from South-East Asian countries, mainly from South and North Korea (38%), China (26%) and Vietnam (14%). In 2020, the foreign population quota in Kyoto Prefecture was 2.4%. Compared to Osaka, Kyoto has a higher percentage of foreigners from Western countries, with foreign residents mainly coming from Europe (4.4%) and America (3.2%) (Immigration Services Agency of Japan, 2020).

Mino City was selected based on an informal request from the Mino Association for Global Awareness (MAFGA), interested in promoting a program of disaster preparedness for foreign residents. MAFGA's interest in disaster preparedness of foreign residents is motivated by the very high percentage of foreign residents in the city (15.1% in 2020). Originally, the intention was to understand the processes and challenges of developing a local project targeting foreign residents' disaster preparedness, but unfortunately, due to the COVID-19 pandemic, the MAFGA project was temporarily suspended and the data for this thesis could not be collected. Although all field-study sites differ in population, level of urbanisation and rate of foreign residents, they all offer support systems for non-Japanese residents, including disaster drills and preparedness activities specifically

targeting foreign nationals. Because of these differences and similarities, these two case-studies can help to illustrate general DRR issues for foreign residents in Japan.

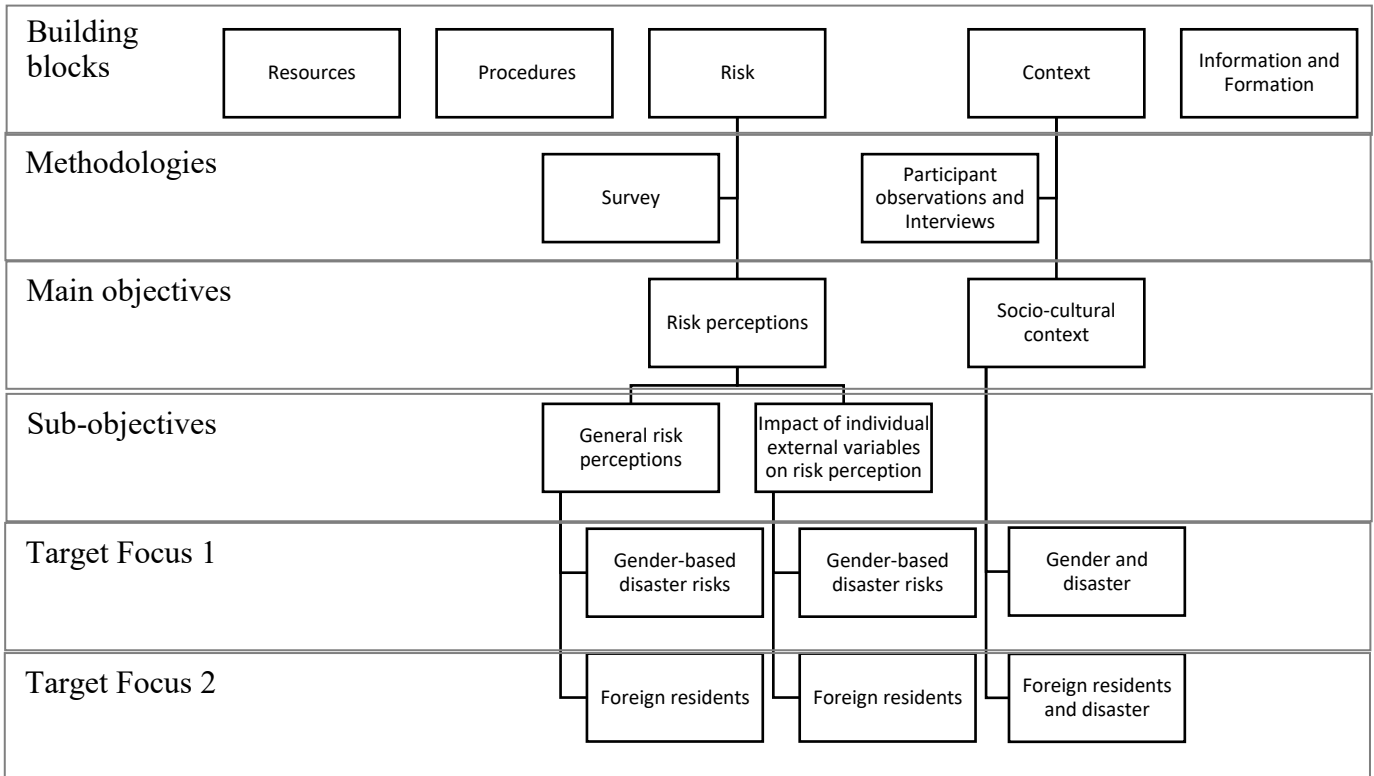
Table 3.1 Census of foreign residents and total population of field work sites (2020) © Japanese Government, 2020

Site	2020 Foreign residents (%)	2020 Total population
Japan	1,885,904 (1.4%)	126,226,568
Osaka Prefecture	253,303 (2.8%)	8,842,523
Kyoto Prefecture	62,510 (2.4%)	2,579,921
Kobe City	49,415 (3.2%)	1,527,022
Minoo City	2,926 (15.1%)	19,267

3.2 Data collection and analysis

In the introduction, five building blocks of DRR were identified from the practices of the Italian Civil Protection: Context; Risk; Resources; Procedures; Formation and Information (Section 1.3). The combination of these building blocks is a framework that can be used to assess existing practices, literature gaps and risk perceptions and suggest practical changes to improve disaster resilience. The study focused on the two main areas, or building blocks, of 1) the understanding of **risk** and 2) the socio-cultural **context** of those risks. Understanding risk was analysed mainly through quantitative methods, while the analysis of the socio-cultural context was conducted through qualitative research methods (See Figure 3.4).

Figure 3.4 Overview of study’s methodologies and main objectives © author



3.2.1 Risk perception and the Survey

The first objective this study focuses on, is to understand **risk** perceptions (see Figure 3.4). More specifically, it focuses on the two elements of 1) general risk perceptions and 2) external factors affecting these risk perceptions.

3.2.1.1 Framework: STOPS Model and General Risk Perception

The first objective of analysing risk perception included two categories of risks: 1) identifying the perception of *gender-based disaster risks* and 2) identifying the perception of *foreign residents’ disaster risks* in Japan. A *structured survey* was devised to identify relevant factors of general perceptions of risk in relation to gender-based disaster risks and disaster risks for foreign residents. To quantify and analyse perception and interest in disaster risk, the survey was based on the model of Situational Theory of Problem Solving (STOPS) (J.-N. Kim & Grunig, 2011), used in the context of behavioural science with regards to health risks (Yan et al., 2018) and risk communication (Aldoory et al., 2010).

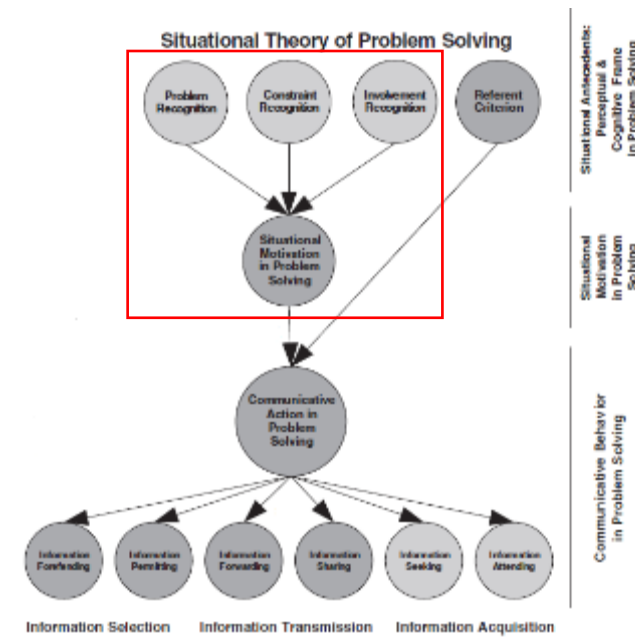
The STOPS model allows the investigation of how Japanese and foreign residents in Japan *perceive* disaster risks and preparedness (Kim and Krishna, 2014; Chen et al., 2017). The model was developed by Kim and Grunig (2011) in the field of disaster communication and comprises a Situational Motivation in Problem Solving and a Communication Behaviour in Problem Solving component (Figure 3.5). To assess interest in disaster risk *before* a disaster, the study used the Situational Motivation in Problem Solving model (red square in Figure 3.5). *Interest* in disaster risk in this study is measured as the STOPS variable “situational motivation” (SM), defined as “the extent to which a person is willing to learn and think more about a given problem” (Kim et al., 2012, p. 151). The model suggests that SM can be predicted by the following three perceptive factors (J.-N. Kim & Grunig, 2011):

1. *problem recognition* (PR): “One’s perception that something is missing and that there is no immediately applicable solution to it”;
2. *constraint recognition* (CR): “One’s perception that there are obstacles in a situation that limit their ability to do anything about the situation”;
3. *involvement recognition* (IR): “One’s perception of the extent to which people connect themselves with a situation”.

The survey administered in Kyushu and Kansai was structured accordingly. Each factor (PR, CR, IR) included two statements to reinforce the robustness of the results. Each statement was measured on a 5-point Likert scale (1= *I strongly disagree* to 5= *I strongly agree*)¹⁵.

¹⁵ See Appendix.

Figure 3.5 STOPS Model and focus of this study (in red) ©Kim and Grunig, 2011



The STOPS model measures how interested the general public is (SM), and how its interest is correlated to awareness of the problem (PR), belief in one’s ability to minimise risk (CR), and the perception of having a personal stake in the problem (IR).

Analytically, the survey data was first evaluated using **descriptive** analysis methods, such as average responses. However, to test the correlations between the four variables (SM, PR, CR, IR) a **multiple regression** analysis was conducted. The third and final analytical step was to test the *causal* relationship between the STOPS variables and the statistical fit of the STOPS model for modelling disaster risk perception was **Structural Equation Modelling** (SEM). SEM was conducted to test if there is a causal relationship between problem recognition, constrain recognition and involvement recognition and the dependent variable situational motivation, and whether the STOPS model is a good fit for the research questions proposed in this project.

3.2.1.2 External factors affecting risk perception

The second aspect of risk perception analysed (based on survey data) is to elaborate whether different **demographic and cultural factors** might impact risk perceptions. The study investigated how age, gender, social background and other factors affected the

average responses to the variables of the STOPS model: situational motivation, problem recognition, constrain recognition and involvement recognition. Analytically, this was carried out through univariate **Analysis of Variance** testing, or ANOVA. Univariate ANOVA testing is usually conducted to test whether the mean responses of two or more groups are significantly different. ANOVA has been used in the past to test gender and age differences in responses in risk perceptions (Y. Kim et al., 2018; McDowell et al., 2020). In other words, ANOVA testing can tell us if the mean response (X) to Q1 of Group A and the mean response (Y) of Group B are different, and if this difference is statistically relevant.

3.2.2 *Socio-Cultural Context, interviews and participant observations*

The second objective of this study is to understand the **context** of disaster risk and vulnerabilities in Japan. Since the two main focuses of the research are gender-based disaster risk and foreign residents' disaster risks, also in this case the research bifurcated to analyse the 1) context of gender-based disaster risk and 2) the context of vulnerabilities of foreign residents in Japan.

3.2.2.1 *Framework: Critical Discourse Approach and Context*

The second objective of analysing risk perception included the contexts of two categories of risks: 1) identifying the context of *gender-based disaster risks* and 2) identifying the context of *foreign residents' disaster risks* in Japan. *Semi-structured interviews* and *participant observations* were used to identify discourses of disaster and risk in relation to gender-based disaster risks and disaster risks for foreign residents. The model used to analyse the qualitative data (participant observation and interviews) is the **Critical Discourse Analysis** (CDA). (Fairclough, 2013; van Dijk, 1995), used in the analysis of social and cultural issues related to gender, class and ethnicity (Charlebois, 2014).

CDA emerged in the 1990s in the disciplines of linguistics and communication and is broadly defined as “an explicitly critical approach, position or stance of studying text and talk” (van Dijk, 1995, p. 17). CDA has been used to analyse gender and social inequality from a socio-cultural perspective (ibid.; Charlebois, 2014), but has not yet been applied to the field of DRR. In CDA, discourses are powerful creators of “common sense” and

“natural” assumptions about values and beliefs in society (Foucault & Gordon, 2010; Fairclough, 2015). CDA assumes a relationship between discourses and social structures (Weedon, 1997; Charlebois, 2014). Therefore, to better understand disaster vulnerabilities and risks based on gender as well as disaster vulnerabilities of foreign residents in the Japanese context, this study analysed how DRR discourses and practices, as well as cultural perspectives of gender and ethnicity, influence public discourses around disaster preparedness.

3.2.2.2 Qualitative methodologies

Semi-structured interviews were conducted with different stakeholders, including policy-makers, NPO workers, local and foreign residents. Semi-structured interviews are traditionally considered well-suited to the exploration of beliefs, values and perceptions (Richardson, Snell Dohrenwend & Klein, 1965). The underlying assumption of this study is that social and cultural contexts influence risk perceptions and disaster response. Therefore, the interview protocols included prompts for the interviewees to discuss aspects of their daily life that they found difficult or challenging in relation to disaster preparedness. Semi-structured interviews were conducted with foreign and Japanese participants (both men and women). Interviews focused on the three broad topics of gender, identity and foreigners, and disaster, as well as their interrelationships. The use of semi-structured interviews also allowed the participants to expand on topics they considered important on their own terms, including sensitive issues such as gender and discrimination (Gordon, 1975). Because of the limited number of interviews and the fact that most of the interviews were conducted with university students and in the specific contexts of the case-studies (Section 3.1), the results cannot be regarded as representative for foreign residents in Japan, but still allow for a richer discussion of challenges around disaster preparedness and social vulnerabilities.

Participant observations are a common methodology in ethnographic studies and, in general, a central aspect of research in cultural anthropology (DeWalt & DeWalt, 2002). Participant observations are useful to “learn the perspectives held by study populations” (FHI, 2005, p. 13). In other words, they allow to identify “cultural meanings” of complex notions, such as gender, disaster and risk (Martin, Agassi & Mintz, 1969). Participant

observations revolve around a continuous negotiation of participation, or *involvement*, and observation, or *detachment* with the study population (DeWalt & DeWalt, 2002), to learn and understand how people “inside” a specific cultural context live, with the observer remaining an “outsider” (Dwyer & Buckle, 2009). Participant observations were conducted in social settings that were considered relevant to the research questions. Observation sites were introduced from the gatekeepers. The criteria of selection were: their focus on disaster or gender, targeting non-experts in disaster, and located in Fukuoka prefecture or Kansai.

Overall, the research focused on disaster, gender, and foreign residents. The literature review outlined broad topics of interest in these three fields. I later explored these probes by investigating how participants experienced these issues. For example, the literature highlighted the notion of discrimination of foreign residents in disaster communication (Uekusa, 2019). To explore this topic, I analysed methods of foreign residents’ discrimination by looking at how linguistic issues were portrayed in disaster communication and in general how disaster preparedness strategies discriminated among social and economic groups of foreign residents.

3.3 Positionality and ethical concerns

In qualitative interpretative research the researcher is part of the “discourse” as recipient as well as agent in the social context producing the discourse. In particular, race, age and gender of the researcher must be considered as influencing factors in data collection and analysis (Charlebois, 2014). The following steps were taken to avoid misrepresentation and minimise my influence on the data. A possible source of misrepresentation is related to communication. Most of the interviews were conducted in Japanese with a (male) Japanese translator present. This could have resulted in issues around positionality and cultural differences. It is known that the gender of the researcher can influence the process and outcome of an interview (Padfield & Procter, 1996). As a female researcher, it was easier for other women to relate and open up about issues related to gender or vulnerability. However, there was a concern that a male interpreter could influence the honesty and openness of female interviewees. To address this issue, the interviewees were asked if they preferred a change of interpreter (none requested a change). Furthermore,

the researcher frequently asked for clarifications of particular terms and the explanation or reframing of what interviewees were communicating exactly. This procedure of review and confirmation with the interviewees was also necessary to address the limitations imposed by linguistic and cultural differences between researcher and interviewees.

Another possible misrepresentation comes from the researcher's role as an interpreter of social reality. In particular, the researcher was aware of how being a "foreigner" would influence the data analysis (Charlebois, 2014; Roberts, 1981). To take into account this limitation, the following steps were taken. Firstly, it was important to keep the interviews open and encourage spontaneous additions. To ensure the sincerity of the responses, the researcher would repeatedly reassure the interviewee of her genuine interest in their views and opinions. Secondly, it was important to redistribute the power rapport between researcher and interviewee (D. Lee, 1997). To do so, the interviewees decided the location and time of the interview. The interviews took place in different locations, such as offices, personal homes and workshops. It was important to avoid rushed interviews, and at times it was useful for the researcher to share her own experience and respond to questions to establish a genuine and relaxed conversation.

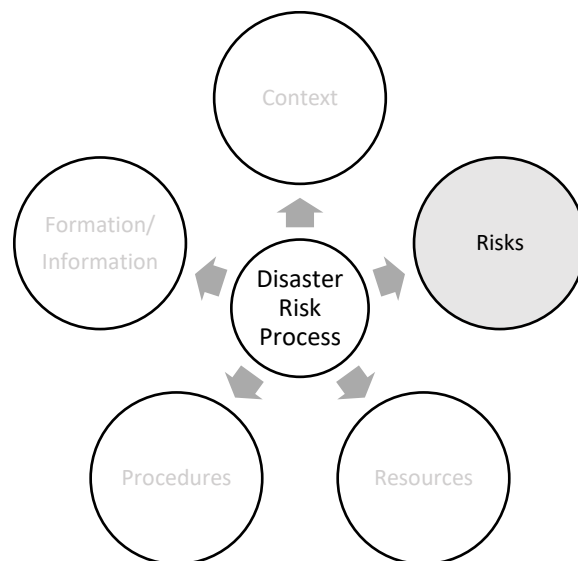
However, the foreign origin of the researcher could also have had a positive impact on her interaction with the Japanese interviewees. As Charlebois noted: "[the] status as non-Japanese located me in a unique position, which helped to rebalance any power inequalities present" (Charlebois, 2014, p. 30). He particularly refers to the possibility of the researcher to be in a "learning" position as a "cultural outsider", subverting the traditional power hierarchy between the subject-researcher and the object-researched. Similarly in this study, the "foreignness" of the researcher allowed the interviewees to take the active lead in conversations and explain in detail about Japanese values and culture, paving the way for very interesting discussions about the structure of the Japanese family, current worries, and new trends of thought among the younger generation.

Chapter 4 General Perception of Gender-based Disaster Risk in Kyushu, Japan

4.1 Introduction

As mentioned in the introduction (Section 1.3), the first part of the study analysis focuses on understanding the element of *risk* of the study framework (Figure 4.1). This chapter addresses perceptions of gender-based disaster risk of local Japanese residents and identifies the predictors of public interest in gender-based disaster risk. The two research questions framing this section are: RQ1a “What is the general perception of gender-based disaster risk in Kyushu, Japan?” and RQ2a “What is the main predictor of public interest in gender-based disaster risk?” The aims of this chapter are to establish 1) whether people are aware of gender-based disaster risk issues and 2) if their interest and involvement in gender-based disaster risk can be predicted by their perceptions of risk.

Figure 4.1 Structure and focus of Chapter 4 (in grey) © author



4.2 Research Design

4.2.1 Site and Participants

As mentioned in the Chapter 3, the research was conducted mainly in Fukuoka Prefecture in Kyushu, Japan (Section 3.1). Fukuoka was originally chosen as a case study for gender-

based disaster risk communication due to the “Mini-Booklet for Parenting Families”, one of the first disaster preparedness booklets directed to parenting families and highlighting women needs before, during, and after disasters. The Booklet was published by the Gender Equality Affairs Office (GEAD) of Fukuoka City in 2018.

A standardised survey was distributed in collaboration with GEAD. The survey was administered in hard copy during disaster-related events and public meetings about community engagement, and online to university students at Seinan Gakuin and Kyushu Sangyo University. The data was collected between July and September 2019. A total of 222 surveys were collected. The targeted population was Japanese citizens from 19 to 84 years of age. The average age of the respondents was 47.5 years, with the majority of respondents being female: 77% respondents were women (n=172) and 23% were men (n=50).

4.2.2 Survey Design and Data Collection

There were two versions of the survey. The first version focused on gender-based disaster risk in a holistic sense, assessing gendered roles and expectations that increase disaster vulnerabilities among men and women. The first version of the survey was based on the problem statement “People are vulnerable to gender-based disaster risks during a disaster” and follow-up questions. This statement was chosen to include the often ignored vulnerabilities of men in disasters (Enarson & Morrow, 1998; Enarson & Pease, 2016). However, during survey trials, two issues became apparent: respondents found the statement confusing and the enumerator had to provide extensive explanations; it was also found that the survey did not distinguish between respondents who associated disaster risk only with women’s risks and those who considered gender-based disaster risk inclusive of both genders.

After discussions with GEAD, it was decided that the issue of disaster vulnerabilities for men, based on their gender, would require a more qualitative approach to consider its complexities. The survey, however, should focus on common associations of gender-based disaster vulnerabilities with women. Aware of these limitations and willing to explore them in subsequent qualitative research, the problem statement in the final version

of the survey was changed to still reflect the importance of disaster risk in the household as follows: “Women, particularly *women with children*, are more at risk during a natural disaster” (emphasis added).

The survey was composed of two sections. The first section was based on the Situational Theory of Problem Solving (STOPS) model by Kim and Grunig (2011). The model aims to measure the respondents’ situational relationship with disaster risk. The dependent variable, “situational motivation”, is causally predicted by three independent variables: problem recognition, constraint recognition and Involvement Recognition. The results allow to identify general perceptions of public behaviour and attitude towards DRR in terms of high involvement or low involvement (see Figure 4.2).

Figure 4.2 Problem-solving behaviour and involvement © Rawlins, 2006

	High Involvement	Low Involvement
Problem-Facing Behavior High Problem Recognition Low Constraint Recognition	<i>Active Public</i>	<i>Active/Aware Public</i>
Constrained Behavior High Problem Recognition High Constraint Recognition	<i>Aware/Active Public</i>	<i>Latent/Aware Public</i>
Routine Behavior Low Problem Recognition Low Constraint Recognition	<i>Active (Reinforcing) Public</i>	<i>None/Latent Public</i>
Fatalistic Behavior Low Problem Recognition High Constraint Recognition	<i>Latent Public</i>	<i>Non Public</i>

This first section included eight questions; two questions devoted to each STOPS variable. The first two questions addressed the importance and urgency of disaster risk preparedness for women and mothers (Q1-Q2 Problem Recognition). The third and fourth questions investigated if the respondent perceived any external constraints preventing them to effect change, and if they considered their actions effective in solving the problem (Q3-Q4 Constraint Recognition). The fifth and fourth question focused on the involvement recognition with disaster risk (Q5-Q6 Involvement Recognition). Finally,

the last two questions considered whether the respondent was interested and willing to learn more about disaster risk of women and mothers (Q7-Q8 Situational Motivation). Table 4.1 below shows the variables considered in the first section of the survey, the number of questions, answer typology, and reference. All questions were measured on a 7-point Likert scale (1= *I strongly disagree* to 7=*I strongly agree*). The second section of the survey focused on *previous knowledge* of gender-based disaster risk and *information behaviour* and will be discussed in Chapter 5.

Table 4.1 Overview of the survey and focus of Chapter 4 (in grey)

Questionnaire sections	Variable	# of Qs	Answer typology	Reference
Section 1 Demographic Variables	Age, gender, nationality	3	Multiple	
Section 2 Experiential Variables	Experiential variables	3	Multiple	
Section 3: risk perception	Problem Recognition	2	1= Strongly Disagree (SD) 2= Disagree (D) 3= Somewhat Disagree (sD) 4= Neither Agree nor Disagree (N) 5= Somewhat Agree (sA) 6= Agree (A) 7= Strongly Agree (SA)	(J.-N. Kim et al., 2012; J.-N. Kim & Grunig, 2011; J.-N. Kim & Krishna, 2014)
	Involvement Recognition	2		
	Constraint Recognition	2		
	Situational Motivation	2		

4.2.3 Hypotheses and Data Analysis

The hypothesis for the first research question is:

H1: Community members in Kyushu have high **awareness** (situational motivation) of gender-based disaster vulnerabilities.

The hypotheses for the second research question are derived from the STOPS model:

H2: Higher **problem recognition** predicts higher situational motivation.

H3: Higher **involvement recognition** predicts higher situational motivation.

H4: Higher **constrain recognition** predicts lower situational motivation.

Survey data was analysed using descriptive statistical analysis, to assess the value of situational motivation, problem recognition, constraint recognition and involvement recognition (Holcomb, 2017). Descriptive analysis on the 7-point Likert scale will measure risk perception as follows: mean values equal or below 3.9 will be considered as “low perception”, between 4 and 4.9 will be considered as “neutral perception”, and above 5 as “high perception”. Confirmatory Factor Analysis (CFA) based on Brown and Moore (2012) was used to test the adequacy of the STOPS model and the correlation between the dependent and independent variables. To test the impact of each variable - problem recognition, involvement recognition and constraint recognition - on situational motivation, Structural Equation Modelling (SEM) after Hoyle (2000) was conducted.

4.3 Results

4.3.1 General perceptions of gender-based disaster risks

RQ1a “What are the general perceptions of gender-based disaster risks in Kyushu, Japan?”

Overall, the descriptive analysis shows that average responses for interest and problem recognition variables were in the positive range (Somewhat Agree – Agree – Strongly Agree), while individual identification and problem recognition variables were in the neutral or positive range (Neither Agree nor Disagree – Somewhat Agree). The participants are highly interested in the topic, as indicated by the mean values of situational motivation (Q7-Q8). Descriptive results also suggest respondents perceive

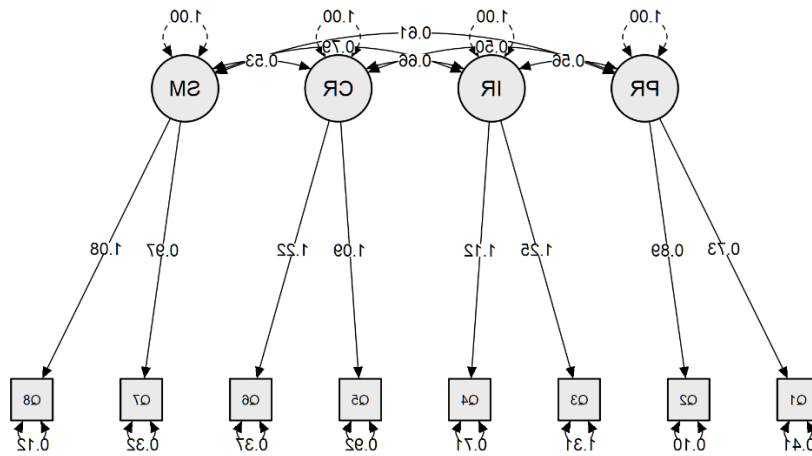
gender-based risks as highly problematic (Q1=6.305; (0.999); Q2=6.260(0.9934)), and their perception of individual vulnerability to gender-based disaster risks is in the medium range (Q3=4.822(1.702)). There is a high perception of vulnerability to gender-based disaster risks in the respondents' close relationships (Q4=5.683(1.390)). Finally, the analysis on constraint recognition suggests that respondents perceive their ability to self-prepare to minimise gender-based disaster risks as medium and similarly they neither agree nor disagree with the notion that authorities will consider their input in changing the issue (Q5=4.833(1.516); Q6=4.659(1.411)) (Table 4.2) (See Appendix 4.1 for full distribution of the responses).

Table 4.2 STOPS Variables' Responses: Valid and Missing entries, Mean, Standard Deviation

	PR1	PR2	IR(Self)	IR(Other)	CR1	CR2	SM1	SM2
Valid	220	219	214	218	215	214	216	218
Missing	2	3	8	4	7	8	6	4
Mean	6.305	6.260	4.882	5.683	4.833	4.659	5.954	5.858
St. Deviation	0.990	0.934	1.702	1.390	1.516	1.411	1.120	1.125
Min.	1.000	1.000	1.000	1.000	1.000	1.000	2.000	1.000
Max.	7.000	7.000	7.000	7.000	7.000	7.000	7.000	7.000

These results were then tested according to confirmatory factors analysis (CFA) (Figure 4.3). CFA shows the empirical model is adequate through a series of goodness-of-fit indexes. The comparative fit index (CFI) is higher than .90, which tell us that the model fit is good. Standardized root mean square residual (SRMR) and root mean square error of approximation (RMSEA) are also below 0.08 which confirms that the model is adequate. Based on the CFA we can assume that all variables are correlated with each other and all correlations are statistically significant.

Figure 4.3. Results of Confirmatory Factor Analysis



Goodness of Fit:

CFI=.981

SRMR=.031

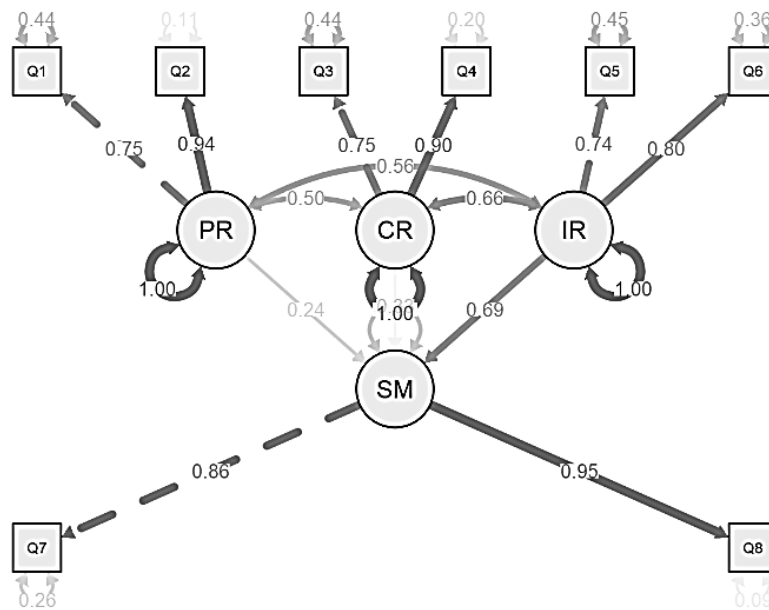
RMSEA=.076

4.3.2 Main predictor of public interest: involvement recognition

RQ2a “What is the main predictor of public interest in gender-based disaster risks?”

The standard equation modelling (SEM) shows the relationship between variables and the standardised factor loadings. Simply put, SEM measures the degree to which a variable, in this case SM, is related to given factors, in this case PR-IR-CR (Bandalos, 2018). Through SEM, it is possible to classify factors as good, mediocre, or bad predictors of situational motivation, i.e. interest in disaster preparedness. SEM suggests that involvement recognition (IR) is a good predictor of situational motivation: 69% of the variation in situational motivation is accounted by involvement recognition, while problem recognition (PR) (24%) and constraint recognition (CR) (22%) are mediocre predictors (Figure 4.4).

Figure 4.4 SEM Results of Gender-based disaster risk



4.4 Discussion

4.4.1 General interest in gender-based disaster preparedness

The study investigated the relationship of Japanese respondents with the problem of gender-based disaster risks. Situational theory of public behaviour used in public communication allows to identify the public’s level of interest with a specific problem (Rawlins, 2006). The results show that respondents have high situational motivation and problem recognition, and medium levels of constraint recognition and involvement recognition. Based on Kim and Grunig (2011), these results identify the respondents as “active/aware” (see Figure 4.2).

The STOPS theory suggests that an active public is more likely to seek information and act based on this information (J.-N. Kim et al., 2012; Rawlins, 2006). Results indicate that the Japanese public in Fukuoka recognises the importance of gender-based disaster risks and has medium-high levels of personal connection with the problem, thus is likely to seek information on the issue. However, the extent to which they will act upon the information received depends upon whether they think their actions can make a difference.

In cases of high levels of *constraint recognition*, people think that their opinion will not be valued and their actions will not bring positive and meaningful changes. Therefore, they will be less likely to engage in active problem-solving behaviour. Results show that the public has medium levels of constraint recognition, indicating that the Japanese public in Fukuoka can be expected to act upon the information received to a certain extent. The factors contributing towards lower levels of constraint recognition are trust in institutions and positive effects of DRR strategies focusing on empowering individuals and fostering notions of self-help (J. Lee, 2020).

4.4.2 Disaster risk communication and involvement recognition

The study results informs disaster communication in relation to gender-based disaster risks. Currently, most risk communication strategies aim to raise problem awareness. However, the results suggest that problem recognition alone is insufficient and highlight the importance of prioritising involvement recognition and self-help capabilities to contrast perception of constraints.

To prioritise involvement recognition with gender-based disaster risks, it is important to foster practical and personalised disaster preparedness initiatives. Many pedagogic studies show that deductive and interactive communication is more efficient than inductive learning to retain information (Benitez-Correa et al., 2019; Wardani & Kusuma, 2020). Current disaster risk communication strategies in Japan rely heavily on practical experience, which fosters involvement recognition with risk. A notable example in Japan are municipal Disaster Prevention Centres, institutions providing free disaster preparedness experiences for local residents (they will be discussed more in Chapter 8).

Increased exchanges between policy-makers and potential victims of gender-based disaster risk are also crucial to increase involvement recognition with risk and decrease perception of constraints in the public (ISDR, 2008). Although most disaster prevention information in Japan is based on national guidelines, general information reaches a higher number of people but also decreases the level of “involvement recognition” with disasters (Cabinet Office, 2014). To increase public awareness and identification of gender-based disaster risks, specific risk awareness campaigns are preferred, and the local government

plays a crucial role. The Mini-Booklet mentioned above is one example where the local government directly intervened to bridge the gap between perceived risks of the public and local authorities (see Chapter 8 for more in-depth discussion).

4.5 Only half of the story

Although informative of the general outlook of public interest in disaster risk perception and informative of what kind of goal disaster risk strategies need to implement, the model has significant limitations. To further understand attitudes and behaviours of the Japanese public in Kyushu towards gender-based disaster risk, individual characteristics need to be included. The literature suggests these characteristics need to include previous experience¹⁶ and demographic characteristics such as gender and age (Y. Kim et al., 2018; Pease, 2014). The analysis of these characteristics will be done in the next chapter.

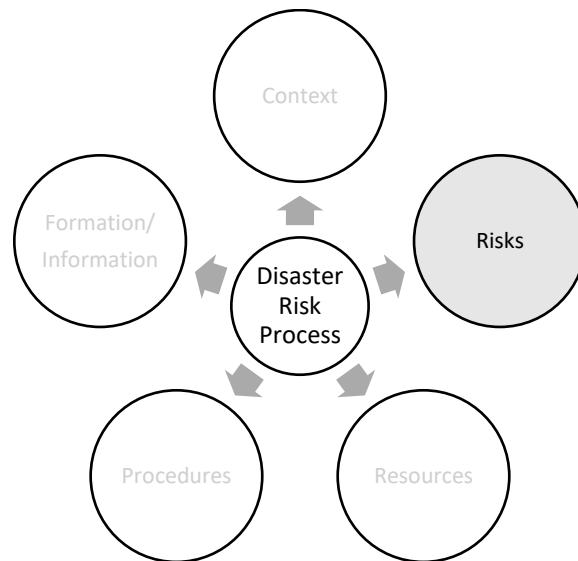
¹⁶ Kim and Grunig (2011) introduced an additional element to the STOPS model, the *referent criteria*, to account for the impact of the experiential dimension of the public's situational relationship with a problem. The *referent criteria* includes all personal experiences with a problem or situation that might affect individuals' problem solving behaviours. In practice, the referent criteria acts as a *leftover* general variable for all the elements not measurable by problem recognition, involvement recognition and constraint recognition (ibid.).

Chapter 5 Demographic and Experiential Factors Influencing the Perception of Gender-Based Disaster Risk

5.1 Introduction

This chapter continues the investigation of the *risk* element of the structure of the study (Figure 5.1). Following the analysis of the general perception of gender-based disaster risk of local Japanese residents in Fukuoka done in Chapter 4, this chapter addresses the second objective of the study 2) to test if and how risk perceptions are influenced by demographic and experiential factors. The research question of this chapter is RQ3a “what are the impacts of experiential and demographic variables on gender-based risk perceptions?”. The aim of this chapter is to examine changes in gender-based risk perception. In particular, it examines how different populations for age, gender, and disaster experience react to the notion of gender-based disaster risk. The analysis of demographic and experiential variables in addition to the model of risk perception, discussed in the previous chapter, could help improving the targeting of disaster preparedness strategies and therefore increase disaster resilience to gender-based vulnerabilities.

Figure 5.1 Structure and focus of Chapter 5 (in grey) © author



5.2 Research Design

5.2.1 Data Collection

The data collection was conducted based on the attribute section of the survey conducted in Chapter 4 (Section 4.2.2). Table 5.1 below shows an overview of the survey and focus of the chapter.

Table 5.1 Overview of the survey and focus of Chapter 5 (in grey)

Questionnaire sections	Variable	# of Qs	Answer typology	Reference
Attributes	Age, gender, nationality	3	Multiple	
Section 1	Problem Recognition	2	1= Strongly Disagree (SD)	(J.-N. Kim et al., 2012; J.-N. Kim & Grunig, 2011; J.-N. Kim & Krishna, 2014)
	Constraint Recognition	2	2= Disagree (D) 3= Somewhat Disagree (sD)	
	Involvement Recognition	2	4= Neither Agree nor Disagree (N)	
	Situational Motivation	2	5= Somewhat Agree (sA) 6= Agree (A) 7= Strongly Agree (SA)	

Then, semi-structured interviews with different stakeholders in disaster preparedness were conducted to explore the relevance of gender and generational issues when dealing with gender-based disaster risk reduction. See Table 5.2 for the specifics and format of the methodologies.

Table 5.2 Methodology overview of Chapter 5

<i>Material</i>	<i>Specifics</i>	<i>Format</i>
Semi-structured Interviews	Multi-stakeholder target Focus on discussion of gender-based disaster risk perception	Recordings Transcripts Notes
Survey	Gender-based disaster risk perception	Paper version Online version

5.2.2.1 Survey (Cont. from Chapter 4)

As mentioned in Chapter 4, the survey was conducted between June and August 2019 with a total of 222 surveys collected. The respondents were all living in Fukuoka Prefecture, Kyushu (For further information about the survey site and participants, refer to Chapter 4, Section 4.2).

The respondents were divided based the demographic features of gender (female=1; male=0), and age groups. A generation is typically conceptualised to range from 22 to 33 years (*OECD Family Database*, 2021). For this study, respondents were categorised in three generations of roughly 20-years: Young Adults (19~40); Middle aged (41~63); and Elderly (65+) (Table 5.3). During the study, I kept in mind that the division into five biological age groups of 20-years does not reflect how people were affected by political, social and economic changes. For example, the right column of Table 5.3 illustrates how the Japanese community can be divided in seven generations according to socio-economic context in Japan. The usefulness of social generations over biological generations has been illustrated by Miyahara and Adelaya (2020).

Table 5.3 Age grouping and living social generations in Japan (adapted from Miyahara and Adelaya, 2020)

20-year generational grouping	Year	Japan social generations
Age group 0 (>93)	1927	Before Baby Boomer
Elderly (>64)	1939	
	1946	
	1947-1949	Baby Boomer 1
	1950	Generation X
	1955	
1956		
Middle-aged (41~63)	1970	
	1971-1974	Baby Boomer 2
	1975	Generation Y
	1978	
1979		
Young adults (19~40)	1986	
	1987-2000	Yutori Generation
	2001-2004	
Youth (<19)	2005-	Generation Z

The survey also included three experiential variables of disasters: previous experience, information sufficiency, and information confidence (Trumbo, 2006). The variables were based on the following statements, adapted from Trumbo (1999): “I have knowledge of this issue from past experience of disaster” (*previous experience*); “I already received all the information I need about this issue” (*information sufficiency*); “I am confident about my knowledge on this issue” (*information confidence*) (see Appendix 1.1). Table 5.4 illustrates survey variables, items, number of questions, answer typology, and reference in the literature.

Table 5.4 Overview of the survey and focus of Chapter 5 (in grey) © author

	Variables	Items	# of Qs	Answer typology	Reference
Section 1-	Demographic	Age	1	Multiple	
	Variables	Gender	1	0=Male 1=Female	
Section 2	Experiential Variables	Previous disaster experience	1	1= Strongly Disagree (SD) 2= Disagree (D) 3= Somewhat Disagree (sD)	(Trumbo, 2006)
		Information sufficiency	1	4= Neither Agree nor Disagree (N)	
		Confidence	1	5= Somewhat Agree (sA) 6= Agree (A) 7= Strongly Agree (SA)	
Section 3	STOPS Variable	Situational motivation	2	1= Strongly Disagree (SD)	Kim and Grunig (2011)
		Involvement recognition	2	2= Disagree (D) 3= Somewhat Disagree (sD)	
		Problem recognition	2	4= Neither Agree nor Disagree (N)	
		Constraint Recognition	2	5= Somewhat Agree (sA) 6= Agree (A) 7= Strongly Agree (SA)	

5.2.2.3 Interviews

The sites of survey data collection were also used to recruit interview participants. In total, eleven semi-structured interviews were conducted with public officials from the fire

department (n=2), the Gender Equality Affairs Department (n=2), the Fukuoka Prefecture office of Disaster Prevention (n=1), as well as private citizens (n=3). Interviewee details can be found in Appendix 2.1.

5.2.2 Hypotheses and Data Analysis

In Chapter 4, the variables of public interest (SM) in gender-based disaster risks were identified (PR-CR-IR) and involvement recognition with gender-based disaster risks was identified as the main driver for interest in gender-based disaster risks (J.-N. Kim & Grunig, 2011) (Section 4.3.2). This chapter further explores the notion of public interest by looking at the external factors influencing interest. Research identified the impact of gender, age and previous experience on risk perceptions in the context of health risks (Andersson, 2011; Chock, 2011; Flynn, Slovic and Mertz, 1994; Gardner and Steinberg, 2005) and disaster risks (Andersson, 2011; Baker, 2011; Chock, 2011; Flynn et al., 1994; Gardner & Steinberg, 2005; Kimura, 2016; McDowell et al., 2020; Trumbo, 2006) (see Chapter 2 Section 2.3.2). The main hypotheses of this study are guided by this literature:

H1: **Gender** has an impact on the perception of gender-based disaster risks/Women have a higher perception of gender-based disaster risks

H2: **Age** impacts the perception of gender-based disaster risks/Younger people have a higher perception of gender-based disaster risks

H3: **Personal experience and knowledge** increases the perception of gender-based disaster risks.

Descriptive statistics was used to illustrate mean responses and correlations. Univariate analyses of variance (ANOVA) were used to test how different gender and generations perceive gender-based disaster risks (H1-H2). Finally, multiple regression analysis was conducted to evaluate if external experiential variables can be predictors of involvement recognition and perceptions and motivation of risk (H3). Analyses were conducted with the free open-source software JASP (v0.14).

5.3 Results

Table 5.5 below shows the descriptive statistics of the variables of interest. The population sample was 77% female, with an average age of 47.5 years. Overall, experiential variables offer relatively low mean responses: previous experience of gender-based disaster risk (Mean=3,604, SD=1,687); information sufficiency scored (Mean=3.217, SD=1.536); and confidence in one's knowledge (Mean=2.863, SD=1.491).

In Chapter 4 (Section 4.2) four variables were identified: problem recognition (PR), constraint recognition (CR), involvement recognition (IR), and situational motivation (SM). Table 5.5 illustrates how these variables are correlated with demographic (age, gender) and experiential (previous experience; information sufficiency; confidence) variables.

Table 5.5 Significant Correlations (Bold), Mean and Standard Deviation

Variable	Age	Gender	Previous experience	Information sufficiency	Confidence
Mean	47.507	0.775	3.604	3.217	2.863
(St. Deviation)	(16.936)	(0.419)	(1.687)	(1.536)	(1.491)
PR1	0.202 **	0.002	0.205 **	0.152 *	0.090
PR2	0.199 **	0.103	0.189 **	0.136 *	0.099
IR(Self)	0.110	0.234 ***	0.385 ***	0.254 ***	0.185 **
IR(Other)	0.223 ***	0.170 *	0.320 ***	0.283 ***	0.247 ***
CR1	0.259 ***	0.022	0.303 ***	0.297 ***	0.242 ***
CR2	0.284 ***	0.085	0.411 ***	0.438 ***	0.340 ***
SM1	0.218 **	0.137 *	0.219 **	0.151 *	0.145 *
SM2	0.276 ***	0.219 **	0.328 ***	0.216 **	0.209 **

* p < .05, ** p < .01, *** p < .001

The first hypothesis of this chapter is that gender has an impact on the perception of gender-based disaster risks (H1). Table 5.5 shows a strong correlation between gender and respondents' involvement recognition with gender-based disaster (IR(Self)= .234), (IR(Other)=.17). Women have a stronger sense of personal identification with gender-based disaster risks and also a higher perception that someone close to them is vulnerable to gender based disaster risks. The analysis also shows that women have higher interest and motivation in gender-based disaster risks, as indicated in both statements of situational motivation (SM1=.137; SM2=.219).

The second hypothesis is that age has an impact on the perception of gender-based disaster risks (H2). Table 5.5 shows higher age is positively correlated with involvement recognition for others (IR(Other)=.223). In other words, older people perceive someone close to them as vulnerable to gender-based disaster risk compared to younger people. However, age does not have a statistically relevant correlation with personal involvement recognition with the problem. Finally, age is statistically correlated with situational motivation (SM1=.218; SM2=.276). In other words, older people have higher interest in gender-based disaster risks than younger people.

The third hypothesis is that previous knowledge and experience has an impact on disaster risk perception (H3). Table 5.5 shows people with previous experience of gender-based disaster risks have higher involvement recognition of the self (IR(Self)=.385) and of close relations (IR(Other)=.320), and more interest and motivation compared to people with less or no previous experience (SM1=.219; SM2=.328). The correlations also found that people with higher values of *information sufficiency* have also higher values of involvement recognition (IR(Self)=.254; IR(Other)=.283), and higher interest in gender-based disaster risks (SM1=.151; SM2=.216). Finally, correlations were found between people with higher *confidence* and involvement recognition (IR(Self)=.185; IR(Other)=.247) and interest in gender-based disaster risks (SM1=.145; SM2=.209).

These correlations indicate there is a relationship but do not prove cause and effect between interest (SM) and the other variables. To determine if these correlations indicate a causal relationship between interest and the other variables, ANOVA testing was conducted for gender (H1 – Section 5.3.1) and age (H2 – Section 5.3.2) variables and multiple regressions were conducted to test the impact of the three experiential variables on interest (H3 – Section 5.3.3).

5.3.1 Demographic variable (H1): gender

In order to explore different risk perceptions of male and female respondents (H1), ANOVA testing was conducted to compare the mean response based on the gender of the respondents (Tables 5.6a-5.6b-5.6c). As mentioned before, a statistical difference between male and female respondents was found in both statements of **situational**

motivation: *I want to better understand this problem* (SM1), $F(1,214)= 4.115$, $p=.044$; and *I am curious about this problem* (SM2), $F(1,216)= 10.852$, $p=.001$. ANOVA testing shows that male respondents (Mean=5.245; SD=1.588) have significantly lower interest in the topic compared to female respondents (Mean= 6.036; SD=1.147). Similarly, male respondents (Mean=5.396; SD=1.106) have significantly lower curiosity compared to female respondents (Mean= 5.811; SD=1.099).

Overall, there is also a significant difference between male and female respondents with regards to **involvement recognition**. With regards to the statement: *I see a direct connection between myself and the problem* (IR(Self)) ($F(1,212)= 12.282$, $p< .001$), male respondents (Mean=4.083; SD=1.711) have significantly lower recognition compared to female respondents (Mean= 5.036; SD=1.644). This suggests that men are less likely to understand themselves as subject to gender-based risks. With regards to the statement: *this problem affects someone close to me* (IR(Other)) ($F(1,216)= 6.453$, $p=.012$), male respondents (Mean=5.245; SD=1.588) identify at a significantly lower rate than female respondents with the idea that people close to them might be at risk during a disaster (Mean= 5.811; SD=1.305).

Finally, gender does not affect the respondents' perception of the problem (PR1-PR2) nor does it impact their perception of their ability to effect change to the problem (CR1-CR2).

Table 5.6a Descriptive Statistics of involvement recognition and interest by gender

		Gender	Mean	SD	N
IR(Self)	Male		4.083	1.711	48
	Female		5.036	1.644	166
IR(Other)	Male		5.245	1.588	49
	Female		5.811	1.305	169
SM1	Male		5.667	0.975	48
	Female		6.036	1.147	168
SM2	Male		5.396	1.106	48
	Female		5.988	1.099	170

Table 5.6b ANOVA testing of involvement recognition and interest by gender

		Cases	Sum of Squares	df	Mean Square	F	p	η^2
IR(Self)	Gender		33.803	1	33.803	12.282	< .001	0.055
	Residual		583.45	212	2.752			
IR(Other)	Gender		12.158	1	12.158	6.453	0.012	0.029
	Residual		407.002	216	1.884			
SM1	Gender		5.085	1	5.085	4.115	0.044	0.019
	Residual		264.452	214	1.236			
SM2	Gender		13.136	1	13.136	10.852	0.001	0.048
	Residual		261.456	216	1.21			

Note. Type III Sum of Squares

Table 5.6c ANOVA Post Hoc Comparisons of gender

			Mean Difference	SE	t	Cohen's d	p tukey	p scheffe
IR(Self)	Male	Female	-0.953	0.272	-3.505	-0.574	< .001	< .001
	Male	Female	-0.566	0.223	-2.54	-0.412	0.012	0.012
SM1	Male	Female	-0.369	0.182	-2.028	-0.332	0.044	0.044
	Male	Female	-0.592	0.18	-3.294	-0.538	0.001	0.001

Note. Cohen's d does not correct for multiple comparisons.

5.3.2 Demographic variable (H2): generational effect

The descriptive and correlation analyses showed that age is correlated with the STOPS model. To test the hypothesis that age is a predictor of gender-based risk perception (H2) the ANOVA analysis was conducted to understand how different generations perceive gender-based disaster risks (Tables 5.7a- 5.7b -5.7c). ANOVA testing found a significant difference the oldest and the youngest generations for all variables of risk perception. In

seven questions over eight total, older age predicted higher levels of problem recognition (PR1-PR2), constraint recognition (CR1-CR2), recognition of close relations being vulnerable to gender-based disaster risk (IR(Other)), and situational motivation (SM1-SM2).

Age plays a significant role in predicting **problem recognition** with regards to the statements *I think this is a serious social problem* (PR1) ($F(2,216)=4.115, p=.018$), and *Something should be done to improve this problem before the next disaster* (PR2) ($F(2,215)=3.410, p=.035$), elderly respondents over 64 (PR1 Mean=6.571; SD=.712) (PR2 Mean=6.444; SD=.713) have significantly higher values compared to the young adult generation (PR1 Mean=6.103; SD=1.057) (PR2 Mean= 6.068; SD=1.057).

Overall, there was a significant difference between elderly and young adults in **constraint recognition**. With regards to both CR statements: *my opinion is important to the local authority addressing this problem* (CR1), ($F(2,211)=6.767, p=.001$), and *my actions can make a difference in solving this problem* (CR2), ($F(2,210)=5.78, p=.004$), elderly people (CR1 Mean=5.41; SD=1.395) (CR2 Mean=5.287; SD=1.358) have significantly higher confidence compared to the young adult cohort (CR1 Mean= 4.54; SD=1.485) (CR2 Mean= 4.287; SD=1.43) and the middle aged group (CR1 Mean= 4.826; SD=1.374). In other words, elderly people have a higher perception that their opinion has an impact compared to young adult respondents.

Similar to PR and CR, there was a significant difference between elderly and young respondents in **involvement recognition** with respect to the statement: *this problem affects someone close to me* (IR(Other)) ($F(2,214)=4.755, p=.010$). Respondents over 64 (Mean=6; SD=1.04) have significantly higher values compared to the young adult group (Mean= 5.345; SD=1.697) In other words, compared to younger respondents, people over 64 years old have a stronger awareness that the problem involves someone close to them.

Finally, there was also a significant difference between elderly and youngest respondents with regards to the **situational motivational** statements: *I want to better understand this problem* (SM1), $F(2,212)=3.626, p=.028$, and *I am curious about this problem* (SM2), $F(2,214)=6.004, p=.003$. Elderly respondents (SM1 Mean=6.222; SD=0.851) (SM2

Mean=6.206; SD=0.826) have a significantly higher identification with the statements compared to respondents aged 19~40 (SM1 Mean= 5.733; SD=1.287) (SM2 Mean= 5.581; SD=1.251) Both statements suggest there is a trend of increasing curiosity about the topic, with a statistically significant difference between the elderly cohort and the youngest cohort.¹⁷

¹⁷ The responses from the middle-aged group (41~63 years old) were not statistically different from the younger or the older groups with regards to Problem Recognition (PR1 Middle Aged=6.319, SD=1.105, $d=-.269$, $p=.402$) (PR2 Middle Aged= 5.852; SD=1.140; $d=-.116$; $p=.808$); Constraint Recognition (CR2 Middle Aged= 4.773; SD=1.334; $d=-.206$; $p=.499$); Involvement Recognition ((IR(Other)Middle Aged= 5.838; SD=1.141; $d=-.148$; $p=.779$); and Situational Motivation (SM1 Middle Aged=6; SD=1.067; $d=-.23$; $p=.491$) (SM2 Middle Aged= 5.912; SD=1.103; $d=-.301$; $p=.275$).

Table 5.7a Descriptive Statistics of risk perception model by age groups

DV	Age	Mean	SD	N
PR1	Young adults	6.103	1.057	87
	Middle-age	6.319	1.105	69
	Elderly	6.571	0.712	63
PR2	Young adults	6.068	1.003	88
	Middle-age	6.343	0.993	67
	Elderly	6.444	0.713	63
IR (Other)	Young adults	5.345	1.697	87
	Middle-age	5.838	1.141	68
	Elderly	6.000	1.040	62
CR1	Young adults	4.540	1.485	87
	Middle-age	4.667	1.543	66
	Elderly	5.410	1.395	61
CR2	Young adults	4.287	1.430	87
	Middle-age	4.773	1.334	66
	Elderly	5.287	1.358	60
SM1	Young adults	5.733	1.287	86
	Middle-age	6.000	1.067	66
	Elderly	6.222	0.851	63
SM2	Young adults	5.581	1.251	86
	Middle-age	5.912	1.103	68
	Elderly	6.206	0.826	63

Table 5.7b ANOVA testing of risk perception variables by age groups

DV	Cases	Sum of Squares	df	Mean Square	F	p	η^2
PR1	Age	8.019	2	4.010	4.115	0.018	0.037
	Residual	210.483	216	0.974			
PR2	Age	5.845	2	2.923	3.410	0.035	0.031
	Residual	184.251	215	0.857			
IR (Other)	Age	17.815	2	8.908	4.755	0.010	0.043
	Residual	407.876	214	1.873			
CR1	Age	29.573	2	14.786	6.767	0.001	0.060
	Residual	461.030	211	2.185			
CR2	Age	22.034	2	11.017	5.780	0.004	0.052
	Residual	400.257	210	1.906			
SM1	Age	8.886	2	4.443	3.626	0.028	0.033
	Residual	259.738	212	1.225			
SM2	Age	14.406	2	7.203	6.004	0.003	0.053
	Residual	256.718	214	1.200			

Note. Type III Sum of Squares

Table 5.7c ANOVA Post Hoc Comparisons of age groups

DV			Mean Difference	SE	t	Cohen's d	p tukey	p scheffe
PR1	Young adults	Middle-age	-0.215	0.159	-1.354	-0.200	0.367	0.402
		Elderly	-0.468	0.163	-2.886	-0.504	0.013*	0.018*
	Middle-age	Elderly	-0.253	0.172	-1.468	-0.269	0.367	0.402
PR2	Young adults	Middle-age	-0.275	0.150	-1.833	-0.275	0.161	0.189
		Elderly	-0.376	0.153	-2.463	-0.421	0.039*	0.050*
	Middle-age	Elderly	-0.101	0.162	-0.623	-0.116	0.808	0.824
IR (Other)	Young adults	Middle-age	-0.493	0.222	-2.227	-0.334	0.069	0.086
		Elderly	-0.655	0.227	-2.880	-0.449	0.012*	0.017*
	Middle-age	Elderly	-0.162	0.240	-0.673	-0.148	0.779	0.797
CR1	Young adults	Middle-age	-0.126	0.241	-0.524	-0.084	0.860	0.872
		Elderly	-0.870	0.247	-3.523	-0.600	0.002**	0.002**
	Middle-age	Elderly	-0.743	0.263	-2.831	-0.504	0.014*	0.020*
CR2	Young adults	Middle-age	-0.485	0.225	-2.154	-0.349	0.082	0.101
		Elderly	-0.763	0.232	-3.292	-0.544	0.003**	0.005**
	Middle-age	Elderly	-0.277	0.246	-1.126	-0.206	0.499	0.532
SM1	Young adults	Middle-age	-0.267	0.181	-1.476	-0.23	0.304	0.338
		Elderly	-0.490	0.184	-2.668	-0.436	0.022*	0.030*
	Middle-age	Elderly	-0.222	0.195	-1.140	-0.230	0.491	0.523
SM2	Young adults	Middle-age	-0.330	0.178	-1.859	-0.278	0.153	0.180
		Elderly	-0.625	0.182	-3.441	-0.572	0.002**	0.003**
	Middle-age	Elderly	-0.295	0.192	-1.538	-0.301	0.275	0.308

*p<.05, **p<.01, ***p<.001

Note. Cohen's d does not correct for multiple comparisons.

5.3.3 Experiential variables (H3): Previous experience, Information sufficiency and Confidence

With regards to the hypothesis that experiential variables can predict situational motivation and involvement recognition (H3), results were ambiguous. Multiple regression analysis shown in Table 5.8 illustrates that *previous experience* of gender-based disaster risk was a relevant predictor for higher risk perception (SM1=0.219 p=0.016; SM2=0.325 p=<.001) and higher values of involvement recognition for the self (IR(Self)=0.417 p=<.001) and others (IR(Other)=0.246 p=0.006). The presence of previous experience also predicts higher belief in the institutional support to reduce

gender-based disaster risks (CR1=0.211, p=0.019) and higher awareness of the problem of gender-based disaster risks (PR1=0.229, p=0.013; PR2=0.187, p=0.042).

With regards to *information sufficiency*, having sufficient information was a relevant predictor for higher values in the statement *my actions can make a difference in solving this problem* (CR2=0.436, p=0.004). People who believe to have sufficient information also believe in their self-efficacy in reducing risks. However, information sufficiency was not a predictor of situational motivation nor involvement recognition.

The last experiential variable is *confidence* in one's own knowledge. The multiple regression results show that confidence in one's knowledge is a relevant predictor for constraint recognition in relation to the statement *my actions can make a difference in solving this problem* (CR2=-0.272, p=0.024). People who have higher confidence in their preparedness have less certainty that their actions can make a difference in reducing risk. Higher confidence in one's knowledge is also a good predictor of lower involvement recognition with risk with regards to oneself (IR(Self)=-0.290 p=0.02). In other words, if one perceives that one is sufficiently prepared for gender-based disaster risks, one's involvement recognition with the problem decreases.

Table 5.8 Multiple regression of experiential variables and significant relationships (in bold)

		PR1	PR2	IR (Self)	IR (Other)	CR1	CR2	SM1	SM2
	Adj R ₂	0.063	0.061	0.197	0.143	0.128	0.248	0.079	0.172
	F(5,200)	3.753	3.656	10.887	7.796	6.982	14.323	4.486	9.541
	P	0.003	0.003	<.001	<.001	<.001	<.001	<.001	<.001
Previous experience	St Coeff	0.229	0.187	0.417	0.246	0.211	0.245	0.219	0.325
	t	2.507	2.051	4.826	2.775	2.369	2.942	2.430	3.781
	p	0.013	0.042	<.001	0.006	.019	0.412	0.016	<.001
Information Sufficiency	St Coeff	0.192	0.118	0.187	0.178	0.239	0.436	0.009	0.010
	t	1.483	0.918	1.544	1.437	1.905	3.747	0.073	0.082
	p	0.140	0.360	0.124	0.152	0.058	0.004	0.942	0.935
Confidence	St Coeff	-0.280	-0.191	-0.290	-0.136	-0.178	-0.272	-0.084	-0.097
	t	-2.109	-1.448	-2.344	-1.070	-1.386	-2.278	-0.645	-0.778
	p	0.036	0.149	0.020	0.286	0.167	0.024	0.520	0.437

5.4 Discussion

As experts seek to include a stronger gender perspective in DRR strategies in Japan, it is important to account for different perceptions of gender-based disaster risk. The importance of including risk perceptions has long been advocated in disaster risk reduction studies (Kunz-Plapp & Werner, 2006) but has not yet been applied to perception of social vulnerabilities in disaster. This chapter provided an opportunity to question how external factors, such as gender, age, knowledge and previous experience could affect the perception of gender-based disaster risks.

The results observed in the context of Kyushu suggest that public awareness of the gender vulnerabilities in disaster problem is not universal. In fact, some groups of society encounter very specific obstacles in recognising themselves as affected by gender-based risks. The analysis of gender highlighted that men tend to fail to identify personally with gender-based vulnerabilities. Age was also found to predict interest, with younger people struggling to identify with the problem and feeling less agency to effect positive change. The fact that the youngest generation is less aware and interested in the problem of gender-based disaster risk suggests that gender-based disaster risks are not recognised as a “gender-equality” problem, traditionally more appealing to younger generations (Ui & Matsui, 2008). Rather, in this study, gender-based disaster risk can be associated with similar results from “health risks” studies, in which elderly had higher perception of risk compared to younger people (Andersson, 2011; Y. Kim et al., 2018).

Experiential variables were found to be good predictors of interest in gender-based disaster risks. Previous encounters of gender-based risk can predict more interest in prevention policies. It was also found that sufficient information can increase the feeling of agency to reduce gender-based disaster risks. The results from confidence in one’s own knowledge were mixed. While higher confidence meant higher belief in one’s agency to reduce risks, it also decreases involvement recognition and therefore could have a negative effect on people’s interest in learning more about disaster risks. In other words, being too confident might decrease interest in new strategies.

The methods used in this chapter can be used to improve the targeting and content of gender-based disaster strategies in the context of Kyushu. For example, while the results suggest that respondents are aware of the issue of gender-based disaster risks, it also highlights possible challenges in increasing public interest and involvement due to high confidence based on their pre-existing knowledge.

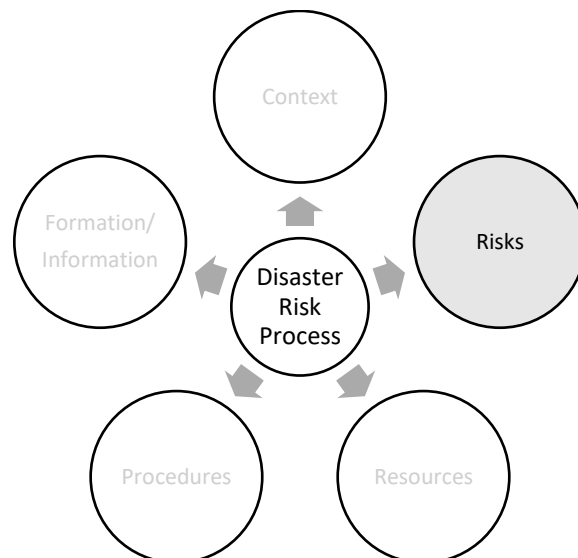
Since the start I wanted my research to have a bifurcated focus. The first aspect I wanted to explore was the issue of gender and disaster in the Japanese culture. For this purpose, I conducted the study on gender-based disaster risk with Japanese residents. The second aspect I wanted to explore was the notion of *social vulnerabilities of foreign residents in Japan*. If the first part focused on a specific typology of social vulnerability for the Japanese residents; in the second part I will explore the multifaceted and complex nature of social vulnerabilities of foreign residents in Kansai, Japan, using a similar methodology. In Chapter 6, I will analyse the general perception of disaster risk of foreign residents in Kansai, Japan. In Chapter 7, I will consider how different individual characteristics (gender, societal model of the country of origin, experiential variables and language skills) influence these perceptions.

Chapter 6 General Perception of Disaster Risk among Foreign Residents in Kansai, Japan

6.1 Introduction

This chapter addresses the perception of disaster *risk* among foreign residents in Japan and investigates possible predictors for interest in disaster risk in the foreign communities of Osaka and Kyoto. Like Chapter 4, it present the first part of the analysis of *risk* for foreign residents, based on the structure of this study (Figure 6.1). The aim of this chapter is to establish whether foreign residents in Kansai are aware of disaster risks and which factors could predict their interest and involvement in disaster risk preparedness. The chapter addresses two research questions: RQ1b “What are the disaster risk perceptions of foreign residents in Kansai, Japan?” and RQ2b “What are the main predictors of interest in disaster risk among foreign residents?”. The research highlights the importance of considering aspects of diversity and inclusion into DRR strategies to improve the public’s understanding of disaster risk and inform existing disaster risk reduction policies and practices.

Figure 6.1 Structure and focus of Chapter 6 (in grey) © author



6.2 Research Design

6.2.1 Background on foreigners' risk perception in disaster preparedness

The fact that foreigners are disproportionately affected in disasters, in combination with an expected increase in Japan's foreign resident population, requires an urgent assessment of their disaster vulnerability (Nagy, 2009). To minimise disaster vulnerabilities of foreign residents, conventional disaster preparedness strategies rely on institutional emergency management, infrastructure safety, and available information. However, little attention has been given to the role that *perception* of risk plays in minimising disaster vulnerabilities, despite the literature suggesting an important link between risk perception and disaster preparedness (Boret, 2020; Oliver-Smith, 1999). This research aims to fill this gap by investigating the *disaster risk perceptions of foreign residents in Japan*, based on the assumption that risk awareness during a crisis can increase resilience and reduces reliance on external help.

Data for this chapter was collected through a survey based on the Situational Theory of Problem Solving (STOPS) model (Kim and Grunig, 2011). The model is centred on individual perceptions and has been used to predict motivation to act and behaviour change (Kim and Krishna, 2014; Chen et al., 2017). The STOPS model has been used in Chapters 4 and 5 to assess gender-based disaster risk perceptions of Japanese citizens, and was applied here to analyse the perception of disaster risk of foreign residents in Kansai, Japan (Petraroli & Singer, 2020).

6.2.2 Site and Participants

The research was conducted between September 2020 and February 2021 in the cities of Osaka and Kyoto, Japan. Kyoto and Osaka were chosen for their high number and diversity of foreign communities. In 2020, 2.8% of the total population in Osaka prefecture was composed of foreign residents (253,303), making it the third highest foreign population in Japan. The foreign community is mostly from Southeast Asian countries, especially South and North Korea (38%), China (26%) and Vietnam (14%). The foreign population in Kyoto Prefecture in 2020 was 2.4% of the total population (62,510), with a higher European (4.4%) and American (3.2%) component (Immigration

Services Agency of Japan, 2020). Both Osaka and Kyoto offer varied support systems for non-Japanese residents. One example are the International House Foundations that offer various services, including disaster drills and preparedness activities specifically targeting foreign nationals. Surveys were administered at the International House in Kyoto and Osaka and distributed online to Kyoto University students and members of a local NPO supporting foreign resident women. The survey was provided in English, Chinese, and Japanese to foreign nationals living in Japan for more than one year. The majority of respondents were university students (52%), followed by employed (25%) and self-employed (13%) workers (see Appendix 1.3). They also differed in gender and age: 53% of the respondents were female (n=56) and 47% were male (n=48), aged 14 to 59.

6.2.3 Survey Design and Data Collection

The STOPS model, developed by Kim and Grunig (2011), is used in this chapter to assess “the extent to which a person is willing to learn and think more about a given problem”, classified as “situational motivation” (SM) (Kim et al., 2012: 151). This model on individual perceptions was chosen because it allows investigating how foreign residents *perceive* disaster risk and preparedness (Kim and Krishna, 2014; Chen et al., 2017). The model suggests that SM can be predicted by three perceptive factors (J.-N. Kim & Grunig, 2011):

1. *problem recognition* (PR): “One’s perception that something is missing and that there is no immediately applicable solution to it”;
2. *constraint recognition* (CR): “One’s perception that there are obstacles in a situation that limit their ability to do anything about the situation”;
3. *involvement recognition* (IR): “One’s perception of the extent to which people connect themselves with a situation”.

Each perceptive factor corresponds with two statements in the survey and is measured on a 5-point Likert scale (1= *I strongly disagree* to 5= *I strongly agree*)¹⁸. Respondents were also categorised based on the following characteristics: nationality, age, gender, length of stay in Japan, occupation, living status, and language self-assessment. In Table 6.1 below,

¹⁸ See Appendix 1.

you can find an overview of the survey questions, variables, number of questions, answer coding, and reference.

Table 6.1 Survey questions overview and focus of Chapter 6 (in grey)

Questionnaire sections	Variable	# of Qs	Answer coding	Reference
Section 1: Characteristics	Nationality	1	Open	
	Age	1	Number	
	Gender	1	1=Female 0=Male	
	Length of stay in Japan	1	1= less than 1 year 2= 1-2 years 3 more than 2 years	
	Occupation	1	1=employed worker 2= self-employed 3= student 4= retired 5= unemployed 6= self-describe:	
	Living status	1	1=living alone 2=living with spouse 3=living with spouse and children 4=living with children	
	Language self-assessment	1	1= not at all 2= beginner 3= daily conversation 4= business level 5= native speaker	
Section 2: Experiential variables	Previous experience		1= Strongly Disagree	
	Information Sufficiency		2= Disagree	
	Confidence		3=Neither Agree nor Disagree	
Section 3: STOPS model	Problem Recognition	2	4= Agree	(J.-N. Kim et al., 2012; J.-N. Kim & Grunig, 2011; J.-N. Kim & Krishna, 2014)
	Constraint Recognition	2	5=Strongly Agree	
	Involvement recognition	2		
	Situational Motivation	2		

The hypothesis for the first research question is:

H1: Foreign residents in Kansai have high **awareness** (situational motivation) of their disaster vulnerabilities.

The hypotheses for the second research question are derived from the STOPS model:

H2: Higher **problem recognition** predicts higher situational motivation.

H3: Higher **involvement recognition** predicts higher situational motivation.

H4: Higher **constrain recognition** predicts lower situational motivation.

6.2.4 Analysis

The data set was first analysed using descriptive statistical analysis. Confirmatory Factor Analysis (CFA) was used to test the adequacy of the STOPS model. To subsequently test the impact of problem recognition, involvement recognition and constraint recognition on situational motivation, multiple regression and Structural Equation Modelling (SEM) were conducted.

6.3 Results and Discussion

The data showed that foreign communities overall have a high interest in disaster risk. This interest is affected by constraint recognition and problem identification among respondents:

6.3.1 General perception of risk

RQ1b “What are the disaster risk perceptions of foreign residents in Kansai, Japan?”

Table 6.2 shows a high interest in the topic of “individual disaster risk perception”, illustrated by the high values of situational motivation (Q7 - *I want to receive information about how to overcome my individual disaster risks*; Q8 - *I am willing to actively learn about how to overcome my individual disaster risks*). Respondents are aware of the topic of individual vulnerabilities for foreigner residents (Q1- *Disaster risk vulnerability is not the same for everyone. It depends on various factors, such as: gender, age, social relations, income, physical abilities etc.*; Q2 - *In addition to general disaster risk*

preparedness, the government should do something about specific these above vulnerabilities before the next disaster) and identify with the issue of multiple disaster risks both personally (Q3 - *I feel vulnerable during disaster*) and for those around them (Q4 - *Someone close to me is particularly vulnerable during disaster*). Although respondents generally consider themselves capable of minimising risk through individual actions (Q5 - *I can do something by myself to be better prepared if a disaster happens*), they consider the lack of communication with authorities an obstacle to their ability to improve risk preparedness (Q6 - *If I contact the local authorities about my individual disaster risks, they will consider my input*). Gender seemed to have a small, but significant impact on results with female respondents having a higher mean response in problem recognition (Q1-Q2), involvement recognition (Q3-Q4) and situational motivation (Q7-Q8), and male respondents having slightly higher scores of constraint recognition (Q5-Q6) (See Appendix 4.2 for full distribution of the responses). This could be interpreted as men having lower perceptions of obstacles towards their individual disaster preparedness.¹⁹

Table 6.2 Descriptive statistics of survey responses of foreign residents' disaster risk

	Q 1	Q 2	Q 3	Q 4	Q 5	Q 6	Q 7	Q 8
Valid	103	103	104	104	102	101	103	101
Missing	1	1	0	0	2	3	1	3
Mean	4.146	3.903	3.865	3.288	3.833	2.941	3.835	3.921
Std. Deviation	1.124	1.107	1.175	1.459	0.996	1.028	0.981	0.997

The results of the descriptive and confirmatory factor analyses show that the general perception of disaster risk of foreign residents (Q1) is characterised by high perception of risk (PR) and interest (SM), high levels of recognition with disaster risk (IR) but also high levels of constraints (CR), in the form of lack of confidence in their ability to minimise risk and lack of trust that the authorities will value their opinion on the matter.

Descriptive results show respondents have high situational motivation and problem recognition, as well as high levels of constraint recognition. Based on Kim and Grunig

¹⁹ Please note that the CR statements were positive (“If I contact the local authorities about my individual disaster risk, they will consider my input”), hence higher values correspond to *lower* constraints.

(2011), these results identify the respondents as “aware/active public” (Chapter 4 Section 4.2.2, Figure 4.2). The STOPS theory suggests that aware/active public is aware of the risks but struggles to seek information and act based on this information (J.-N. Kim et al., 2012; Rawlins, 2006).

6.3.2 Predictors of risk perception

RQ2b “What are the main predictors of interest in disaster risk among foreign residents?”

Similarly to Chapter 4 (Section 4.3.2), CFA established the accuracy of the model and relationship between the variables (Tables 6.3a-3b). The p-value lower than 0.05 of the Chi-square test confirmed the accuracy of the model (Table 6.3a). Furthermore, the low p-values of the CFA show that all variables are statistically correlated with SM and that PR and IR are also statistically correlated (in bold in Table 6.3b).

Table 6.3a Chi-square test of confirmatory factor analysis

Model	X ²	df	p
Baseline model	198.126	28	
Factor model	25.753	14	0.028*

Table 6.3b CFA factor covariances and statistical correlations (in bold)

		Estimate	Std. Error	z-value	p	95% Confidence Interval		Std. Est. (all)
						Lower	Upper	
Problem Recognition	↔ Involvement recognition	0.580	0.131	4.430	< .001***	0.324	0.837	0.580
Problem Recognition	↔ Constraint Recognition	0.264	0.176	1.500	0.134	-0.081	0.608	0.264
Problem Recognition	↔ Situational Motivation	0.454	0.113	4.005	< .001***	0.232	0.676	0.454
Involvement recognition	↔ Constraint Recognition	0.227	0.194	1.171	0.241	-0.153	0.606	0.227
Involvement recognition	↔ Situational Motivation	0.381	0.127	3.003	0.003**	0.132	0.629	0.381
Constraint Recognition	↔ Situational Motivation	0.685	0.159	4.302	< .001***	0.373	0.997	0.685

*p<0.5, **p<.01, ***p<.001

Table 6.3c shows various fit indexes used to test the accuracy of the model. The results were mixed with only the Comparative Fit Index CFI=0.931 indicating the STOPS model is a good fit to describe the study observations on risk perception of foreign residents. The high levels of the Tucker Lewis Index TLI=.862 and the root mean square error of approximation RMSEA=0.090 suggest that the STOPS model has only an “average fit” to describe risk perception variation among foreign residents.

Table 6.3c Fit indices

Index	Value
Comparative Fit Index (CFI)	0.931
Tucker-Lewis Index (TLI)	0.862
Root mean square error of approximation (RMSEA)	0.090
RMSEA 90% CI lower bound	0.029
RMSEA 90% CI upper bound	0.144
RMSEA p-value	0.113
Standardized root mean square residual (SRMR)	0.049
Goodness of fit index (GFI)	0.945

These results can be interpreted as follows: while the independent variables (Problem Recognition, Involvement Recognition, Constraint Recognition), identified in the STOPS model, can predict interest (*situational motivation*) in disaster risk to some extent, other factors, not captured by the STOPS model, might be influencing foreign residents’ interest and motivation in disaster risk.

Having established the relationship between variables and SM, multiple regression analysis was conducted using situational motivation as the dependent variable. Subsequently, standard equation modelling (SEM) was used to determine how much variance of SM can be explained by the STOPS model and what factors best predict this variance.

The adjusted R² value illustrates that 92.4% of the variance in SM can be explained by the STOPS model (Table 6.4a) and the p-value lower than .001 of the ANOVA testing (Table 6.4b) supports the argument that the variables’ joint capacity to predict the variation of SM is significant.

Table 6.4a ANOVA model summary

Model	R	R ²	Adjusted R ²	RMSE
H ₁	0.964	0.928	0.924	1.098

Table 6.4b ANOVA testing results

Model		Sum of Squares	df	Mean Square	F	p
H ₁	Regression	1533.881	6	255.647	212.102	< .001
	Residual	118.119	98	1.205		
	Total	1652.000	104			

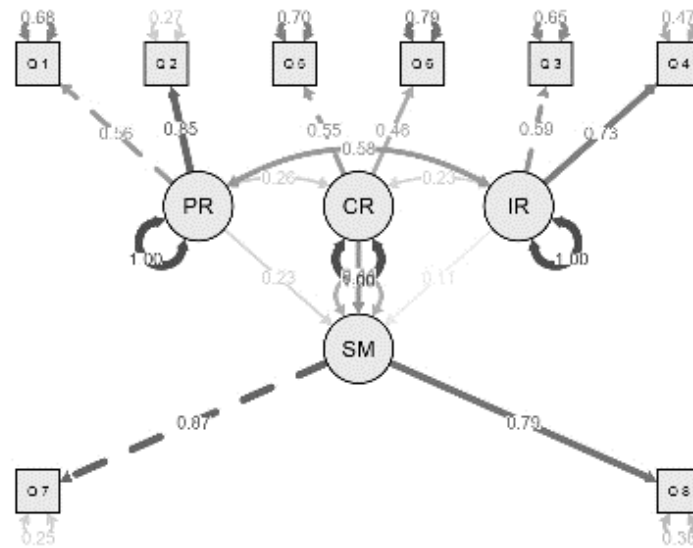
Through a multiple regression, it was also possible to establish that, holding other variables constant, *constraint recognition* (Q5-Q6) and *problem recognition* (Q1) are good predictors of situational motivation (Table 6.5).

Table 6.5 Multiple regression coefficients and predictors of SM (in bold)

Model	Unstandardized	Standard Error	Standardized	t	p	95% CI		
						Lower	Upper	
H ₁	Q1	0.233	0.097	0.234	2.394	0.019	0.040	0.426
	Q2	0.195	0.108	0.193	1.805	0.074	0.019	0.410
	Q3	-0.033	0.090	-0.039	0.371	0.712	0.211	0.145
	Q4	0.200	0.087	0.240	2.303	0.023	0.028	0.372
	Q5	0.264	0.096	0.250	2.761	0.007	0.074	0.454
	Q6	0.291	0.093	0.277	3.120	0.002	0.106	0.476

The Standard Equation Modelling (SEM) was used to identify the factors loading of the model, which is how much variation of SM can be accounted by the independent variables of PR, IR and CR (Figure 6.2). The results show that problem recognition accounts for 23% and constraint recognition for 60% of the variance in situational motivation (Figure 6.2). This means that higher risk perception and lower perceived obstacles increase the desire to think and learn more about individual disaster risk. The analysis also showed that *involvement recognition* (Q3-Q4) does not predict situational motivation in this study.

Figure 6.2 SEM Results for foreign resident’s disaster risk



6.4 Summary

This chapter shows the analysis of the perception of disaster vulnerabilities of foreign residents in Osaka and Kyoto and illustrates what drives interest and motivation to engage in preventive actions. The study results can be summarised as follows:

- Foreign communities have high interest in disaster risk and motivation to engage in preventive actions.
- Constraint recognition is the main obstacle to interest and motivation in disaster risk.
- Higher problem recognition increases the probability of interest in disaster risk.

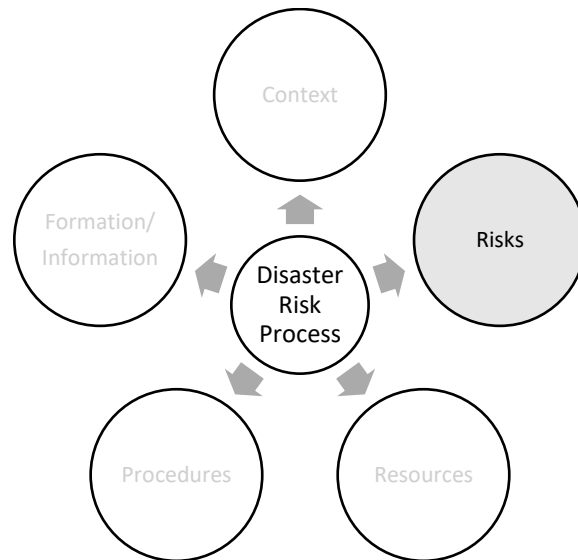
It is important to note that the STOPS model proposed fails to completely (100%) explain changes in interest and perception of risk among respondents. To better understand what might predict and influence interest and motivation in disaster risk beyond the factors identified in the STOPS model, it is necessary to investigate the role of external socio-cultural variables. The next chapter will explore the effects of social background, gender, and previous experience of disasters on disaster risk perceptions among foreign residents in Kansai, Japan.

Chapter 7 Demographic, Language, and Experiential Factors Influencing the Perception of Disaster Risk among Foreign Residents in Kansai, Japan

7.1 Introduction

This chapter outlines the second part of the analysis of *risk* for foreign residents (Figure 7.1). In particular, it tests whether external factors influence the perception of disaster risk of foreign residents in Kansai, Japan. The aim of this chapter is to establish if available knowledge, gender and social background can predict interest and involvement in disaster risk of foreign residents in Kansai. This chapter highlights the importance of a socio-cultural behavioural approach to DRR in order to increase the understanding of disaster risk among foreign residents and improve existing disaster risk reduction policies and information initiatives.

Figure 7.1 Structure and focus of Chapter 7 (in grey) © author



This chapter addresses the research question RQ3b: “what are the impacts of experiential and demographic variables on risk perceptions of foreign residents in Kansai, Japan?” The study found that gender, age, and society structure of the foreigner’s home country strongly influence disaster risk perceptions.

7.2 Research Design

7.2.1 Background and hypotheses

This study investigates various external factors that might affect disaster risk perception of foreign nationals in Kansai, Japan. Gender and language, variables widely established in the disaster literature, as well as society structure of the country of origin of the respondent will be discussed.

The impact of gender on disaster risk is well documented, supporting the notion that women have higher disaster risk perceptions and are generally more risk averse than men (Andersson, 2011; Harris et al., 2006). However, these findings are not conclusive and little attention has been given to the complex conditions of gender issues within foreign communities in Japan (Bisri & Sakurai, 2014).

Similar to gender, language is a frequent focus in the analysis of disaster vulnerability of foreign minorities. Research on disaster communication for foreign residents often focuses on linguistic barriers to disaster information and pays less attention to other social and cultural aspects such as disaster risk perceptions of foreign populations (Bisri & Sakurai, 2014; Uekusa, 2019). Although a substantial body of literature identified linguistic challenges of foreign residents in the stages of disaster preparedness and emergency behaviour, a systematic analysis of whether linguistic skills impact the *perception* of risk of foreign residents is missing.

This study contributes to the literature on disaster studies from a socio-cultural perspective, grounded on the belief that to understand individual perceptions of disaster risks, it is helpful to acknowledge different cultural backgrounds and other social factors. Social factors, such as age, gender and social class, are important aspects of social vulnerabilities in disaster (Hamidazada et al., 2019; Jayarathne & Babu, 2017). An example was the post-disaster study by Davidson et al. (2013) that investigated the effects of social and economic factors on disaster vulnerabilities among Latino and African communities in the US. The study showed that the socio-economic conditions of immigrant communities made them more vulnerable and more exposed to negative mental health outcomes compared to the local residents. However, these aspects have

been analysed as vulnerabilities after a disaster, not as factors that can influence the perception of risks of individuals before a disaster. To acknowledge the importance of different cultural backgrounds among foreign residents in Kansai, this study introduces the additional element of individualistic-communitarian societies to the analysis to investigate if society structures in the country of origin (COO) affect disaster risk perceptions of foreign nationals (Trompenaars & Hampden-Turner, 1998; Zialcita, 1999).

Finally, experiential variables are often considered influencers of risk perception and situational motivation (Halpern-Felsher et al., 2001). In the original STOPS model, the variable “referent criterion” is used to refer to all existing previous structures that might influence situational motivation and decision-making (Chen et al., 2017; J.-N. Kim & Grunig, 2011). In this chapter I consider how existing experiences, personal perceptions of information sufficiency and confidence in one’s own preparedness influence disaster risk perception.

Based on the literature discussed above, the chapter will test the following four hypotheses among foreign residents:

- H1: **Gender** has an impact on the perception of disaster risks/Women have higher situational motivation than men
- H2: The **socio-cultural background** has an impact on perception of disaster risk
- H3: **Language level** affects perceptions of disaster risk/ Lower language level corresponds to perception of higher disaster risk
- H4: **Personal knowledge and experience of disaster** increases the perception of disaster risks

7.2.2 Survey Design and Data Collection

The literature above established the how of the following characteristics influence social vulnerabilities: gender, cultural background, language, previous experience and existing knowledge. The main hypothesis of this chapter is that those variables also impact perception of disaster risk (H1 to H4). In Chapter 6, risk perception was measured through four variables: problem recognition, involvement recognition, constraint recognition and

situational motivation, derived from the STOPS model by Kim and Grunig (2011). In this chapter, the study will focus on how these six variables derived from the literature can be considered potential factors influencing the variables of risk perception. Table 7.1 below shows a description of the six variables considered.

Table 7.1 Overview of the survey © author

Factors impacting disaster risk perc.	Variables	Answer coding	Reference
Gender	1. Gender	1=Female 0=Male	
Socio-cultural background	2. Societal model of the country of origin	1= Communitarian 0= Individualistic	(Trompenaars & Hampden-Turner, 1998)
Language level	3. Language competence	1=Not at all 2=Beginner level 3=Conversation level 4=Business level 5=Native speaker	
Experiential variables	4. Previous experience 5. Information Sufficiency 6. Confidence	1= Strongly Disagree 2= Disagree 3=Neither Agree nor Disagree 4= Agree 5=Strongly Agree	(Trumbo, 2006)

While the variables gender and language skills are relatively straightforward, methodologically, the socio-cultural factor of societal model of country of origin and the experiential variables require some methodological clarification.

With regards to the societal model of the country of origin, the researcher referred to Trompenaars and Hampden-Turner distinction of the “communitarian” or “individualistic” nature of the country of origin (Trompenaars & Hampden-Turner, 1998) and cross-referenced the data with the Hofstede Insights software for cultural comparison, as well as media accounts, and existing literature from social and communication science (Hofstede Insights; Zialcita, 1999; Myles, 2018; Dansong, 2020). With regards to measuring perception of existing knowledge and experience, three experiential variables were included based on (Trumbo, 2006):

1. *Previous knowledge*-Q3 “I learned what to do and how to prepare for natural disaster from a past experience”
2. *Information sufficiency* - Q4 “In Japan, I have received sufficient information about disaster preparedness”
3. *Confidence* - Q6 “I can easily find information about disaster preparedness”

7.2.3 Analysis

The first step of the data analysis was an overview of the descriptive statistics of the mean responses for each variable (Gender – SCOO – Language – Previous Experience – Information Sufficiency – Confidence). A series of correlations then was conducted to identify significant relationships between the variables and the STOPS variables (PR – IR – CR – SM). A series of univariate analyses of variance (ANOVA) was used to test the effects of the external factors of gender (H1) and the society system of the COO (H2) on the model variables of problem recognition, involvement recognition, constraint recognition and situational motivation. Finally, the impact of language (H3) and previous experience, information sufficiency and confidence (H4) on the STOPS variables was measured through multiple regression analysis.

7.3 Results

In Chapter 6, it was shown that the foreign community’s interest in disaster risk (*situational motivation*) increases when the individual perceives the disaster risk as an issue that is not immediately solvable (*problem recognition*). Also, interest decreases when a person perceives obstacles limiting their ability to improve the situation (*constraint recognition*). This chapter tests if six external variables derived from the literature -gender, language, society model of the country of origin, previous experience, perception of information sufficiency, and confidence- might explain different levels of

risk perception, measured as involvement, constraint, problem recognition and situational motivation²⁰.

7.3.1 Demographic variable (H1) gender

The first hypothesis of this study was that “**gender** has an impact on the perception of disaster risks”. In particular that “women have higher situational motivation than men” (H1).

The descriptive statistics below show in detail the differences between male and female respondents. This first overview suggests that in this survey women respondents have higher mean responses compared to men respondents in all variables with the only exception of constraint recognition, whereby the mean response by female respondents was lower than the male respondents (Table 7.2). This highlights that women respondents on average had higher awareness of disaster risks (PR), higher identification with disaster risks (IR), higher motivation to learn more about preventive actions (SM), but also lower confidence in their own efficacy and trust in the authorities to consider their input as valuable (CR).

²⁰ Other socio-economic variables, such as occupation, living conditions and length of stay in Japan were not statistically significant (Appendix 1.3)

Table 7.2 Descriptive Statistics - Gender

	Gender	Mean	SD	N
PR1	Male	4.021	1.158	48
	Female	4.255	1.092	55
PR2	Male	3.688	1.055	48
	Female	4.091	1.127	55
IR(Self)	Male	3.708	1.288	48
	Female	4.000	1.062	56
IR(Other)	Male	3.250	1.437	48
	Female	3.321	1.491	56
CR1	Male	3.894	0.983	47
	Female	3.782	1.013	55
CR2	Male	2.979	0.967	47
	Female	2.907	1.086	54
SM1	Male	3.479	0.989	48
	Female	4.146	1.870	55
SM2	Male	3.625	1.044	48
	Female	4.189	0.878	53

This difference, however, is only statistically significant with regards to situational motivation (SM1=0.340, $p < .001$; SM2=0.284, $p = 0.004$), as shown in the correlation analysis below (Table 7.3).

Table 7.3 Significant Correlations (Bold), Mean and Standard Deviation

Variable	Gender	Language	SCOO	Previous experience	Information sufficiency	Confidence
Mean (St. Deviation)	0.538(0.501)	2.779 (0.847)	0.710 (0.456)	2.971 (1.208)	3.059 (1.097)	2.824 (0.948)
PR1	0.104	0.075	0.026	0.084	0.118	0.127
PR2	0.183	-0.035	0.079	-0.040	0.111	-0.054
IR (Self)	0.124	-0.079	0.145	-0.092	-0.131	-0.041
IR (Other)	0.025	0.052	0.200*	0.104	0.100	0.004
CR1	-0.056	0.132	-0.194	0.030	0.193	0.220*
CR2	-0.035	-0.060	0.267**	0.251*	0.378***	0.313**
SM1	0.340***	-0.114	0.132	0.251*	0.183	-0.042
SM2	0.284**	-0.103	0.188	0.201*	0.218*	0.197

Significance* $p < .05$, ** $p < .01$, *** $p < .001$

To establish if these correlation have a causal nature, ANOVA testing was conducted (Table 7.4a-7.4b). The data confirms that a causal relationship is only between gender and situational motivation. This suggests that foreign men and women respondents were

not statistically different in their risk awareness (PR1-PR2), identification with risk (IR(Self)-IR(Other) or their ability to effect change to the problem (CR1-CR2).

However, these results confirm the hypothesis that gender is a significant predictor of disaster risk perception among the foreign resident community in terms of motivation to learn more about disaster risk. Statistical difference in mean responses was found in both statements of situational motivation: *I want to better understand this problem* (SM1), $F(1,101)= 13.238, p=<.001$; and *I am curious about this problem* (SM2), $F(1,101)= 8.672, p=0.004$. ANOVA testing results shown in Table 7.4a below illustrate that foreign men have significantly lower interest in the topic (SM1 Men=3.479; SD=0.989) and also significantly lower curiosity (SM2 M=5.396; SD=1.106) compared to foreign women (SM1 FW= 4.146; SD=1.870) (SM2 M= 3.625; SD=4.189)²¹.

Table 7.4a ANOVA testing – Gender and statistical significance (in grey)

	Cases	Sum of Squares	df	Mean Square	F	p	η^2
PR1	Gender	1.400	1	1.400	1.110	0.295	0.011
	Residual	127.416	101	1.262			
PR2	Gender	4.171	1	4.171	3.486	0.065	0.033
	Residual	120.858	101	1.197			
IR(Self)	Gender	2.199	1	2.199	1.603	0.208	0.015
	Residual	139.917	102	1.372			
IR(Other)	Gender	0.132	1	0.132	0.061	0.805	6.012e-4
	Residual	219.214	102	2.149			
CR1	Gender	0.317	1	0.317	0.317	0.575	0.003
	Residual	99.850	100	0.998			
CR2	Gender	0.128	1	0.128	0.120	0.730	0.001
	Residual	105.516	99	1.066			
SM1	Gender	11.379	1	11.379	13.238	<.001***	0.116
	Residual	86.816	101	0.860			
SM2	Gender	8.003	1	8.003	8.672	0.004**	0.081
	Residual	91.363	99	0.923			

Note. Type III Sum of Squares

²¹ Post-Hoc comparison Table for gender can be found in the Appendix 4

Table 7.4b ANOVA Post Hoc Comparisons

			Mean Difference	SE	t	Cohen's d	p _{tukey}	p _{scheffe}
PR1	Male	Female	-0.234	0.222	-1.053	-0.208	0.295	0.295
PR2	Male	Female	-0.403	0.216	-0.867	-0.369	0.065	0.065
IR(Self)	Male	Female	-0.292	0.230	-1.266	-0.249	0.208	0.208
IR(Other)	Male	Female	-0.071	0.288	-0.248	-0.049	0.805	0.805
CR1	Male	Female	0.112	0.198	0.563	0.112	0.575	0.575
CR2	Male	Female	0.071	0.206	0.346	0.069	0.730	0.730
SM1	Male	Female	-0.666	0.183	-3.638	-0.719	<.001	<.001
SM2	Male	Female	-0.564	0.191	-2.945	-0.587	0.004	0.004

* p < .05; ** p < .01; *** p < .001

Note. Cohen's d does not correct for multiple comparisons.

7.3.2 Cultural background (H2) Societal model of the country of origin

The second hypothesis of this chapter was that “the **socio-cultural background** has an impact on perception of disaster risk” (H2). To investigate the impact of the socio-cultural background on the perception of disaster risk among foreign residents, the variable of the **societal model of the country of origin** (SCOO) was used. The main characteristics of the individualistic and communitarian societies are shown in Table 7.5. In the analysis, 71% of the respondents came from communitarian societies (e.g. China) and 29% from individualistic societies (e.g. U.S.).

Table 7.5 Characteristics of individualistic and communitarian societies © author

	INDIVIDUALISTIC SOCIETY	COMMUNITARIAN SOCIETY
FOCUS	Individual achievement over community	Community's goals over individual achievements
VALUES	Focuses on individual autonomy; individual decision-making	Focuses on community values; more people involved in decision-making
STATE ROLE	Lower state intervention	Higher state intervention

The descriptive statistics shown in Table 7.6 below illustrate that the mean responses of respondents from communitarian society models are consistently higher than the mean responses of respondents from individualistic societal countries with the only exception of the constraint recognition's statement *I can do something by myself to be better prepared if a disaster happens* (CR1).

Table 7.6 Descriptive Statistics - Society Model of the Country of Origin (SCOO)

	SCOO	Mean	SD	N
PR1	Individ.	4.100	1.185	30
	Comm.	4.164	1.106	73
PR2	Individ.	3.767	1.194	30
	Comm.	3.959	1.073	73
IR(Self)	Individ.	3.600	1.380	30
	Comm.	3.973	1.072	73
IR(Other)	Individ.	2.833	1.577	30
	Comm.	3.473	1.377	74
CR1	Individ.	4.053	0.833	29
	Comm.	3.712	1.034	73
CR2	Individ.	2.500	0.882	28
	Comm.	3.110	1.035	73
SM1	Individ.	3.633	1.033	30
	Comm.	3.918	0.954	73
SM2	Individ.	3.633	1.033	30
	Comm.	4.042	0.963	71

The correlation table shown above suggests that *Societal Model of the country of origin* (SCOO) was statistically correlated with constraint recognition (CR2=0.262, p=0.009) and the respondents' involvement recognition of their close relations (IR(Other)=0.2, p=0.042) (Table 7.3). In other words, respondents from individualist countries perceive higher constraints in their efficacy to reduce or minimise their own risks (CR2) and lower recognition that someone close to them might be exposed to disaster risks (IR(Other)) compared to respondents from communitarian countries.

In order to test the statistical significance of these correlations, ANOVA testing was conducted for all survey questions. Tables 8.a-8.b confirmed the correlation results: respondents from communitarian societies have statistically higher **involvement recognition** (IR(Other)) and statistically lower **constrain recognition** (CR2) than respondents from individualistic societies.

With regards to **involvement recognition**, in the statement: *Someone close to me is particularly vulnerable to disaster risk* (IR(Other)), (F(1,102)= 4.203, p=0.042), respondents from the individualist countries (Mean=2.833; SD=1.577) have significantly lower recognition compared to respondents from communitarian countries (Mean= 3.473;

SD=1.377). This suggests people from individualist countries are less likely to consider people close to them as vulnerable to disaster risks. An alternative interpretation could be derived from considering external factors such as the socio-economic occupation and the living conditions of the respondents. In fact, 67% of the respondents from individualist countries have been in Japan for about 2 years (47%), arguably too little to create extensive social connections in Japan. On the other hand, 46.6% of the respondents from communitarian societies define themselves as employed workers. The living conditions might also influence the perception of vulnerabilities of close relations. 72% of the respondents from individualist countries live alone, compared to only 33% of the respondents from communitarian countries.

Respondents from individualistic societies also had statistically lower **constrain recognition** (CR2) than respondents from communitarian societies. With regards to the statement: *If I contact the local authorities about my individual disaster risk, they will consider my input* (CR2) ($F(1,102) = -0.612, p=0.007$), respondents from the individualistic countries (Mean= 2.5; SD=.882) registered a significantly lower response than respondents from communitarian countries (Mean=3.11; SD=1.035). In other words, it seems that people from individualistic countries have lower trust that the local authorities will engage with them about their individual disaster risks.

Table 7.7a ANOVA testing for Society Model of the Country of origin and statistical significance (in grey)

	Cases	Sum of Squares	df	Mean Square	F	p	η^2
PR1	SCOO	0.088	1	0.088	0.069	0.793	6.842e-4
	Residuals	128.727	101	1.275			
PR2	SCOO	0.786	1	0.786	0.639	0.426	0.006
	Residuals	121.751	101	1.230			
IR(Self)	SCOO	2.969	1	2.969	2.177	0.143	0.021
	Residuals	139.146	101	1.364			
IR(Other)	SCOO	8.734	1	8.734	4.230	0.042*	0.040
	Residuals	210.613	102	2.065			
CR1	SCOO	3.759	1	3.759	3.900	0.051	0.038
	Residuals	96.407	100	0.964			
CR2	SCOO	7.520	1	7.520	7.587	0.007**	0.071
	Residuals	98.123	99	0.991			
SM1	SCOO	1.721	1	1.721	1.801	0.183	0.018
	Residuals	96.474	101	0.955			
SM2	SCOO	3.526	1	3.526	3.643	0.059	0.035

Table 7.7a ANOVA testing for Society Model of the Country of origin and statistical significance (in grey)

Cases	Sum of Squares	df	Mean Square	F	p	η^2
Residuals	95.840	99	0.968			

Note. Type III Sum of Squares

Table 7.7b ANOVA Post Hoc Comparisons

			Mean Difference	SE	t	Cohen's d	p tukey	p scheffe
PR1	Individ.	Comm.	-0.064	0.245	-0.263	-0.057	0.793	0.793
PR2	Individ.	Comm.	-0.192	0.241	-0.799	-0.173	0.426	0.426
IR(Self)	Individ.	Comm.	-0.373	0.253	-1.475	-0.319	0.143	0.143
IR(Other)	Individ.	Comm.	-0.640	0.311	-2.057	-0.445	0.042	0.042*
CR1	Individ.	Comm.	0.426	0.216	1.975	0.433	0.051	0.051
CR2	Individ.	Comm.	-0.610	0.221	-2.755	-0.612	0.007	0.007**
SM1	Individ.	Comm.	-0.284	0.212	-1.342	-0.291	0.183	0.183
SM2	Individ.	Comm.	-0.409	0.214	-1.909	-0.416	0.059	0.059

Note. Cohen's d does not correct for multiple comparisons.

* p < .05; ** p < .01; *** p < .001

7.3.3 The “non-relevance” of language (H3)

The third hypothesis of this chapter is that **language level** affects perceptions of disaster risk. In particular, that lower language level corresponds to perception of higher disaster risk (H3). Language is often considered the most important factor of disaster vulnerability for foreigners in Kansai (Uekusa, 2019). However, the correlation table in this study suggests that different language levels do not affect the perceptions of disaster risk of foreign residents.

Regression analysis also showed that *language* was not statistically correlated with any of the STOPS variables (Table 9). In other words, having better (or worse) language skills does not impact risk awareness, identification with risk, perception of constraints, nor the interest in disaster risk of the respondents. These results support the argument that language barriers are not the only factor of disaster risk perception among foreign residents in Kansai.

Table 7.8 Regression analysis of language level

	St. Coeff.	T	adjR ²	F _(1,102)	p
PR1	0.062	0.627	-0.006	0.393	0.532
PR2	-0.080	-0.806	-0.003	0.650	0.422
IR(Self)	-0.70	-0.712	-0.005	0.507	0.478
IR(Other)	0.123	1.252	0.005	1.567	0.214
CR1	0.138	1.407	0.019	1.979	0.163
CR2	-0.044	-0.444	-0.008	0.197	0.658
SM1	-0.073	-0.737	-0.004	0.543	0.463
SM2	-0.072	-0.728	-0.005	0.530	0.468

7.3.4 Experiential variables (H4): Previous experience, Information sufficiency and Confidence

The final hypothesis of this chapter is that “**personal knowledge and experience of disaster** increases the perception of disaster risks” (H4). To test this hypothesis, the impact of three different experiential variables (previous experience, information sufficiency and confidence) on the STOPS variables was analysed.

The correlation analysis (Table 7.3) showed that *previous experience* correlated with lower constraint recognition (CR2=0.251 p=0.012) and with higher situational motivation (SM1=0.251, p=0.011; SM2=0.201, p=0.045). Higher *sufficient information* was correlated with lower constraints (CR2=0.378, p=<.001) and with higher situational motivation (SM2=0.218, p=0.03). Lastly, *confidence* in one’s own preparedness strongly correlated with lower constraint recognition (CR1=0.378, p=<.001)²².

To test if their correlation also had a causal relationship with the STOPS variables, I conducted a multiple regression analysis (Table 7.9). Only a few of these correlations were confirmed.

Previous experience of disaster risks during a disaster was measured through the statement “*I learned about what to do and how to prepare for natural disasters from a past disaster experience*”. The multiple regression analysis found previous experience to

²² The two statements for the *constraint recognition* variables were in the positive form, therefore higher values indicates lower constraints.

be a good predictor of higher **situational motivation** (SM1=0.243, p=0.02). In other words, people who have previous experience of disaster are more motivated to learn more about how to increase their preparedness. Previous experience also predicted **constraint recognition**'s statement *"If I contact the local authorities about my individual disaster risks, they will consider my input"* (CR2=0.204, 0.038).

Also the experiential variable of *information sufficiency*, measured through the statement *"In Japan, I received sufficient information about disaster preparedness"* was a predictor of lower **constraint recognition** (CR2=0.336, p=<.001). These results indicate that previous experience of disaster and having sufficient information reinforce the idea that individual constraints are taken seriously by the local authorities tasked to address them.

Confidence in one's disaster preparedness and was assessed through the statement *"I am well prepared in case of an emergency situation"*. The multiple regression showed that confidence in one's knowledge is a good predictor of **constraint recognition**'s statement *"There are things I can do by myself to be better prepared if a disaster happens"* (CR1=0.235, p=0.025). This suggests that people who have higher confidence in their preparedness also have higher confidence in their self-efficacy to reduce risk.

Table 7.9 Multiple regression analysis of experiential variables and significant relationships (in bold)

		PR1	PR2	IR (self)	IR (other)	CR1	CR2	SM1	SM2
	Adj R ₂	-0.027	-0.010	-0.019	0.000	0.077	0.155	0.057	0.01
	F(3,95)	0.136	0.685	0.379	1.009	3.718	7.008	2.966	1.326
	p	0.939	0.563	0.768	0.392	0.014	<.001	0.036	0.271
Previous experience	St Coeff	-0.047	-0.151	0.013	0.007	-0.027	0.204	0.243	0.097
	t	-0.438	-1.422	0.125	0.069	-0.265	2.105	2.368	0.92
	p	0.662	0.158	0.901	0.945	0.792	0.038	0.02	0.36
Information Sufficiency	St Coeff	0.057	0.036	-0.037	0.178	0.173	0.336	0.142	0.168
	t	0.523	0.329	-0.339	1.659	1.67	3.404	1.363	1.566
	p	0.602	0.743	0.735	0.1	0.098	<.001	0.176	0.121
Confidence	St Coeff	0.004	0.042	-0.095	-0.017	0.235	-0.022	-0.089	-0.051
	t	0.039	0.389	-0.874	-1.162	2.277	-0.255	-0.85	-0.276
	p	0.969	0.698	0.384	0.872	0.025	0.822	0.398	0.635

7.4 Discussion

The study found that gender, socio-cultural background, and experiential variables are all significant determinants of the situational motivation of foreign residents, while Japanese

language proficiency does not seem to predict disaster risk perception and interest in learning more about disaster risk (SM).

The study confirmed the first hypothesis (H1), showing that foreign women have higher situational motivation in disaster risk than men. However, since there is no difference in PR, IR and CR, the STOPS model does not explain why women have a higher interest in learning more about disaster risk (SM). This could be because the STOPS model only accounts for individual perception but not for socio-cultural roles and expectations. Alternative explanations on why women have a perception of higher individual risk can be found in the literature (Harris et al., 2006). One interpretation is that women can devote more time to disaster preparedness strategies than men in Kansai, since women are usually employed as part-time workers after they start a family (Charlebois, 2014). Another understanding is that women have higher stakes in disaster risk perception for they also need to take care of the children and the elderly at home in case of disaster (Dominelli, 2020; Petraroli & Singer, 2020). Also, the importance of the socio-cultural background has been stressed as driver of risk perception and interest for men and women, with different countries having significantly different gender vulnerabilities based on the cultural, legal and social system. Lechowska argued in a review on cross-cultural risk perception that “The significance of gender [in risk perception] is greater in countries where legal and cultural gender differences are stronger” (Lechowska, 2018, p. 1354). These arguments will be addressed in the following chapters.

The study also confirmed the second hypothesis, suggesting the impact of the **socio-cultural background** of the respondent on risk perception (H2). The study analysed the different responses of individuals from communitarian and individualistic societies, finding that respondents from communitarian societies have higher involvement and lower constraints compared to the respondents from the individualistic countries. So? What does this mean? However, the fact that the country of origin seems to have an impact on motivation and perceptions suggests that there is a socio-cultural discriminant among the foreign population that needs to be further investigated. For example, living conditions and weak socio-economic status might impact risk perception (Bélanger et al., 2011). The discrepancy between society models could also be due to different exposure to disasters in the home country, since communitarian societies are mostly located in

Asia-Pacific regions and are thus more exposed to natural hazards and disasters compared to those who come from Western countries (Wood, 2018).

The hypothesis that Japanese **language** proficiency impacts risk perception of foreign residents in Japan (H3) was not confirmed. In fact, the missing impact of language skills on disaster risk perceptions encourages a shift in the disaster preparedness narratives concerning foreign residents. These initiatives should move beyond the linguistic issues that dominate the discourse on foreign minorities' disaster vulnerabilities (Uekusa, 2019) to focus on other social vulnerabilities derived from lack of identification with disaster risk and perceived constraints in minimising personal risks.

Finally, with regards to the **experiential variables** (H4), the study found that awareness of disaster risk (PR) is recognised across different cohorts, without any significant increases due to experience or knowledge. However, it seems relevant that previous experience of disaster increases the trust that respondents have in the local authorities to value their inputs. Also previous experience of disaster was found to increase interest in further disaster preparedness information, as suggested in previous studies on risk perception (McDowell et al., 2020). Furthermore, additional disaster information as well as increased sense of self-efficacy (or confidence) lower the perception of constraints in minimising disaster risks. This finding seems to suggest that even when foreign residents believe to be fully prepared and fully informed they do not become less interested in additional information about disaster risk, contrary to classical information seeking models (Hurne & Gutteling, 2008).

Overall, these results do not question the validity of previous studies on language as a marker of foreign residents' disaster vulnerabilities in Kansai, but suggest that language has limited power to explain disaster risk perception and subsequent interest in disaster preparedness of foreign minorities.

This study demonstrated the importance of demographic, socio-cultural and experiential variables for a better understanding of disaster risk perceptions and interest in disaster preparedness of foreign residents in Kansai. By doing so, it suggested the necessity to include other notions of cultural and economic structures, relations between language and

power hierarchies, and social justice in disaster preparedness and academic discourses (Fairclough, 2015).

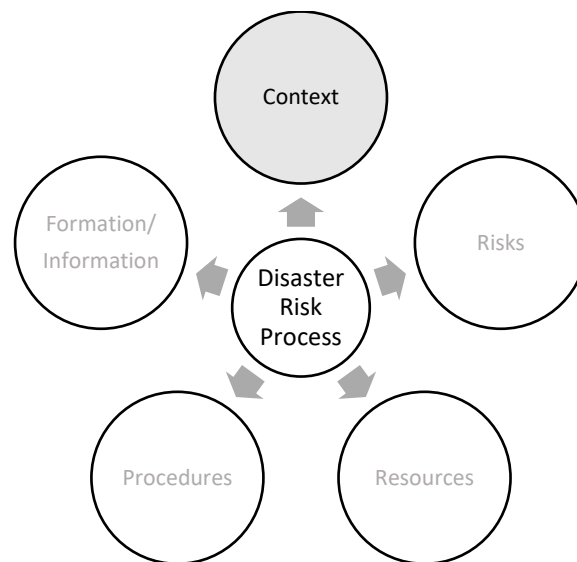
So far, the general notions of disaster discourses (Chapter 2-3) and data about disaster risk perception of vulnerable groups in Japan (Chapters 4-5-6-7) were discussed. However, the quantitative proposed so far is only the first step to understand how Japanese and foreign respondents perceive disaster risks and engage with disaster information. To inform these results and promote truly inclusive and diverse disaster preparedness strategies, there is a need for more qualitative research on gender and cultural discourses. This will be done in the following Chapters 8-9, which will contextualise these previous findings in the societal discourses of gender, age, culture and power that underlie disaster practices in Japan.

Chapter 8 Disaster Vulnerabilities and Gendered Discourses in Disaster Preparedness in Kyushu, Japan

8.1 Introduction

Chapters 5 and 7 have illustrated how demographic and experiential factors can affect perceptions of disaster risk among both Japanese and foreign communities. This chapter will explore the *context* around risk for women in Kyushu, Japan (see Figure 8.1). In particular, this chapter aims to illustrate how discourses of gender are affecting disaster vulnerabilities for women.

Figure 8.1 Structure and focus of Chapter 8 (in grey) © author



The international community has recognised gender as an important factor in Disaster Risk Reduction (DRR) arguing that gender can influence people’s disaster vulnerabilities and capabilities in all phases of disasters (IFCR, 2011; UNDP, 2016; UNISDR, UNDP and IUCN, 2009). Studies show that especially women are vulnerable to disaster risks based on gender (Enarson & Morrow, 1998; Jayarathne & Babu, 2017; Takeuchi & Shaw, 2008) and it is the responsibility of national governments not only to identify these vulnerabilities but also to develop education and preparedness strategies to address them. The Japanese Government has shown progressive commitment to the inclusion of gender equality in DRR policy briefs and official commitments (Cabinet Office, 2016; Gender

Equality Bureau, 2012). Currently, the main concern of policymakers and stakeholders in DRR in Japan is to identify factors of gendered disaster vulnerability and integrate them into preparedness strategies but there is insufficient academic research on gendered disaster vulnerability in disaster preparedness to back up DRR strategies in the Japanese context.

To better understand causing factors of the complex disaster vulnerability and gender relationships in Kyushu, Japan (as identified earlier), this chapter will investigate how disaster vulnerabilities of women are connected to the complex set of social and community norms and values prevalent in public discourses of gender in general. Grounded Theory will be deployed to identify those gendered disaster vulnerabilities based on data collected from participant observations and stakeholder interviews. In addition, public discourses around gender are extracted from the literature on gender and DRR using Critical Discourse Analysis. The chapter shows that the main factors of gendered disaster vulnerabilities are inadequate disaster education, a lack of protection measures, and cultural issues grounded in public discourses of gender. The chapter shows further that these public discourses of gender are deeply embedded in Japan's disaster preparedness strategies and affect both the quality and quantity of disaster information available.

8.2 Research Design

8.2.1 Background: linkages between gender and disaster studies

This chapter addressed the research gap on factors of gendered disaster vulnerability in disaster preparedness (Chapter 2 – Section 2.3.2) by asking policymakers, rescue workers, and community members to identify gendered disaster vulnerabilities in the context of disaster preparedness in Kyushu. The aspects of disaster preparedness considered in this chapter are household preparedness, emergency, evacuation shelters, and disaster management.

In Chapter 2, it was discussed how discourses are not only the main source of disaster information for the public, but also educate individuals about their capabilities and vulnerabilities and actively shape the scope of DRR preventive and mitigating measures

(Section 2.1). However, little is known about the role gendered discourses play in disaster preparedness. Discourses are broadly defined as “metaphors, representations, images, stories, statements and so on that in some way together produce a particular version of events” (Burr in Charlebois 2015, p.26). Although discourses on the role of women as belonging to the domestic and men to the public realm are being criticised in ongoing debates on gender equality (see Chapter 2, Section 2.3.2), these discourses have not been sufficiently analysed in relation to disaster preparedness (Enarson & Pease, 2016; Yamashita & Soma, 2017). This chapter argues that gendered disaster vulnerabilities are shaped by already existing gendered discourses in society. In other words, disaster preparedness does not happen in a vacuum, outside notions of gender and identity, but is deeply embedded within current social structures.

This chapter addresses the third objective of this study 3) to analyse the socio-cultural context of disaster vulnerabilities of gender-based disaster risks and risks for foreign residents in Japan. This study will focus on the first part of the study objective, focusing on gender-based disaster risk through two interrelated research questions: RQ4a “What are the disaster vulnerabilities of women in Kyushu, Japan?” and RQ5a “What are the impacts of gender discourses on disaster vulnerabilities for women in disaster preparedness?”

8.2.2 Data Collection

8.2.2.1 Field sites and Participants Overview

Fieldwork for this chapter was conducted in Fukuoka City, Japan, between June and September 2019. As mentioned in the methodology chapter (Chapter 3, Section 3.1.1) gender in disaster became particularly relevant in Fukuoka City after the Kumamoto earthquake in 2016. The Fukuoka municipal office was among the first to initiate relief initiatives (Interview 1a). The disaster event represented a watershed experience from the perspective of gender in disaster as it revealed specific gender-based risks (Takashima, 2016; Tokinaga, 2017). Subsequently, the Gender Equality Affairs Department (GEAD) of Fukuoka city government started a unique project to increase the resilience of parenting families: the Mini-Booklet for Parenting Families, previously discussed in Chapter 4. The

combination of awareness to gendered disaster vulnerabilities and gender equality, as well as the recent experience of the Kumamoto earthquakes in the Kyushu region, as well as seasonal floods that have occurred in recent years, makes Fukuoka a meaningful case-study for the analysis of gendered disaster vulnerabilities and disaster preparedness in Japan. Data collection for this study included participant observations and semi-structured interviews conducted in three settings in Fukuoka and Kumamoto City (see Section 8.2.2). Data collection and analysis was informed by a critical literature review on disaster vulnerability and gender discourses in Japan. To allow for an exploratory study of the disaster vulnerabilities of women in Kyushu, Japan, data was first analysed using Ground Theory (GT), an approach driven by data itself and not a pre-given theoretical framework. The second part of data analysis employed Critical Discourse Analysis (CDA). CDA offers a systematic inquiry into latent power relations and ideologies embedded in discourses. CDA was chosen to examine the social and material consequences of gendered discourses shaping disaster vulnerabilities of women in Kyushu.

8.2.2.2 Participant observations

Qualitative data was collected through participant observations (POs) in three different locations in collaboration with GEAD and the Non-Profit Organisation (NPO) Enogaikai (Table 1). The first location was Kodomo Plaza (*Children Plaza*) in Fukuoka. Kodomo Plaza are municipality-owned buildings, run by volunteers, aimed at parents with children from 0-6 years old. Kodomo Plaza not only offer a place for guardians to take their children, but also provide services like child-care lectures and consultations. Kodomo Plaza offer important opportunities for the dissemination of information about childcare and help mothers to network and build relationships with other community members. Observations were conducted during a seminar organised by GEAD to introduce the gender Mini-Booklet and raise awareness for household and evacuation preparedness.

POs were also conducted at the Citizens' Disaster Prevention Centre (CDPC). CDPCs are public facilities present in all major cities in Japan and devoted to disaster education and emergency preparedness through various entertainment activities. CDPCs are a remarkable example of Japanese informal disaster preparedness based on voluntary

participation that is not associated with a school or a training institution (Coombs et al., 1973). POs were conducted on 10 days in total, during July and August 2019. Each observation lasted 1-2 hours.

The third location for PO was an Evacuation Simulation event at a local elementary and junior-high school, organised by the NPO Enogaikai. Usually, these events are organised by the fire department or other disaster-related institutions. However, this event was different because Enogaikai is mostly involved in gender vulnerabilities in society, including awareness campaigns for the LGBTQIA+ community. Firefighters from the Fire and Emergency Department, NPO volunteers, sponsors of disaster-related products and the local television were present. The focus of the event was to recreate the experience of spending two or three days in an evacuation centre after a disaster. The observation exercise lasted around three hours.

Table 8.1 Overview of the PO settings, Fukuoka (Japan) © author

Event	Sponsor	Goal	Disaster aspect
Kodomo Plaza	GEAD	Increase awareness and preparedness for disaster among parenting families	Home preparedness
Citizens' Disaster Prevention Centre	Fire Dept	Saving as many lives as possible immediately after the disaster	Emergency
Simulation	(NPO)	Experiencing evacuation shelter	Evacuation

8.2.2.3 Interviews

Ten semi-structured interviews were conducted with a total of twelve interviewees (see Appendix 2.1). The interviews with GEAD members (Interview 1a-1b-2-4) focused on their activities, challenges and limitations of promoting gender equality to the public in general and in relation to disaster preparedness with the “Mini-Booklet for Parenting Families”. During meetings this doctoral research endeavour (investigate gendered disaster vulnerabilities in Fukuoka) was met with enthusiasm and support. GEAD became not only a stakeholder but also a helpful gatekeeper to access interviewees and events.

Two firefighters from the Fire Defence and Disaster Prevention Department were interviewed at the CDPC (Interview 5-6). These interviews focused on the activities of the CDPC in Fukuoka City, the disaster risks for women and men, and the challenges and limitations of firefighters in case of an emergency or disaster. The researcher also interviewed the Manager of the Disaster Prevention Province Office from the Disaster Prevention and Crisis Management Bureau, Fukuoka Prefecture (Interview 10). The interview focused on the role of the Disaster Prevention and Crisis Management Bureau and the limitations and challenges in terms of gendered disaster vulnerabilities. The director of the gender-equality oriented NPO Egaonokai was also interviewed on the topic of disaster preparedness and gendered disaster vulnerabilities (Interview 7). Four in-depth interviews with female community members from different age-groups, backgrounds and occupations were completed (Interview 3-8a-8b-9). The discussion focused on their worries, experiences and opinions and on the role of men and women in household preparedness, emergency and evacuation. Each interview lasted between 30 and 45 minutes.

8.2.2.4 Data analysis

RQ4a on social vulnerabilities of women in Kyushu was addressed using Grounded Theory (GT). The analytic process of GT, introduced in 1965 by Glaser and Strauss (1967), consists of “systematic inductive, comparative, and interactive approach to inquiry” (Charmaz, 2008, p. 156) coding data; developing, checking, and integrating theoretical categories; and writing analytic narratives throughout inquiry” (Charmaz and Belgrave, 2015, p.??). GT coding has been previously used to discover factors of disaster vulnerability among women in Afghanistan (Hamidazada et al., 2019). Vulnerabilities were analysed through GT analysis. GT analysis was conducted on interview data as well as pictures and field notes obtained during POs. Codes were developed based on recurring themes and issues in the data. Codes were then synthesised into seven factors: *cultural issues, disaster management, disaster education, protection measures, community support, language and age*. Themes are not exclusive, and a single code can refer to multiple factors. For example, the quote “in my opinion women are more vulnerable during the evacuation phase in particular because there is *no separation between male*

and female sections, so women are often *victims of harassment or abuse.*” refers to both *protection measure* (Lack of physical safety) and *disaster management* (Lack of privacy).

Critical Discourse Analysis (CDA) was used to answer the second research question on gendered discourses (RQ5a). Discourses are found through literature analysis of documents and literature review. The coding of interviews into gendered discourses established through literature review was done through CDA. CDA investigated public discourses related to the roles and expectations for men and women in Japan’s society. Both interview and PO data was analysed based on the reference to “male” (building tents, construction, strength-related etc.) and “female” roles (child-rearing, cooking etc.) drawn from the literature (Charlebois, 2014; Dasgupta, 2000, 2009, 2013). For example, sentences like “*women do not participate in the community disaster preparedness*” would be assigned to the discourse “women are domestic”. Again, it is possible to have multiple discourses of femininity and masculinity represented in the same sentence. For example, “*women are the main responsible for the house and the children*” would fall under the “women are domestic” and “women are caretakers” discourses. Table 8.2 below gives an example of how the coding process was developed. Quantitative results outlining the vulnerabilities and gendered discourses (section 8.1) are discussed separately from the qualitative analysis (section 8.2).

Table 8.2 Example of coding transcripts © author

Data Source	Data	Factors of Vulnerability (GT)	Gender discourse (CDA)
Interview (Community member)	<i>Mothers tend not to evacuate when they have a small child. They are worried the baby might disturb the others or the baby might get lost.</i>	Women take care of children (Factor: CULTURAL ISSUE); Women tend not to evacuate (Factor: EVACUATION; CULTURAL ISSUE)	Women are caretakers; Women refrain/avoid to...
PO (Evacuation simulation)	<i>[husbands and children learn cooking skills in the evacuation shelter]</i>	Independence in the evacuation shelter (Factor: EVACUATION) Food (Factor: PROTECTION MEASURES)	Women should [not] cook

8.3 Overview of disaster vulnerability and gendered discourses: quantitative results

8.3.1 Factors of gendered disaster vulnerability in disaster preparedness

The first question (RQ4a) of this study focused on identifying the disaster vulnerabilities for women in Kyushu, Japan. The question was addressed through GT coding. In total, 113 codes and seven factors of disaster vulnerabilities were identified. The data was divided into four aspects of disaster preparation: household preparedness, emergency, evacuation, disaster management. The results shown in Table 8.3 illustrate that lack of disaster education, insufficient protection measures, cultural issues, and lack of women in disaster management, are the main factors of disaster vulnerability for women in Kyushu, Japan.

Table 8.3 Factors of disaster vulnerability for women

FACTORS OF VULNERABILITY	DISASTER PREPAREDNESS ASPECTS				Total
	Household Preparedness	Emergency	Evacuation	Disaster Management	
Disaster education	15	19	15	2	51
Protection measures	13	22	12	1	48
Cultural issues	13	6	5	16	43
Disaster management	0	6	3	14	24
Community support	1	1	0	2	6
Language	0	1	0	3	4
Age	0	1	1	1	3

8.3.2 Impacts of gendered discourses on disaster vulnerabilities

To answer the second research question (RQ5a) on the impacts of gendered discourses on disaster vulnerabilities, the data analysis focused on identifying gendered discourses in the literature and their relationship to the seven vulnerability factors identified in the first stage of the analysis (see 8.1.1). The gendered discourses in the literature focus on the division between domestic and public realms, the difference between male and female

responsibilities, and the culturally assigned roles to both men and women. Based on the literature review, the following categories of disaster vulnerabilities were identified: 1) *Women caretakers*; 2) *Women vulnerable*; 3) *Women domestic* (house and cook); 4) *Men public*; 5) *Women refrain/avoid to...* (lack of agency); 6) *Women should respect the men* (gender hierarchy); 7) *Men vulnerable*; 8) *Women should...* (responsibility); 9) *Men should...* (responsibility).

Categories of gendered discourses and factors of vulnerability (identified in 8.1.1) are then analysed doing descriptive statistics. Methodologically, the data, previously coded into seven factors of disaster vulnerability, was coded based on references to gendered discourses. By doing so, it is possible to see how often certain gendered discourses arise in the discussion on disaster vulnerabilities of women. And more specifically how discourses are related with each factor of disaster vulnerability of women (RQ5a). Table 8.4 shows the descriptive statistics of gender discourses for each factor of vulnerability. The results show that *women as vulnerable*, *women as domestic* and *women as caretakers* are the three most common discourses about disaster vulnerability in the data from interviews and POs (mentioned 31, 36, and 33 times respectively). The table also shows that women vulnerabilities in disasters derive from their lack of agency (*Women refrain/avoid to*) and responsibility (*Women should...*). It is important to note that very few mentions about men were made in relation to disaster vulnerabilities for women, with the highest number relating to the cultural framing of “men’s public role” (*M. public* mentioned 14 times). There was no mentions in the data from interviews and POs of disaster vulnerabilities of men, a growing field established in disaster literature (Dominelli, 2020; Enarson & Pease, 2016).

The results shown in Table 8.4 illustrate that more than half of the data on disaster vulnerabilities from the interviews and POs was related to gendered discourses (56%), especially on women as vulnerable, domestic and caretakers.²³

²³ Other causes of vulnerability beyond gender were highlighted: the lack of awareness about the unpredictability and recurrence of natural hazards; the misconception that disasters are insulated events

Table 8.4 Coding of gender discourses by factor of vulnerability

	W. caretakers	W. vulnerable	W. domestic (house and cook)	M. public	W. refrain/avoid to...	Women should respect the men	M. vulnerable	W. should...	M. should...	% Gender discourse mention
<i>Factors of vulnerability</i>										
Disaster education	8	5	4	3	1	0	2	0	5	33%
Protection measures	8	10	4	0	3	0	0	1	0	48%
Cultural issues	13	15	19	9	6	2	3	8	6	95%
Disaster management	0	3	3	2	5	0	1	4	0	46%
Community support	1	2	1	0	0	1	0	2	0	83%
Language	0	0	1	0	1	0	0	1	0	25%
Age	1	1	1	0	1	0	0	1	0	67%
Total	31	36	33	14	17	3	6	17	11	56%

8.4 Qualitative discussion on gendered discourses and disaster vulnerability for women

In this section, I reflect upon the quantitative results developed in section 8.1 using qualitative data from POs and interviews. This discussion is a necessary component to answer the research question (RQ5a) “What are the impacts of gender discourses on disaster vulnerabilities for women in disaster preparedness?”. In the previous section, the factors of vulnerability for women were identified (8.1.1) as well as the gendered discourses linked to these vulnerabilities (8.1.2). Data from the POs and the interviews will now be used to make sense of the quantitative findings.

rather than compound hazards; the lack of self-help capabilities of people. Albeit important, these factors are outside the scope of this study and therefore will not further investigated.

This section discusses results on disaster vulnerabilities (8.1.1) and gendered discourses (8.1.2). The three main factors of disaster vulnerability – disaster education, protection measures, cultural issues – identified through GT analysis, will be analysed with the gendered discourses uncovered in CDA analysis. This section discusses the connection between the main factors of disaster vulnerability and gendered discourses. To further analyse the impact of gendered discourses on disaster vulnerability for women (RQ5a), the discussion will be organised along different aspects of disaster preparedness: household preparedness, emergency, evacuation, and disaster management. The vulnerabilities in the evacuation and emergency phase, even though taking place during or after a disaster, can be considered the consequences or effects of inadequate disaster preparedness. Therefore, the following discussions on vulnerabilities in evacuation and emergency preparedness (See Sections 8.4.1.2 Vulnerabilities during evacuation and Section 8.4.2 Protection measures) are situated in the disaster preparedness conversation.

8.4.1 Disaster education

This section outlines the relation between women vulnerabilities in disaster education and discourses of women as domestic and caretakers of children. This first analysis identified inadequate or missing disaster education as a crucial factor affecting disaster vulnerability for women, especially in relation to household preparedness and evacuation (see Table 8.3). The second analysis found that 33% of the data about disaster education was related to gendered discourses (see Table 8.4).

8.4.1.1 Vulnerabilities in household preparedness

When it comes to vulnerabilities of women in disaster education, 7 of the 12 interviewees highlighted a concern that women are particularly vulnerable to disasters because they are expected to be the sole responsible for household preparedness. This gendered role leads to two main vulnerabilities for women and other members of the family. Firstly, in case of disasters, women are slower to evacuate because they have to think not only of their own personal safety but also of the wellbeing of other family members, including children. Secondly, since most relevant information on disaster preparedness focuses predominantly on women, other family members, including the husbands, are not equally

prepared to evacuate safely with children and other dependent family members. This division could be considered a result of the Japanese system of childrearing and household division. Childrearing and household tasks in Japan, including household preparedness, are traditionally tasked mainly to women (National Institute of Population and Social Security Research, 2019; Yamashita & Soma, 2017). Household preparedness is closely associated with housework and childcare (Tyler & Fairbrother, 2018). A recent survey conducted among married women in Japan found that only two percent of respondents considered their spouses in charge of childcare issues, while 57.4 percent confirmed to be the main decision makers on childcare issues (National Institute of Population and Social Security Research, 2019). Another important aspect shaping vulnerabilities of women is the unequal division of housework. In a recent national survey, it was found that women in Japan spend more than 7 hours daily on housework, which is the highest number globally. On the other hand, men spend the lowest amount of time, with less than 1h30 per day (Gender Equality Bureau, 2020). It was mentioned by 5 interviewees that the division of household tasks is crucial to understand the role of women in disaster preparedness. “Women are traditionally in charge of the food and medicine for the family, the husband is often unaware of the location of medicines or baby stuff, sometimes even of the emergency backpack” (Interview 8a).

The lack of information material about household preparedness for families with children was formally identified for the first time after the Great East Japan Earthquake of 2011 (Ranghieri and Ishiwatari, 2014; Cabinet Office, 2014). Similar issues were also visible during the Kumamoto Earthquake in 2016, urging local governments to improve their strategies towards household preparedness (Interview 10). One outcome of this increased awareness is the Mini-Booklet: “[During the Kumamoto Earthquake] there was the lack of information for families rearing young children and elderly people, which *made women vulnerable*”. Based on this discovery, GEAD started the Mini-Booklet project, which was completed in 2018 (Interview 1a) and aims to address two crucial issues of household preparedness: the emergency backpack and the storage of emergency food and water.

The lack of clear instructions on how to prepare an emergency backpack, considering the needs of families with children, is an important shortcoming in household preparedness (Interviews 1a-1b-8). In Japan, the emergency backpack is one of the most popular

elements of household preparedness, with customised versions been sold online and at home centres. Currently, there is no option specifically targeting families with children, and families are struggling to find information on how to prepare such an emergency backpack (Interview 1b). The Mini-Booklet offers support to these families and gives clear instructions for families on what to bring and how to prepare for disasters, as shown in Figure 8.2.

Figure 8.2 Mini-Booklet emergency backpack instructions ©GEAD



Another household preparedness responsibility tasked to women is storing emergency food and water (Interviews 1b-5-6-8a). In Kyushu, small quakes and seasonal typhoons are common, resulting in people to be unable to leave their home, sometimes for days. The interviewees mentioned that the usually small storage spaces in Japanese apartments do not allow for larger amounts of food and water to be stocked. Moreover, emergency food is prone to food waste as it eventually expires (Interview 1b). One interviewee emphasised the difficulty of stocking emergency food and water in city apartments, arguing the benefits of living in the countryside: “I think that in the countryside we also have more food stock because food is less available because supermarket are quite far so you have to stock more food and usually you have bigger houses so you can stock up more as well” (Interview 8a). In the Mini-Booklet, the issue of, for example food waste, is addressed by introducing the concept of the “rolling stock” principle, a food rotation system (Figure 8.3).

Figure 8.3 Mini-Booklet “Rolling Stock” instructions ©GEAD



Although the public discourses around women being solely responsible for children and household preparation is slowly changing, gender framings in the Mini-Booklet suggest that women are still predominantly seen as domestic; not only regarding household preparedness but also in case of an evacuation (Interviews 7-8b-9).

8.4.1.2 Vulnerabilities during evacuation

It was highlighted by 3 interviewees that another important point in time related to women’s disaster vulnerabilities created *before* the disaster, and deeply embedded in disaster preparedness and cultural norms, is in the evacuation phase. At the evacuation shelter, women are expected to perform important family tasks around childcare and meal preparation. Men are generally not expected to partake in these activities (Interview 8b). The expectations that women continue to perform “housework” in the evacuation phase might impact the mental health of women, having less time to take care of themselves, while being held solely responsible for the wellbeing of the family, including the husband (Interview 7). The Enogaikai simulation event addressed this issue by stressing the necessity of educating both women *and men* to unburden the former of the *duty* to provide care to other members of the family. Reshaping the roles and expectations during the evacuation phase was a crucial focus of this event, especially the expectation that only women are responsible for cooking during evacuation. Hence, an important task of this simulation was to teach all participants to prepare meals by themselves (Figure 8.4). As emphasised by the organiser: “Women are usually the ones expected to cook for the rest

of the family at the evacuation shelter. We want the children and the husband to learn as well so that the women can concentrate more on themselves” (Interview 7).

Figure 8.4 Picture of cooking station at Enogaikai Simulation © author



8.4.2 Protection measures

Lack of protection measures in evacuation shelters was mentioned in 8 out of 12 interviews and was the second most accounted factor of disaster vulnerabilities for women. After the 2016 Kumamoto disaster, both the local government and NPOs recognised the risks and vulnerabilities for women in evacuation shelters. In particular, the lack of privacy and safety for women was stressed in a meeting with the Disaster Prevention and Crisis Management Bureau of Fukuoka Prefecture (Interview 10). When crucial measures to be taken to improve the safety and resilience of people at shelters in general were discussed, almost half of the concerns were linked to gendered discourses (48%).

8.4.2.1 Lack of privacy and safety

It was reported in 7 interviews that disaster preparedness includes preparing proper personal protection measures to be implemented during and after disasters. For women, emergency and disaster situations pose additional challenges, such as protection from unwanted attention, physical and sexual threats (Parkinson, 2019; Parkinson & Zara, 2013), and shelter from generally uncomfortable situations based on their gender (Farmer et al., 2018; Rushton et al., 2021). During the interviews, two important facets of vulnerability for women were identified. First, women being able to call for help: “...I believe for women the most important thing is the toilet and a whistle to ask for help or

attract attention” (Interview 9). Second, the lack of physical separation of female and male areas in the evacuation shelter: “In my opinion women are more vulnerable during the evacuation phase because there is no separation between male and female sections, so women are often victims of harassment or abuse” (Interview 9). A related obstacle in the prevention of harm and provision of support for victims of emotional and physical abuse is the fact that women tend to refrain from reporting abuse and harassment in evacuation shelters (Interview 1b). This issue is believed to have cultural roots: “Another problem with cultural roots that we have found is that women usually do not denounce cases of harassment, domestic or sexual violence in the evacuation shelters” (Interview 10). These structural and cultural issues make it difficult to ensure a safe environment for women during and after a disaster. Throughout the study, various protection measures have been proposed to mitigate these problems. The Mini-Booklet, for example, includes a map of evacuation shelters that offer separate bathrooms, spaces to dry clothes, and a private area for mothers with small children (Figure 8.5). The issue of space separation is something that is usually decided by the local evacuation site manager. Although evacuees can propose changes, it is not part of the manager’s responsibilities to follow up on these suggestions. One measure proposed during the Enogaikai simulation event to increase privacy for families is to bring a compact tent to the evacuation shelter (Figure 8.6). However, a tent is usually not part of the emergency kit. It takes up considerable space and might be difficult to carry during evacuation.

Figure 8.5 Gender-sensitive evacuation map, Mini-Booklet (L) © GEAD **Figure 8.6** Picture of tent at Enogaikai Simulation (R) © author



During 2 interviews, the need for interventions targeting cultural change to reduce vulnerabilities of women in evacuation shelters was stressed. The literature recognises the importance of support services for victims of domestic violence (DV) (Parkinson, 2019; Parkinson & Zara, 2013). In Japan, support services are more available than before, but an internal system of safe and private reporting channels for abuse within evacuation shelters is missing (Interview 10). A suggestion on how to minimise vulnerabilities of women in the evacuation shelters was to include more women as evacuation shelter managers. The lack of women as managers in disaster situations is a crucial challenge in Japan and is currently supported in the Sendai Framework for DRR (UNISDR, 2015). In Japan, managerial roles usually fall on older men in the community. Some interviewees suggested that because of this setting, women often hesitate to confide in those men about their sexual or reproductive health issues (e.g., tampons, condoms, birth-control pills), and are less likely to rely on a male manager to report more serious cases of abuse or sexual violence (Interview 1b; Interview 10). These results support the literature on women's vulnerabilities in evacuation shelters, and the need for wider educational practices about physical, sexual and emotional abuse in schools and workplaces. This includes, but is not limited to, disaster situations, and could help to create a virtuous cycle of de-stigmatising reporting of abuse and even preventing abusive behaviours in evacuation shelters in the first place.

8.4.2.2 Decision not to evacuate

Another significant risk affecting women, mentioned in 3 interviews with policy-makers, originated from the fact that women in Kyushu tend to not go to evacuation shelters (Interviews 1a-8b-10). Evacuation shelters are crucial points to share information and receive support provided from the institutions to the citizens. Women who decide not to evacuate are therefore particularly vulnerable because they are largely invisible to the disaster or medical support network and are often precluded from accessing important information and essential resources distributed exclusively at evacuation shelters (Interview 1a). There is a growing literature on gender's impact on predicting evacuation behaviour, with ambiguous results. Some studies argue that women are more likely to evacuate compared to men because they have higher perception of risk and are more likely to have disaster preparedness plans (Bateman & Edwards, 2002; Meyer et al., 2018).

Other studies found no significant impact of gender on predicted evacuation behaviour (Kinatader & Warren, 2016). There are, so far, no studies on the impact of gender on predicting evacuation behaviour. However, during this study policy-makers at the municipal (GEAD) and prefectural level (Disaster Prevention and Crisis Management Bureau) perceived women as being less likely to evacuate. The reason, for a speaker person of the Disaster Prevention and Crisis Management Bureau of Fukuoka Prefecture is that mothers with small children prefer not to evacuate. “Mothers tend not to evacuate when they have a small child. They are worried the baby might disturb the others or the baby might get lost” (Interview 10). One respondent echoed this opinion, suggesting she was hesitant to evacuate: “I would rather not evacuate and stay in the car because the baby is too small and difficult to manage in a space with others with no privacy” (Interview 8b). However, another interviewee recognised the benefits of going to an evacuation shelter particularly in terms of accessing useful information: “I think an evacuation shelter would be better [than not evacuate or stay in the car] because they would have *information*. (Interview 8a). These arguments highlight the complexity of the choices women have to make in case of disaster and suggest that women might have difficulties in deciding whether to evacuate or not. Although there is not academic research focusing on Japan informing why that might be the case, this study suggests a possible reason is that women with small children might decide to not evacuate, in spite of the awareness that evacuation shelters are crucial points to receive information. It is worth exploring further the link between motherhood and gender with evacuation behaviour in Japan.

8.4.3 Cultural issues

Cultural issues were reported in 7 out of 12 interviews. The study found that the third most important factor of disaster vulnerability for women in Kyushu are cultural issues related to gendered discourses (98% in Table 8.4), particularly issues of community dynamics and lack of women in disaster management.

8.4.3.1 Community dynamics

The importance of community dynamics influencing vulnerabilities of women in disaster preparedness was mentioned in 4 interviews (Interviews 2-8a-9-10). Public officials and community members in this study highlighted that, while community relationships are mostly seen as *increasing* disaster resilience of Japanese residents, they can negatively affect the participation of younger women in disaster preparedness. The lack of participation of younger women in community disaster preparedness can lead to gaps in the understanding of their needs and concerns in case of a disaster (Interview 10). The former became evident during the 1995 Great Hanshin-Awaji Disaster in Kobe, when around 80% of the people were estimated to have been saved by neighbours instead of rescue teams (City of Kobe, 2010; Shaw, 2014). *Chonaiikai* (neighbourhood associations) play an important role in Japanese disaster preparedness efforts (Hendry, 2011; Tsutsui, 2014). Their members are trained in facilitating the evacuation process in the case of a disaster, and additional support networks ensure that families can evacuate safely (Bajek et al., 2008).

However, although strong community ties can help reducing community risks (Interviews 2-9), the strict hierarchical relationships between older and younger generations can make it difficult for young women to voice their opinion and have their worries addressed by the local DRR manager (Interview 10). This can be seen, for example, during *demae kouza* (出前講座- disaster preparedness classes) organised by prefectural offices upon request from local communities (Ogden, 2010). Prefectural officials noted that the majority of attendees are male and retired individuals who are eager to support their local communities (Interview 10). The low female turnout and notions of respect towards the elderly (敬老 *keirō*) have a negative effect on women participation: “The goal is training women to be leaders in disaster situations, but some cultural values can be obstacles. A big problem is that women hesitate to express their opinion because women should respect the [older] men’s opinion more than their own (ibid).

8.4.3.2 Lack of women in disaster management

The lack of women in disaster management is considered one of the most important issues in mainstreaming gender in DRR and it is a challenge present at all levels of DRR management in Japan, not only in local communities (UNISDR, 2015). This challenge was brought up in interviews with policy-makers and illustrates that the lack of women in disaster management leads to missed opportunities of critical representation of alternative viewpoints and perspectives. Including women as competent experts and involved party in disaster management is not only an issue of gender equality and representation, but also a measure to prevent gender issues from losing priority in the policy and management agenda in disaster and post-disaster phases (Interviews 4-10). The issue of lack of women in disaster management can be seen as rooted in the traditional work-centric system (仕事中心 *shigoto chūshin*) associating men with the leading roles of the *breadwinner* and “protector”, and women tasked instead with caring and household activities (K. Ito, 2005; McLelland & Dasgupta, 2005). To foster more women participation in DRR, policy makers and NPOs have focused on creating women-only spaces and initiatives to better encompass “...the opinions of those who are less likely to speak out” (Gender Equality Bureau Cabinet Office)²⁴. One example is the “Bousai (Disaster) Mama Café”, a women’s club that gives voice to female perspectives on DRR preparedness: “There is overall a lack of women related to the problems [of emergency and evacuation]” (Interview 10). Such initiatives aimed to empower women about their own capabilities as make their point of view known to policy-makers in informal settings.

The Mini-Booklet (see above) can also be seen as another kind of response to the under-representation of women in disaster management. The design and contents of the MB were entirely led by women and show the benefits of shifting from the current service-centred approach to a person-centred disaster perspective (Interview 4). The main characteristic of a person-centred perspective is the recognition that individuals are different and have different needs and vulnerabilities. The main characteristics of a person-centred perspective are community solidarity and a care-centred and multi-

²⁴ https://www.gender.go.jp/policy/saigai/shishin/shishin_11.html

stakeholder approach (Villeneuve et al., 2021). The MB focuses on concrete needs of parents with small children and suggests protection measures that can be easily applied. However, like other disaster and emergency preparedness initiatives, the MB tends to represent women as mainly responsible for traditional household tasks and child-rearing activities (Tokyo Metropolitan Government; Yatsuhiko Metropolitan Government, 2020).

From this study's results, it can be argued that while gender is becoming more and more at the centre of soft strategies of disaster preparedness, discourses of women as exclusive caretakers and domestic are still existing. Practices that are based on these discourses can be detrimental to reducing disaster vulnerabilities of women because they implicitly support the idea that childcare and the household disaster preparedness are *women's issues*.

8.4.4 *Women's strengths and capabilities*

One final point that should be included in the discussion are the strengths and vulnerabilities of women. The study focused on the vulnerabilities of women during disaster, but important mentions of the female capabilities and strengths were underlined in all 12 interviews. The following arguments support the literature on women's positive attributes and advantages in case of disaster (Ear, 2017; McNamara et al., 2021). Even though the family is strongly reliant on women in case of disaster, these are considered a source of vulnerability and not as proof of capabilities and resilience. In addition to their organising and management skills, women are often associated with notions of companionship and emotional support (Ganapati, 2012). In a discussion on the experience of isolation of an elderly businesswoman, she recalled the importance of women supporting each other in moments of crisis as well as in daily life: "When I lived in Okinawa, there is the best culture of women empowerment and community support. In Fukuoka, I was supported by other women, also from the NPO Enogaikai and it was an environment that allowed me to start and continue my business" (Interview 9). There were other references to the strengths of women in disaster preparedness, such as their resilience and rationality during evacuation and household preparedness. "The aim of the GEAD is show that women are already leaders at all levels: in the workplace, at the local level of the community, at the individual level of the family, and at the level of safety

from emergencies." (Interview 4). In the case of emergencies, women are often in charge of emergency backpack, and food and healthcare of the other members of the family in the evacuation shelter: "Women are the sole responsible for cooking during evacuation at the moment" (Interview 7). Women naturally have organising and managing roles while being in charge of the children safety and the house resilience in addition to their own safety (Yamashita & Soma, 2017): "The important thing [for women] is to keep an eye on the children, and to remember to protect yourself and the house." (Interview 9).

8.5 Summary

The study identified the main disaster vulnerabilities for women in Kyushu and the impacts of gendered discourses on these vulnerabilities. The discussion was organised along different aspects of disaster preparedness: household preparedness, emergency preparedness, evacuation and disaster management. It revealed that lack of disaster education about household preparedness and evacuation, insufficient protection measures in the evacuation shelters, and cultural issues are the three main factors of disaster vulnerability for women. The study confirmed that these disaster vulnerabilities strongly relate to discourses of women as victims, domestic and caretakers. The study also showed that female leadership is still underdeveloped in DRR management. Drawing on three different case-studies of gender-sensitive disaster initiatives, the study concluded that traditional gendered discourses present in society also influence content and context of most current disaster initiatives, perpetuating disaster vulnerabilities of women.

This study overall contributes to a better understanding of disaster vulnerabilities of women by highlighting the paradox of women's roles in disaster resilience in Japan: women are the main target of household preparedness and child-care disaster information but are mostly absent from decision making processes in DRR policy and management. Their contribution is limited to activities at women-only spaces that can improve individual preparedness but only have a short reach to address more structural problems in DRR management. In fact, women-only spaces often result in further division between men and women, with men often being excluded. Moreover, female voices in disaster preparedness at the local community level are often ostracised by gender norms and rules of respect and hierarchy.

The results of this study offer suggestions to policy makers and NPOs who are interested in reducing the vulnerabilities of women in disaster in the context of Kyushu. The study suggests the promotion of critical discussions and the inclusion of more gender aspects to formal disaster education programs at schools and workplaces. To reduce disaster vulnerabilities of women, it is necessary to educate new generations of Japanese men and women through the systematic inclusion of gendered disaster vulnerabilities in formal disaster education. In addition to such a holistic DRR education initiative, safe evacuation shelter conditions and a more gender inclusive disaster management approach is needed. It is important to improve both privacy measures and reliable reporting systems for abuse in evacuation shelters. Changes are also required to address the lack of female representation in disaster management, especially at the local level of evacuation shelter management.

In conclusion, this study highlights the importance of adopting a socio-cultural approach to disaster vulnerabilities for women in Kyushu to promote an inclusive disaster resilience concept. Gendered discourses and alternative family paradigms, like women working full-time and single fathers, need to be continuously negotiated and included in public debates around disaster; not only to empower women, but also to create equal opportunities for everyone to define their own personal role during and after disasters.

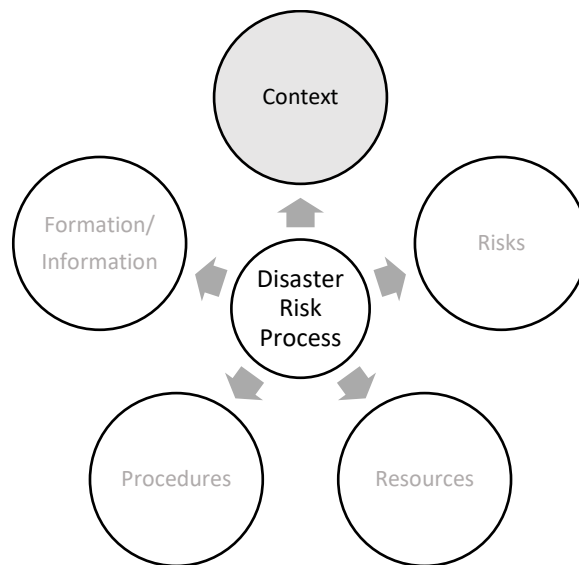
Another vulnerable group regarding disaster risks and vulnerabilities are the foreign residents in Japan. In the subsequent chapter, a similar socio-cultural approach is used to identify and better understand disaster vulnerabilities of foreign residents in Kansai, Japan.

Chapter 9 General Disaster Preparedness Challenges and Risk Vulnerabilities for Foreign Residents in Japan

9.1 Introduction

Chapters 6 and 7 focused on the risk perception of the foreign community and how gender and country of origin affected this perception. This chapter focuses on the *context* of disaster risk by analysing discourses of disaster and cultural narratives (Figure 9.1). The aim of this chapter is to outline the main challenges and vulnerabilities in disaster preparedness with specific attention paid to how these challenges affect different resident categories in Kansai, Japan.

Figure 9.1 Structure and focus of Chapter 9 (in grey) © author



In order to give a comprehensive understanding of what are the factors of vulnerability in Japan, and of foreign residents in particular, a broader target population had to be considered. Therefore, this chapter has a wider focus than previous chapters and does not exclusively target foreign residents but also Japanese policy makers and NPOs working in Kansai, Japan.

An important concern of policymakers and other stakeholders in DRR in Japan is to integrate the vulnerabilities of foreign residents and tourists into preparedness strategies.

To better understand what situation foreign and Japanese residents face regarding disaster preparedness in their daily lives, this chapter identifies disaster preparedness challenges based on a complex set of social and community norms and values, stressing the impact of those on foreign residents. The challenges and gaps in disaster preparedness were identified through GT model based on data collected from participant observations and stakeholder interviews. The challenges were contextualised through cultural, social and economic references from the interviews as well as the literature (see Appendix 3.1).

9.2 Research Design

9.2.1 Background: building a bridge between gender and disaster studies

This chapter addressed disaster preparedness challenges in Kansai, Japan. Like in Chapter 8, the analysis again focused on the following aspects of disaster preparedness: household preparedness, emergency, evacuation shelters, and disaster management. Emergency and evacuation vulnerabilities are included in this study on disaster preparedness because social vulnerabilities and discriminatory practices against non-Japanese residents during the emergency and evacuation are often informed by disaster preparedness measures, as well as cultural norms and expectations previous the disaster.

As mentioned in Chapter 6, foreigners are disproportionately affected in disasters (Nagy, 2009). Chapters 6-7 suggested that foreign residents have high disaster risk perceptions based on cultural background and gender. There are only few studies considering disaster preparedness challenges and concerns and *perceptions* of risk, despite some research on the relation between risk perception and disaster preparedness (Boret, 2020; Oliver-Smith, 1999). This chapter adds to this strand of literature by investigating the *disaster preparedness challenges of both Japanese and foreign residents* from a multi-stakeholder perspective. It challenges overly simplistic understandings of foreign residents in Kansai, Japan, and contributes towards a more holistic understanding of disaster preparedness across different society groups.

A common perception is that language is the main vulnerability and challenge of foreign residents in Japan. Hence, most research on disaster communication for foreign residents focuses on language and pays less attention to other social and cultural aspects, such as

disaster risk perceptions (Uekusa, 2019). This limited view considers foreign residents in Japan as a homogenous group regardless of different socio-economic status and cultural background (Hamidazada et al., 2019; Jayarathne & Babu, 2017). In this chapter, I contextualise the results of Chapter 7 (on foreign residents' perceptions of disaster risk) by exploring the argument that the socio-cultural context of foreign residents is important to understand their disaster vulnerabilities. This study stresses the diversity of foreign residents and the need to reflect on the complexity of disaster vulnerabilities and challenges in a multi-cultural society. Two interrelated research questions will be addressed: RQ4b "What are the challenges of disaster preparedness in Kansai, Japan?" RQ5b "What are the challenges of disaster preparedness for foreign residents in Kansai, Japan?"

9.2.2 Data Collection

9.2.2.1 Field Sites and Participant Overview

Fieldwork for this study was conducted in different parts of Kyushu and Kansai, Japan: Fukuoka, Kumamoto, Kyoto, Kobe, and Osaka, between June 2019 and July 2021. The sites were chosen based on the presence of NPOs supporting foreign residents, such as International Houses, open disaster drills and trainings for foreign residents, and other events dedicated to disaster preparedness. Disaster events not specifically tailored to a target group were also included in the observations and interviews to investigate general communication and preparedness challenges in Japan.

9.2.2.1 Field Sites

Disaster preparedness training events are frequently held all over Japan, especially in metropolitan areas. Since April 2019, I was able to observe and participate in various events and trainings. Among them, I participated in a series of events and seminars for the 25th anniversary of the Kobe earthquake in January 2020. In addition, I participated in various trainings and drills organised for foreign residents and foreign students, organised by Kyoto University and other non-profit organisations. Due to the COVID-19 pandemic, many events were cancelled or heavily restricted to adapt to safety guidelines. However, this gave space for new opportunities, such as the opportunity to participate in

the 16th symposiums which normally held in Tokyo but due to COVID-19 was held online. Below is a table with the characteristics of participant observations physical and virtual sites (Table 9.1).

Table 9.1 Overview Participant Observation Sites © author

<i>Event</i>	<i>Sponsor</i>	<i>Goal</i>	<i>Components</i>	<i>Disaster aspect</i>
25 th Anniversary of Kobe Earthquake (22-23/01/2020)	NA	Memorial of Kobe earthquake	Various seminars and lectures. Art exhibitions Disaster information stalls	Reconstruction and Recovery
Foreign residents disaster drill (05/09/20)	DRI and KOKOKA	Increase awareness and preparedness of foreign residents	Lecture by DRI researcher Simulation of emergency: learning how to use hazard maps, international phone service in case of emergency Group discussion and debate	Emergency and evacuation
外国人のための防災研修—災害の時にあなたにできること— (27/02/2020)	Osaka International House -	Increase disaster literacy of foreign residents	Guided visit to Osaka disaster prevention center Short lecture and workshop on main concerns and worries Volunteers' recruitment	Emergency
Citizens' Disaster Prevention Centre	Fire Dept	Saving as many lives immediately after the disaster	Tour conducted by firefighter/volunteer working at the CDPC Interactive activities (simulations, short movie)	Emergency
Disaster preparedness event (08/09/2020)	Osaka International House - DRI	Resilience of local foreign residents and volunteer training	Lecture on disaster education Training exercise with volunteer translators Workshop and group discussion a	Emergency and evacuation
International forum on acceptance of foreign nationals and integration into Japan (25/02/21)	IOM and Ministry of Internal Affairs of Japan from 2005	Increase awareness of current challenges and vulnerabilities of foreigners in Japan	Series of lectures about current challenges and situation of foreign residents in Japan	Life in Japan

9.2.2.2 Interviewees

The interviews for this study were conducted between May 2019 and July 2021. In total, twenty-one interviews were conducted in different prefectures with various stakeholders

(see Appendix 2.2) including scholars (5), policymakers (4), rescue workers (2), NPO workers (4), and community members (10). The interview protocol was based on a bottom-up approach. In other words, the interviews were interviewee-led and based on an ethnographic semi-structured approach (Leech, 2002; Sherman Heyl, 2001). By doing so, interview conversations evolved organically and reflected topics interviewees felt most comfortable talking about. This method also allowed to focus on what they considered most relevant in regards to their concerns and experiences. Various accounts from foreign residents linked the discussion of disaster preparedness and emergencies to the COVID-19 situation. Although not originally part of the interview, these discussions led to some interesting connections between disaster prevention for “immediate” disaster events and “slow disasters”, such as the COVID-19 pandemic, which heightened existing discriminatory practices (Anderson et al., 2020; Devakumar et al., 2020; Rose-Redwood et al., 2020).

9.2.2.3 Data analysis

Similar to Chapter 8, data analysis will utilise GT to identify the general categories and specific challenges in disaster preparedness from the participants’ perspectives (Section 8.2.2.4). The coding categories are general themes, found by identifying through common themes from the quotes in interview transcripts, and entries from pictures, field notes, and documents obtained during participant observations. Four general categories were coded: *cultural issues*, *disaster management*, *disaster education*, *protection measures*. Each entry or quote was associated with a general coding category and a specific challenge, also identified through GT analysis. While coding categories aimed to bring together different quotes and entries, challenges were coded to best represent the content of each entry or quote. For example, the quote “*The daily newspaper was only in Japanese. Sometimes the articles had information for foreigners, but not every day. At that time there was no internet so for foreigners we gave a number that they could call in case they needed assistance.*” was coded for the general category of *disaster management*, under the specific challenge *insufficient available information in a different language*. Specific challenges can be rooted in more than one general category. For example, in the following quote the specific challenge “*social isolation and integration*” for foreign residents refers to the general categories of *cultural issues* and *disaster management*: “*as individuals,*

foreigners are often ignored on their own. I have been living in Japan for a long time but I am still not considered a part of the community. However, if foreigners come together and help during a disaster then they are more likely to be recognised”.

9.3 Results and Discussion

278 entries and quotes were identified from the data, with 216 of them being relevant for this study (challenges and concerns in disaster preparedness). Among the data on specific challenges, 36% of the challenges (78) referred to multiple categories. Counting the challenges that referred to multiple categories as duplicates, the total amount of data increased to 294 total data references. Of the four main general categories, nine specific challenges were derived using grounded theory (see Table 9.2). Most challenges were rooted in cultural issues (126), disaster management (61) and protective measures (73), followed by disaster education (34).

Table 9.2 Coding results overview

<i>Disaster Preparedness Challenges</i>	<i>General Categories (number of codes)</i>				Total
	Cultural issues	Protection measures	Disaster management	Disaster education	
1. Social isolation and integration	55	7	7	0	69
2. Identity biases	22	2	2	1	27
3. Cultures of disaster	11	3	2	0	16
4. Optimistic bias	2	7	0	3	12
5. Lost in translation	3	21	13	14	51
6. Lack of emergency measures	4	17	7	2	30
7. Moral hazards	3	1	3	1	8
8. Lack of disaster education	0	0	3	8	11
9. Invisible foreigners	0	0	6	0	6
10. Others ²⁵	26	15	18	5	64
Total	126	73	61	34	294

²⁵ The entire set of codes can be found in the Appendix 3.

9.3.1 Cultural issues

In 14 out of 21 interviews, cultural issues were reported as a possible source of disaster vulnerabilities. The data analysis showed that the majority of aggregate entries and quotes (55%) are related to socio-cultural structures in Japan's society. Among the various cultural issues, three main challenges for foreign residents' disaster preparedness emerged from the data analysis: 1) their social isolation, 2) their lack of a "culture of disaster", 3) and the challenges from being represented as a homogenous group not as residents but as temporary.

9.3.1.1 Social isolation and integration

7 interviewees identified social isolation and lack of community networks in case of an emergency as the main concern and challenge for foreign residents. Local communities play an important role in disaster preparedness (Bajek et al., 2008; Nakano, 2005; Patterson et al., 2010). It can be argued that the stronger the relationships in a neighbourhood are, the higher the disaster resilience is:

"As for disaster preparedness I would say it depends on the areas where they [foreigners] live but sometimes there are areas where they have local community organisation that is different from the local authority, more grass root. These organisations organise their own disaster preparedness projects and drills. To prepare for disaster is important that people in the community know each other at least. For example, when disaster happens some people may decide to evacuate to the evacuation centres but some people might decide to stay or can't evacuate. But unless the community people know where these people live before the disaster, it is very difficult for the local government to figure out who is safe and who is not, who is in accommodation centre and who is not. In that way, if the communitarian relationship is strong then the local government can clarify the stage of damage at an earlier stage, otherwise it might take a very long time. (Interview 19)

After moving to Japan, foreign residents often struggle to become part of the local community, even after decades. In other words, they suffer from a double vulnerability: they are less likely to find support among people living close in case of a disaster and they are also somewhat invisible to the local government in case a disaster occurs (see above). As emphasised by one of the participants:

“The community is important also because if the foreigner has good relationship with the neighbours probably some people will know them and during the emergency somebody will worry about them. But if the foreigners do not have social connections, nobody would even know they are there.” (Interview 18)

Learning the basics of the Japanese language is considered the first step to overcome the main barrier of integration of foreign residents in the local community:

“That’s why it is very important for foreigners to learn Japanese because once they learn Japanese they can communicate and it is important to make friends in the neighbourhood. Close friendships are not necessary but to learn where the chonaikai (neighbourhood association) is, who is the president and the director. They would never ever approach the foreigners themselves so the latter have to try to know the people. They have to make the first step.” (Interview 18)

“I think [disaster preparedness] really depends on how much interactions the neighbours want to have or the residents want to have. The **language issue** is a barrier because if the person is not a Japanese but still speaks Japanese then it may be easier for them to integrate with the neighbourhood, otherwise the other Japanese people may feel a bit hesitant to start a conversation.” (Interview 19)

However, being able to communicate in Japanese is only the first, but not final step in increasing integration in the local community (Yamaguchi in IOM and Ministry of Internal Affairs of Japan, 2021). Foreign residents who can easily communicate in Japanese still reported various forms of social isolation:

“In Japan you cannot become friends unless you have a child. We take the kids to the same school or we go to the same official hobby. Most of my friends are mothers of kids from the kindergarten. I say friends but that’s not really friendship apart from one of them really. My kid was in that school since he was 5 months old because I had to go back to work because my husband was ending his PhD and not working. My kid looks a lot like me so he stands out among the Japanese students... We don’t really talk a lot, we don’t exchange numbers unless there is a school-related activity to organise then you have LINE group. I found it difficult to make friends really, but definitely more connected than before when I was single.” (Interview 18)

Lack of a social networks of foreign residents heavily depends on whether they live in rural or urban areas. While foreign residents employed as professionals usually reside in bigger cities, a considerable number is employed in rural areas. This applies is particular to Technical Intern Training Program (TITP) applicants. This category of migrant workers accounted for 20% of Japan’s foreign workforce in 2020 (Bélanger et al., 2011;

Quyen Tran, 2020) and is known for their unstable legal, social and economic status (Kuga, 2018; Takenoshita, 2017). For people like these trainees, their vulnerabilities are aggravated by a lack of disaster preparedness, due to lack of access to disaster information. An NPO worker shares her concerns for these people who are often marginalised in media and public policy:

“Especially the foreigners who come through the “technical trainee programs” have a lot of issues: they tend to live in the countryside where they have less international communities and most of them don’t speak English and very often they don’t speak Japanese. They live in areas prone to disasters like mountains or fishing villages so I think they need to have some scheme to promote disaster preparedness to protect those vulnerable people.” (Interview 19)

While a non-Japanese ethnicity can be an additional obstacle in creating a social network, Japanese residents also encounter similar problems. A Japanese respondent suggested that different cities have different habits when it comes to social interactions, which can affect foreign and Japanese residents equally:

“...I live in Tokyo but I don’t know the people living next door. The community relationship is very scarce in Tokyo so we don’t know if the neighbour is safe in case a disaster happens. In that sense, we are not very prepared in case of disaster. The area I live has been flooded and burned down and those people who experienced a lot of accidents and disasters together traditionally have a stronger community relationship. However, in the case of newcomers they do not have much ties with the community”. (Interview 19)

The discussion of social isolation naturally led to the COVID-19 pandemic situation, and a strong emphasis on the negative impact of isolation on *mental health* (Gagné, 2020; Huremović, 2019). While isolation was especially felt during COVID-19 for everyone in Japan, foreign residents had specific worries regarding their inability to go back home, the uncertainty of their legal status in Japan, and their lack of connections (Yang, 2020).

2 respondents shared their personal experience with *mental health and loneliness*:

“In January ...I had my own personal problems: I just ended a long-distance relationship and had moved into a new apartment. The gym was closed so there was no activity and you could not go out. I can’t go out, broke up my relationship. I couldn’t join anywhere, so I started having a lot of thoughts about my career, about my life. At that time I was very lonely. I was spending all my time in the lab, but when those things happened I was alone. I don’t really know anyone

seriously in Japan, I can't speak Japanese...so it was a very difficult time. And my personal problems were adding to it. Actually, I felt very lost.” (Interview 16)

“I lived alone and always lived here. But when my friend had to move away I realised I did not have a lot of friends, I don't have a network and so I can't find a lot of information...I had already stopped working. My apartment is not big (one room, one hallway kitchen and a bathroom), and being forced to stay in such a small space with only Netflix or the news, that was not the healthiest way to spend the time. And when bad news is more than the good news, it is very easy to notice the negative over the positive. Being stuck in that small room for literally everything for months was hard. I could still FaceTime people and go on walks, so that I could at least get out of the apartment, but with everything that was going on I found myself often asking the question “what am I doing?”, I think I really struggled with purposelessness, and that on top of the uncertainty of everything else.” (Interview 15)

9.3.1.2 Identity bias: foreigners as homogeneous or “guests”

In disaster preparedness policies, politics and media discourses there is a tendency to present foreign communities in Japan as a homogenous group with a very similar socio-economic status and prospects, therefore facing similar challenges. Although the notion of monocultural Japanese society (*nihonjinron* “theory of Japanese” is being challenged, the inclusion of multi-ethnic groups and cultural diversity is still often overlooked or misrepresented in Japanese society (Burgess, 2007; Kramer, 2003; Sugimoto, 2014). Foreign residents are often blended into hierarchical stereotypical groups based on physiognomy and nationality: Caucasian and of higher social and economic status, and low-skilled workers usually from South East Asian countries (Myslinska, 2014; Shipper, 2002). These representations are usually promoted in the Japanese pop culture and media (Fukuda, 2017; R. Ito & Bisila, 2020). 4 interviewees highlighted how this simplification of cultural diversity is highly problematic in the context of disaster preparedness. Disaster strategies that do not acknowledge the diversity of the foreign community can leave some ethnic and religious minorities underserved by the local disaster management and more exposed to discrimination in the disaster and post-disaster relief and support measures.

The lack of cultural diversity often seen in the portrayal of foreign residents in Japan is also reflected in disaster measures. This was evident after the Kumamoto earthquakes in 2016. In an interview with the manager of one of the international shelters, the issue of multi-culturalism was raised with regards to food and religious needs:

“Some people could not eat the food because they could not read Japanese and would not trust us to find halal food among the emergency food. We had to wait until one of the embassies sent us approved halal food.” (Interview 4).

Also the issue of privacy for personal and religious needs was identified:

“We had to create a room for people who wanted to pray or for women who needed to breastfeed” (Interview 4).

A more holistic perspective on people’s diverse needs and concerns would be helpful not only for foreign residents but for all individuals’ needs as well, such as food requirements for allergic individuals and women’s needs:

“I think it is important to consider the timing of the earthquake. *Women things* like pads for menstruation; food is also important. Usually food includes a lot of rice, but *there are people who are allergic or whatever, or if there are Muslim [people] they cannot eat certain things.* In Sumida and probably most of the cities in Japan, there is a neighbour association. That neighbour association manages all the food and other supplies for natural disaster. In that aspect it would be interesting to evaluate how many foreigners live in the neighbour... And establishing maybe the kind of foreigners they have in each neighbour association and prepare food for them if there is necessity.” (Interview 18)

Different types of foreign residents are not usually represented in the common imaginary, leading to the existence simplistic stereotypes. The founder of an NPO supporting foreign women shared her experiences in dealing with stereotypes of foreign women in Japan:

“Even the ladies in Paruyon are so different: there are academics like you, university professors, home makers, translators, women who just come to Japan from developing country to just get married to a Japanese guy and who can’t speak Japanese, can’t speak English. I think that the only foreigner they know would be the *stereotype*. For the white person that is the language teacher, if in your neighbourhood there are a lot of foreign trainees who work in the factory that would be your stereotype.

She argues further that a possible reason for the simplification of foreigners as a homogeneous group can be the dominant media representation of foreigners as a visitors or only short-term residents:

“I think it is because maybe it is also because of the *media*. The foreign faces that are on TV are either the “talent-san” or retired university professors, something like that, or the English teacher, or comedian. There are also new stories about the internees. There is nothing in between, and I am in between, I don’t belong to

either group. For Japanese to see us and realise that we live here, and we have our lives here and some of us have opinions about the Japanese society, we are not just here on vacation is a big problem....*Their expectations of me is that I am "just a visitor, a guest"*, like I am having a long vacation. It's really frustrating ...It is difficult for them to actually understand that foreigners live here and can be specialists. We're very different among us." (Interview 21)

Based on ethnicity, there are *different levels of integration* and support available. An example of ethnic groups with strong support networks are the Chinese communities (Liu-Farrer, 2013):

"There are groups of Chinese people. These people have business and support each other, they have associations. They have people who can support each other. Same goes for Korean. But for other people like me who speak Spanish, I only have one Spanish friend I can call. *I don't have a community living in my area.* The Bolivian community lives in ..., and I don't know if they have language support even there. I think they do because they work in companies and factories. Probably they have explanation for Spanish and Portuguese speakers. But what about French people, Italian people etc?" (Interview 18)

It is important to stress how some foreign minorities are more vulnerable than others. The above-mentioned TITP trainees are an "invisible" foreign minority. However, the visible, privileged, English-speaking, white foreigner, who bears higher social and economic status, and does not require to learn Japanese to live comfortably, is perceived differently:

"White people are usually employed in English-speaking jobs. The job market is a big thing in Japan. If you can, for example, get a job as an English teacher and you are a native speaker you don't really need to learn Japanese, also because they don't want you to speak Japanese to the students. There are the expats in Tokyo that get transferred for 2 or 3 years and then they go back so I don't expect them to learn Japanese." (Interview 21)

Rather than considering foreigner residents as guests, they are a crucial resource for disaster resilience at the community level (Interview 8). Recent discussions evolve around the inclusion of students in disaster preparedness strategies. As a researcher from DRI emphasised:

"There is a need to connect the local and foreign communities. Students are a resource that is not used. The reason is that they do not fit the "long-relationship" value that is very important in the Japanese communities, based on long-term membership (Interview 8).

However, there have been a few successful projects in Sendai, Kumamoto and Yokohama, in collaboration with the International Student Associations of Kumamoto and the Yokohama International Student House, where the students were encouraged to join neighbourhood associations (*chonaikai*). Here, students would help the elderly in the neighbourhood during local cultural events, like seasonal festivals (*matsuri*). A university student recalled his experience with the local community after the Kumamoto earthquake in 2016:

“At the time I was studying in Beppu. It was middle of the night when we had to evacuate from our home and go to the evacuation shelter...In the following days me and the other international students organised to go around the city to bring water and go door to door to see if anybody needed anything...A lot of those pillars at the entrance of traditional homes had fallen, and me and my friends would help elderly who could not lift the stones by themselves” (Interview 13)

9.3.1.3 Cultures of disaster

In 4 interviews, the main difference between foreigners and Japanese was identified as their different cultural understanding of disaster. In particular, it was suggested that because of a different culture of disaster preparedness, some foreign residents might lack awareness of disaster risks. This lack of awareness could lead to less access to important information about life-saving disaster preparedness measures and post-disaster support initiatives, leaving them more vulnerable to physical harm and unable to use proper lifelines.

Japan’s history and identity has been shaped through the representation and re imagination of its past disasters (Ekström & Kverndokk, 2015; Krüger, 2015). The Tokyo earthquake and fire in 1923, the Great Hanshin Earthquake in Kobe in 1995, and the Tohoku earthquake and nuclear disaster of 2011 have all contributed to the creation of collective images of disasters which “influence how extreme events are managed and remembered” (Ekström and Kverndokk, 2015; 365). The occurrence of seasonal typhoons, heavy rains and small earthquakes also contributed to public awareness of disaster prevention measures and progressive disaster education in schools and workplaces (Fujioka, 2016; Kitagawa, 2016).

The city of Kobe has various examples marking the “collective imagination” of disasters. Among them is the Earthquake Memorial Museum, a testimony of how memory and imagination of disaster were permanently reshaped after 1995 (Figure 9.2). The museum testifies the horrors suffered by the affected community but also makes a hopeful statement that prevention and disaster education can help to minimise the impacts of such events in the future. A researcher working at the Disaster Reduction Institute, part of the museum, suggested that the very location of the museum refers to the concept of “rebirth”, with the land where it stands been a residential area destroyed by fires following the quakes...a location to which former residents did not want to move back (Interview 2).

Figure 9.2 Earthquake Memorial Museum © 人と防災未来センター



Kobe was considered a model of success in urban redevelopment after a disaster and is seen as the origin of the “build back better” (BBB) model, which greatly impacted disaster management at the global level (Saya et al., 2017). The Great Hanshin earthquake was not only a world-wide learning experience in terms of disaster reconstruction but also changed the structure of Japan’s society as a whole. It marked the beginning of Japanese volunteerism (Nakano, 2005), a deeper and long-term commitment to networks of social support and localised disaster resilience through disaster information, drills and trainings organised by local neighbourhood associations, volunteer groups, schools, cultural groups etc. (J. Lee & Fraser, 2019; Tatsuki, 2007). These aspects of Japanese disaster culture are an important aspect of everyday life and the collective memory of Japanese residents, but can lead to further challenges for foreign residents. The literature suggests that a lack of experience with disaster events often results in a lack of preparedness (Antronico et al., 2019).

Although disaster events occur often in Japan, the case-study suggests that the disaster awareness of foreign residents is significantly lower than that of Japanese residents. In fact, it was mentioned in two interviews that the lack of familiarity with disasters and disaster prevention is the main difference between Japanese and foreign residents:

“Foreigners don’t have any sense of urgency with regards to disaster. In Japan, everyone knows what happens if there is a disaster and everyone tries to prepare, and you often don’t have that overseas. Well, this kind of disaster may come anytime and we need to prepare for it. In Japan we have earthquakes all the time, and we have to prepare for that.” (Interview 17).

“I think in my case, I was born in Barcelona, a Mediterranean paradise with not a lot of disasters. We have some floods, draughts and minor earthquakes. In fact sometime I think that it would be worse if it happened in Spain because nobody would know what to do. I remember my father went to Turkey when there was this huge earthquake and more than 3thousand people died and he was so traumatised.” (Interview 20)

Another aspect of disaster preparedness that is deeply embedded in Japanese culture and poses challenges for foreign residents, are the *evacuation shelters*, as reported by 3 interviewees (Interviews 13-19-20). In Japan, evacuation shelters are open to everyone who needs support and information, or seeks refuge after a disaster. Shelters in Japan are usually situated in school gyms and are equipped to meet the basic needs of the residents in the area (water, food, toilets, basic information etc.). However, only little attention has been paid to the requirements of foreign residents (see section 9.3.3 for more information). Foreign residents are often not aware where the shelters are located and do not have the basic understanding of how they work:

“I have the impression they don’t really go to public evacuation shelters. I don’t know because of lack of information or because they choose to not evacuate. It seems to me they prefer to evacuate to their friends’ place or their relatives’ rather than relying on the public institutions so that’s probably cultural but also it’s maybe invisible pressure that they might want to avoid the evacuation shelters.” (Interview 19).

Another source of vulnerability for foreign residents suggested in the study is the lower trust that the Japanese government will take care of them in case something happens. Disaster literature suggests that *trust in the government* is an important aspect of disaster preparedness (J. Lee, 2020). Previous results of perceptions of obstacles in connecting

with the authorities (see *constraint recognition* in Chapter 6, Section 6.3.2 and Chapter 7, Section 7.3.4) suggest that foreign residents have heightened perception that the authorities will not be able to deal with them during an emergency situation:

“If something really bad happens, like I lose the house. I don’t trust they will care enough or be interested enough. Even Japanese people say it is difficult for them to get compensation... I feel here [in Japan] the majority of people know what to and they have this trust in the government or in the system which we, as Spaniard, don’t really have.” (Interview 20).

9.3.2 Protection measures

The lack of protection measures was mentioned in 12 interviews. The results showed that it was the second most accounted for aspect of disaster preparedness challenges (73 data references, Table 9.2). When discussing the important measures taken to improve the safety and resilience of people, two main points were highlighted from the point of view of the “providers” of protection measures, i.e. policy-makers and NPOs, and from the point of view of foreign residents, the “receivers” of protection measures, respectively. For the former, the main challenge is tackling the optimistic bias, the cognitive belief that a disaster would not happen (Trumbo et al., 2014), that often makes protection measures ineffective not only for foreign residents but for all residents. For the former, the main challenge during a disaster is to find reliable and understandable information.

9.2.2.1 Optimistic bias defeats self-help protection measures

A critical concern that came out from interviews with rescue workers and NPOs was the lack of individual resilience and self-help capabilities of foreign residents, leaving them exposed to harm in case of a disaster (Interviews 5-6-19-22). A crucial reason for this lack of resilience is optimistic bias. People who experience optimistic bias have lower perceptions of risk and are less likely to be prepared in case a disaster happens level of risk perceptions has been stressed in the literature (Chock, 2011; Trumbo et al., 2014). The negative impact of optimistic bias in disaster preventive behaviour is supported by the research findings in this chapter. Both community members and DRR staff mentioned optimistic biases regarding the unpredictability and recurrence of natural hazards: “Disasters are a learning process. The first problem is that people do not think that it

[disaster] would happen to them” (Interview 22). As suggested by Trumbo (2014), this study finds that optimistic bias is not fixed but fluctuates in time, increasing after the occurrence of a disaster:

“After a disaster, the number of visitors to the centre spikes depending on where the earthquake takes place. If the natural disaster is far the number of visitors does not change because they think the disaster happens because of the location. However, also water disasters like floods and heavy rains do not impact the number of visitors” (Interview 22).

“It’s ironic but when disaster happens somewhere, from the following year the local authorities from those affected areas would start to request this information but before the disaster happens they don’t really pay much attention.” (Interview 19)

To address optimistic bias in the resident population, the majority of disaster preparedness events focuses on fostering notions of self-help and mutual help during disasters and at evacuation shelters, because “external help will not come until the very end” (Interview 19). In practice, self- and mutual help are created through different participatory initiatives. The most common are disaster drills and evacuation shelter simulations for both service providers and receivers (Parzniewski, 2017). In the latter case, residents learn what to expect at shelters and how to become self-sufficient by learning simple tasks, such as how to save water, make a bed or toilet from cardboard, or the procedures that will take place in evacuation shelters (Figure 9.3). Evacuation shelter experiences are helpful to provide people, who have never experienced evacuating to a shelter, an impression of what to expect. The lack of such evacuating experience can cause anxiety, especially regarding the lack of information about which services and commodities will be available at the evacuation centre. One interviewee stated: “When we prepare for disaster we imagine a situation of temporary evacuation of around two days, but since we don’t have a direct experience it is a bit difficult to imagine” (Interview 11).

Figure 9.3 Toilet from carton board, Enogaikai Simulation © author (L)
Figure 9.4 Training of local volunteers in evacuation simulation, Osaka International House ©author (R)



Although optimistic bias can affect anyone, optimistic bias of foreigners seems to lead to different understandings of disasters (see above 9.3.1.3 “Cultures of disaster”):

“Probably another factor is that foreigners don’t have any sense of urgency with regards to disaster. In Japan, everyone knows what happens if there is a disaster and everyone tries to prepare, and you often don’t have that overseas. Well, this kind of disaster may come anytime and we need to prepare for it. In Japan we have earthquakes all the time, and we have to prepare for that.” (Interview 17)

The issue of optimistic bias suggests that the problem is not insufficient information but rather the lack of interest in disaster information:

“In terms of information they do publish information in print and online but no one really bothers to read them. For example, there is a quite a large amount of disaster preparedness info but that does not guarantee that the information will reach everyone.” (Interview 19)

9.2.2.2 “Lost in translation”: Insufficient information and new sources

Another concern shared by 6 of the interviewees was inadequate information available during crises. Reliable information at times of crisis is crucial to prevent the escalation of vulnerabilities as well as adequately assess individual needs and necessary actions. Two points were highlighted in particular: 1) the lateness and inaccuracy of content, and 2) English as the sole foreign language used in non-Japanese disaster communication.

Maybe one of the most recognised vulnerabilities of foreigners is the lack of easily available information in languages other than Japanese at the time of emergency and evacuation (Uekusa, 2019):

“In the district you have information about the natural disasters that the City Hall shares. If there are signs of a flood coming, the city hall has the updated information, and throughout the city there are speakers saying “Be careful the water is rising” and give information about the water, but *everything is in Japanese*. All the residents can listen but only in Japanese. And these speakers are not so clear so even if you speak Japanese you cannot understand because it is not so clear. So, during that time because if the flood come it would really be a natural disaster.” (Interview 18)

“In 2011 personally I was in a public office building at the time of the quake and I could not go back home because all transport had stopped and I was worried about my daughter ...at that time *there was zero information available in foreign language*.” (Interview 18)

Another challenge is the *lack of precise information* from official sources. This problem was noted both with regards to traditional disaster contexts and during the COVID-19 pandemic (Interviews 14-21). A respondent recalls the aftermath of the Great Tohoku disaster in 2011 the difficulty in assessing reliable and trustworthy information:

“After that [disaster], I feel *it was very difficult to get correct information*. The Japanese Government was informing really slowly and there were all these foreign media, focused on sensationalism and scandal. You could see all these pictures of flooded houses and of course there was the radiation. I kind of felt I was fine in Kyoto, it was not that dangerous. But my parents were watching that news every day and they kept telling to come back home.” (Interview 21)

Another respondent noted how the lack of prompt translation into English was a problem also during the COVID-19 pandemic:

“The information is available for Japanese but the latest information is not available for foreigners. For example, you would have the information on the home page of the city office or the district office. That happens all the time for Corona (COVID-19), but everything is in Japanese. Even when they are translated but the translation is not accurate.” (Interview 18)

The frustration of many interviewed foreign residents with the slow and unprecise information regarding the COVID-19 situation led many to trust alternative or unofficial

sources to obtain important information, such as Facebook, Twitter and other informal sources (Interview 10-15-21).

9.2.2.3 Lack of emergency measures

4 interviewees with NPO workers and community members mentioned that additional emergency resources would have been helpful in previous critical situations. These resources were mainly: communication with the home country and embassy, support in filling out administrative forms in Japanese, or getting access to Japanese health services. Communication with the family of foreign residents is crucial during emergency situations, but not given high priority in the current disaster management framework. Even if a disaster does not directly affect foreigners, it is important to maintain a viable line of communication with their families at home to avoid panic and discomfort:

“My first thought was *I need to call my parents* quickly before they can see it on the news at home. Even though they have been to Japan before they still don’t know where Tohoku is and they will get worried. So I managed to send them an email but I was not able to call them because the phone lines were down. I was lucky that I could send them an email. That was really my first reaction.” (Interview 21)

In terms of getting financial support from the Japanese government, it was mentioned that the process is complex and very difficult for foreign residents to navigate, possibly leading to indirect discrimination in access to financial support measures at critical times. A recent example was the bonus of 100,000 yen given to residents in Japan during the COVID-19 pandemic. A foreign resident recalls:

“Last year I subscribed for any disaster related events and they sent out a few different things for COVID-19. But when it came to this form to fill out to receive money from the government *I did not receive any assistance*. I heard through the rumour that foreigners were eligible too. I did a bit of homework on how to fill it out, but *it was difficult*. The form was *only in Japanese*, there wasn’t any English. I still haven’t got it because I made a mistake in filling it out. So yes, there has been some frustration when it comes to information and communication. There were email alerts but it has been quite an active search.” (Interview 18)

This anxiety in accessing services is even more evident when discussing the need for **medical help**. Foreigners who do not understand Japanese do not know how to ask for

help or explain their symptoms and other who attempted to get mental health support during COVID-19 experienced a slow response:

“I emailed them last month telling them “I am in a bad situation”. They gave me an appointment with a psychologist three weeks later. The appointment was last Friday but they emailed me saying that it was cancelled and they moved it to next Friday. During those time I got support from an Indian psychiatrist. I am not blaming ..., they must have a lot of requests. I was not an emergency but the fastest slot available was in three weeks.” (Interview 16)

This point connects with the last concern identified by respondents: the *availability of manpower and resources* if an earthquake or another natural hazard were to happen. In fact, news about and personal experiences of service disruptions and material shortages make many respondents worry about how the pandemic impacts disaster response:

“Even if I feels sick, during this period she is trying not to go to the hospital due to the COVID-19 situation. I fear that if a disaster were to happen, there would be problems in getting health care due to the current lack of manpower and resources.” (Interview 13)

9.3.3 Disaster management and education

Challenges in disaster management and education were discussed in 10 interviews and accounted for 21% of the total data (Table 9.2). The main challenges in disaster management are the over-reliance of foreign residents on external help and the inability of policy-makers and operators to identify foreign residents to provide disaster prevention information and support during a disaster (see Section 9.3.1.1 “Social Isolation”). In terms of disaster education, the main challenge is the lack of basic disaster education. The disaster education challenge and the disaster management challenge both ground on the inability of policy-makers and DRR stakeholders to identify vulnerable groups and motivate them to get involved in disaster education initiatives.

9.3.3.1 Moral hazards

In insurance economics a “moral hazard” refers to the “tendency of insurance protection to alter an individual’s motive to prevent loss.” (Shavell, 1979). This term was used in a presentation during the 25th year memorial of the Great Hanshin earthquake in Kobe with regards to compulsory natural hazard insurance. The speaker referred to the “moral hazard”

of compulsory disaster insurance, which often had the unintended effect of making individuals more likely to expose themselves to hazards due to the belief that they will be safeguarded in any event (Kobe Conference, 21/01/2020). This section builds on this use of the concept in disaster preparedness to argue that people decide to not engage in preventive behaviour because they have the “insurance” that any damage will be taken care of by an external party. “Moral hazard” usually refers to the above-mentioned insurance systems but is also useful to understand how some residents might choose riskier disaster behaviour, such as not getting necessary disaster information and disaster preparedness, because they trust that someone, such as rescue workers, will take care of them and the damage (Interview 22).

Together with the “optimistic bias” (see 9.2.2.1), this notion of trusting third parties to provide disaster preparedness could explain the lack of preventive action. While both can be used to justify the lack of disaster preventive measures and behaviours, the notion of “moral hazards”, as intended in this chapter, is different from “optimistic bias”. The former accepts a level of danger but foregoes it based on the presence of a “safety net” (Frank et al., 2021). The optimistic bias on the other hand is a cognitive bias by which an individual assumes they are less likely to experience negative situations and more likely to experience positive ones (Dolinski et al., 2020). Nevertheless, the two issues often lead to the same result, i.e. the lack of interest in disaster education and disaster preventive measures. For foreign residents, the “moral hazard” takes the form of depend on Japanese partners and social connections. Foreigners seem to believe that Japanese will take care of necessary disaster preparedness, and therefore, making it unnecessary for the foreign residents to get prepared themselves: “I assume because he is Japanese and he has this experience as mountaineering and survival he will take care of me or he will let me know what to do” (Interview 20).

In addition to depending on others for safety, foreign residents might also have a different view on their roles as protectors and safeguards for community resilience. A foreign resident noted during a preparedness event held by Kyoto International Foundation, when learning about how to support vulnerable people in the same building: “I don’t understand why we have to learn all these things [talking about evacuation and hazard maps] anyways it is their [firefighters] job to save us, they are the trained, not us” (Intervention done during KOKOKA disaster preparedness for foreign residents, see Figure 9.5). The

intervention was met with surprise by the Japanese translators, for whom the notion of solidarity during an emergency is well-accepted and rarely questioned. In fact, the argument of the participant poses an interesting question about the different cultural expectations of one's role during a disaster between foreign and Japanese residents.

Figure 9.5 Group discussion, KOKOKA Disaster Prevention event ©author



9.3.3.2 Lack of basic disaster education

From the disaster preparedness providers' point of view, the lack of knowledge of basic emergency skills is an important challenge for both Japanese and foreign residents (Interviews 5-6). Disaster education in Japan usually relies on visualisation and participation through school drills starting from a very young age. This is supplemented by interactive and child-friendly activity services provided by local governments (Fujioka, 2016). Most disaster preparation experiences for Japanese residents originate from these participatory activities. Typical examples are: practicing 911 calls, using a fire extinguisher, or experiencing earthquake simulations (Figure 9.6 and 9.7). These activities are usually provided under the supervision of volunteers and rescue operators.

Figure 9.6 Flooded door, CDPC © author (L) **Figure 9.7** Flooded Car Door Simulators ©author (R)



Foreign residents represent a specific category of vulnerable individuals in this discussion as they often do not have the opportunities to develop disaster literacy, with the Japanese language barrier being one reason. Many events, such as the CDPC, do not provide the full activity in English and are mostly oriented to the Japanese-speaking residents.

“That [the problem of disaster preparedness] is the same for both Japanese and foreigners, but because most Japanese people have been to school and have experienced emergency drills, we do have basic knowledge about disaster preparedness. That’s an issue: unless you belong to something, it’s difficult to get enough information to prepare for disaster.” (Interview 19).

This comment suggests that the above-mentioned cultural issues of social isolation (Section 9.3.1.1) and different cultural practices of disaster education (Section 9.3.1.3) can contribute to different levels of disaster literacy.

9.3.3.3 *The “invisible” foreigners*

Previously, I discussed how certain foreign groups’ needs and differences are “invisible” in the cultural understanding of “foreignness” (Section 9.3.1.2 “Identity bias”). . Also in disaster management, there is a systemic overlook of foreign residents of especially vulnerable social and economic status. These individuals would be the ones who would be more affected in case of disaster, and although in particular need of protection, do not get to experience disaster preparedness training (Kanbara et al., 2016). While there is a growing media focus on the disaster vulnerability of trainees in Japan (Nakamura & Shiotsuki, 2020; Yamada & Shimura, 2019), little academic research has focused on those

foreign residents who are unable to access formal disaster education. An interviewee noted that since compulsory disaster training usually takes place in the workplace in Japan, people belonging to smaller firms, work at home, or are self-employed have significantly less chances to get basic emergency preparedness.

“In terms in disaster preparedness, the challenges in general are for example, if your children go to school, the school would organise emergency drills. Or if you belong to companies, they do organise emergency drills, but *if you don't belong to either to these social institutions, then you may not have the chance to experience emergency drills or learn about disaster preparedness unless you proactively seek the information and opportunity.* That is the same for both Japanese and foreigners, but because most Japanese people have been to school and have experienced emergency drills, we do have basic knowledge about disaster preparedness. That's an issue: unless you belong to something, it's difficult to get enough information to prepare for disaster.” (Interview 19)

An interesting proposal from the Osaka International Foundation to reach these invisible foreign communities is to recruit Japanese-speaking students as trained disaster supporters:

“So far we are targeting international students because they are the ones who can speak Japanese. If we could get actual residents to come that would be good, but it's still a problem. Reaching out to residents is a problem, we still have to figure out how to solve it: is it a communication problem? Are they indifferent? We don't know. What we can do right now is reach out to the vocational schools. A lot of students there are working part time in different places so that's why we could get a lot of students. Also, they are students now but some of them after graduation will probably be working in Japan. It's a *long-term investment.*” (Osaka International Foundation)

9.4 Summary

The starting point of the discussion was the isolation experienced or feared during the traditional “natural disaster”, i.e. earthquakes, strong rainfalls, typhoons and tsunamis. Naturally, the discussions often led to the small challenges foreign residents face daily, that become relevant and potentially life-threatening vulnerabilities in case of all emergencies and crises, as happened during the COVID-19 pandemic outbreak. This natural progression is a testament to the need to consider the inclusion of foreign residents in disaster resilience not as an *ad hoc* interventions, but as part of a bigger effort to integrate foreign residents more in the daily life. Compared to more structured

interventions, such as disaster drills or disaster trainings, creating a social network for sharing information and social support has the advantage of being adaptable to the changing nature of crises and disasters, creating a sound basis of local support to face expected and unexpected crises.

This chapter discussed the main disaster preparedness challenges and concerns of foreign and Japanese residents in Kansai, Japan. It showed that the main challenges for foreign residents are informed by language barrier and social isolation, lack of effective disaster education, insufficient information and stereotypes. The discussion also highlighted how disaster preparedness challenges often derive from inequities within socio-cultural and economic structures, especially with regards to non-English speaking foreign residents of lower socio-economic status living in Japan's countryside. These socio-cultural and economic inequalities, as well as the separation between the foreign and local community lead to inefficient disaster communication strategies in terms of both content and focus.

This study contributes to a more holistic understanding of disaster preparedness and highlights the importance of inclusion and diversity for disaster resilient multi-cultural societies. It was shown that the roots of vulnerabilities often lie in social and economic structures, hence disaster resilience efforts should not only target DRR policy and management, but also aim to foster social interactions and support networks available for foreign residents. The study ultimately suggests the inclusion of different lifestyles and cultures in disaster education.

Chapter 10 Conclusion

10.1 Introduction

This chapter revisits the three study objectives and presents the final conclusions of the thesis. Sections 10.2 and 10.3 address the elements of *risk* in the study's framework (see Figure 10.1). Section 10.1 addresses the first study objective "to understand the general perception of risk with regards to the social vulnerabilities of gender-based disaster risks and risks for foreign residents in Japan" (SO1). This section outlines the answers to the research questions on *perceptions of risk* (RQ1) and *predictors of risk* (RQ2), as follows:

- RQ1a "What is the general perception of gender-based disaster risk in Kyushu, Japan?"
- RQ1b "What are the disaster risk perceptions of foreign residents in Kansai, Japan?"
- RQ2a "What is the main predictor of public interest in gender-based disaster risk?"
- RQ2b "What are the main predictors of interest in disaster risk among foreign residents?"

Section 10.3 outlines the relationships between risk perception and social and cultural characteristics to address the second objective (SO2) "to test if and how risk perceptions of gender-based disaster risks and risks for foreign residents in Japan are influenced by demographic and experiential factors". This section answers the questions:

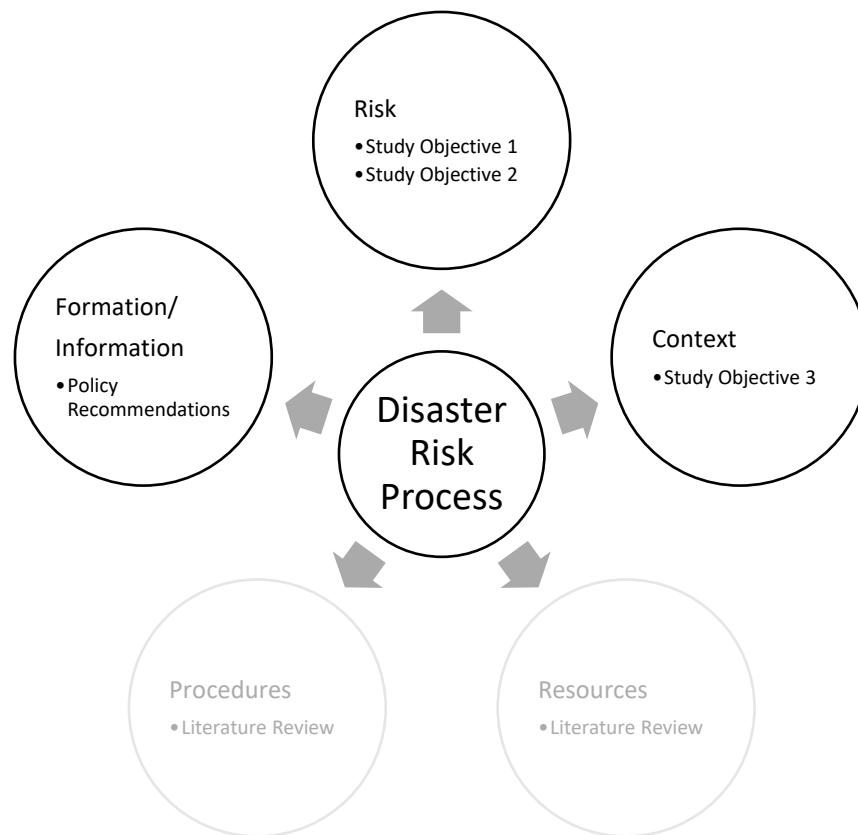
- RQ3a "what are the impacts of experiential and demographic variables on gender-based risk perceptions?"
- RQ3b "what are the impacts of experiential and demographic variables on risk perceptions of foreign residents in Kansai, Japan?"

Section 10.4 covers the *context* of the study framework and addresses the third objective (SO3) "to analyse the socio-cultural context of disaster vulnerabilities of gender-based disaster risks and risks for foreign residents in Japan". This section answers the questions:

- RQ4a "What are the disaster vulnerabilities of women in Kyushu, Japan?"
- RQ4b "What are the challenges of disaster preparedness in Kansai, Japan?"
- RQ5a "What are the impacts of gender discourses on disaster vulnerabilities for women in disaster preparedness?"
- RQ5b "What are the challenges of disaster preparedness for foreign residents in Kansai, Japan?"

Section 10.3 addresses the final element of the conceptual model applied to this study: the *formation* (of stakeholders) and *information* (of the public) by offering some general policy recommendations. Finally, the limitations of this study and future research areas will be outlined in Sections 10.4 and 10.5.

Figure 10.1 Structure and study objectives © author



10.2 Conclusions to Study Objectives

10.2.1 Public risk perception and social vulnerabilities

As experts seek to include social vulnerabilities in DRR strategies, this research contributes to the study of social disaster vulnerabilities and risk perceptions (Boret, 2020; Oliver-Smith, 1999) by investigating the public’s perceptions of two categories of social vulnerabilities in Japan: gender-based disaster risks and disaster risks of foreign residents. Because this study was based on the case-studies of Kyushu and Kansai, the conclusions cannot be generalised to Japan in general. However, the findings can inform

further studies in other socio-cultural contexts. Discussion points and challenges help to inform better understandings and further research into social vulnerabilities of gender issues and foreign residents in Japan. The hypotheses for gender-based disaster risks and foreign residents' disaster risks were (Chapter 4-6):

Gender-based disaster risks (Chapter 4)

- H1: Community members in Kyushu have high **awareness** (situational motivation) of gender-based disaster vulnerabilities.
- H2: Higher **problem recognition** predicts higher situational motivation.
- H3: Higher **involvement recognition** predicts higher situational motivation.
- H4: Higher **constrain recognition** predicts lower situational motivation.

Foreign residents' disaster risks (Chapter 6)

- H1: Foreign residents in Kansai have high **awareness** (situational motivation) of their disaster vulnerabilities.
- H2: Higher **problem recognition** predicts higher situational motivation.
- H3: Higher **involvement recognition** predicts higher situational motivation.
- H4: Higher **constrain recognition** predicts lower situational motivation.

With respect to gender-based disaster risk perceptions, Chapter 4 presented the results of a quantitative analysis of risk perceptions among Japanese residents. It concluded that the public is highly aware of the problem of gender vulnerabilities and motivated to engage in future disaster preparedness initiatives focused on gender issues. Although the general understanding of policy makers is that risk awareness is an effective driver for disaster preparedness motivation, the chapter's results suggest that *awareness* of risks alone does not necessarily results in higher motivation. Rather, the crucial predictor of interest in disaster preparedness is people's *identification* with gender-based disaster risk. These results extend the literature on risk perception by suggesting that, in the public perception, disaster risks, like health risks, are strongly connected with the individual dimension and perceptions of individuals who feel directly vulnerable and exposed to a specific category of risk (Andersson, 2011; Y. Kim et al., 2018; Yan et al., 2018). Based on these results, future studies could benefit from a more interdisciplinary approach across health and risk

behaviours. In particular, disaster preparedness strategies could be informed by studies on healthy and safe behaviours to better target the citizens.

When it comes to the perceptions of disaster risks among foreign residents in Kansai, Japan, Chapter 6 suggests that risk awareness is relatively high among respondents but, similarly to the results for gender-based disaster risks discussed in Chapter 4, not the main factor in motivating disaster preparedness. The study found that in addition to risk awareness (*problem recognition*), *constraint recognition* is an important predictor for people's motivation to learn more about disaster risks. Chapter 6 further suggests that the perception of personal constraints is important to understand the motivation of foreign residents to learn more about disaster risks. Currently, foreign residents show a high-level perception of constraints, illustrated by their lack of confidence in self-help capabilities and the perception that government officials do not fulfil their responsibilities of care towards foreigner residents. Such perceived constraints, reinforced by language barriers, information gaps and other difficulties of access, are highly detrimental to foreign residents' motivation to improve their disaster preparedness. These results are similar to previous studies suggesting that ethnic minorities are more vulnerable to disaster risks than local citizens (Matsuura, 2021; Shah et al., 2013), and also adding to the literature by proposing that the lack of self-efficacy in disasters can lead to disaster vulnerabilities (Lindell & Whitney, 2000; Paton et al., 2001). In the case of foreign residents, the lack of self-efficacy is perceived in the form of constraints and lack of interaction with the authorities, which is a topic widely discussed across social and cultural studies in Japan, especially with regards to the employment and working system (Kuga, 2018; Lie, 2015) but rarely included in studies on disaster preparedness.

10.2.2 Factors of risk perception

The study subsequently focused on identifying the drivers of high-level risk perceptions among the respondents of both case-studies by testing the following hypotheses (Chapters 5 and 7):

Gender-based disaster risks (Chapter 5)

- H1: **Gender** has an impact on the perception of gender-based disaster risks /Women have a higher perception of gender-based disaster risks
- H2: **Age** impacts the perception of gender-based disaster risks/Younger people have a higher perception of gender-based disaster risks
- H3: **Personal experience and knowledge** increases the perception of gender-based disaster risks.

Foreign residents' disaster risks (Chapter 7)

- H1: **Gender** has an impact on the perception of disaster risks/Women have higher situational motivation than men
- H2: The **socio-cultural background** has an impact on perception of disaster risk
- H3: **Language level** affects perceptions of disaster risk/ Lower language level corresponds to perception of higher disaster risk
- H4: **Personal knowledge and experience of disaster** increases the perception of disaster risks

With regards to gender-based disaster risk, Chapter 5 focused on identifying patterns of high- and low-level interest and identification with gender-based disaster risks. The results suggest that gender, age and experiential variables (*previous experience, information sufficiency, and confidence*) are important factors for motivation to seek information about gender-based disaster risks. In terms of gender, responses illustrated that men, compared to women, had lower recognition of themselves as being affected by gender-based risks, which supports findings in Chapter 4 and confirms the literature on heightened risk perceptions of women compared to men (Flynn et al., 1994; McDowell et al., 2020; Morioka, 2014). In terms of age, younger people seemed to identify and generally care less about gender-based disaster risks compared to elderly people. This result supports the argument that disaster risk perceptions are somewhat similar to health risk perceptions in as far as elderly people tend to identify more and be more aware of the risks (Baker, 2011; Y. Kim et al., 2018). In the matter of experiential variables analysed in this study, Chapter 5 confirmed the existing literature that previous disaster experiences can create higher interest in disaster preparedness (Baker, 2011). However, at the same

time, higher confidence in one's own disaster preparedness decreases the motivation to continue learning about disaster risk in the future. This result is in line with the behavioural studies that suggest that information sufficiency decreases interest and motivation (Trumbo, 2006).

A similar analysis was conducted for foreign residents in Chapter 7. The results suggested that for foreign residents, motivation to take disaster preventive actions is affected by gender, the society model of their country of origin, their experience of disasters and their confidence in having a sufficient disaster preparedness level. As for gender, similar to Chapter 5, women appear to be more motivated in taking preventive actions compared to men. It was also found that respondents from communitarian societies (e.g. China) are significantly more interested in disaster preparedness than their counterparts from more individualistic societies (e.g. USA). Similar to Chapter 5, foreigners' previous disaster experience seems to result in higher interest in disaster preparedness. However, contrary to the results of gender-based disaster risks (Chapter 5), confidence in one's preparedness and information sufficiency led to higher interest in future disaster preparedness action for foreign residents. A reason for this could be that people's higher sense of information sufficiency and higher confidence in personal self-help capabilities could result in lower constraints (Trumbo, 2006). Lower constraints, in turn, predict future interest in disaster preparedness, as shown in the results from Chapter 6 (Section 6.3.2). Finally, although somewhat important in determining respondents' recognition of disaster risk, Chapter 7 found that language is not a major factor affecting people's motivation to take disaster preventive action. Various studies have focused on language as the main barrier to the disaster preparedness of foreign residents (Uekusa, 2019). However, this study's findings suggest that current DRR strategies that focus predominantly on linguistic issues of disaster communication, should be complemented by studies paying more attention to foreign residents' socio-cultural characteristics and target those who perceive individual actions and opinions do not have an impact on disaster preparedness.

10.2.3 Impact of socio-cultural context on risk perception and disaster preparedness

In the third and final analysis, the study focused on exploring the underlying socio-cultural discourses of disaster and social vulnerability for both case-studies (Chapters 8 and 9).

In terms of gender-based disaster risks, Chapter 8 identified major disaster vulnerabilities for women in Kyushu and possible impacts of gendered public discourses on household preparedness, emergency preparedness, evacuation and disaster management. Chapter 8 illustrated that the lack of disaster education on household preparedness and evacuation, insufficient protection measures in evacuation shelters, and several cultural barriers are the main factors of disaster vulnerability for women in Kyushu, Japan. This was followed by the lack of female representation in disaster management, low community support, language barriers and age. The study confirmed that these factors of vulnerabilities are related to discourses of women as victims, domestic and caretakers as well as discourse about men as breadwinners and life-savers (Fatouros & Capetola, 2021; Fordham, 2013; Fulu, 2007; Hamidazada et al., 2019; Tyler & Fairbrother, 2013). Regarding household preparedness, women's vulnerabilities originate largely from them being exclusively responsible for household preparedness and evacuation planning for the family. On the other hand, the study also suggests that traditional notions of masculinity as separate from household matters (Dasgupta, 2000, 2013; K. Ito, 2005; Taga, 2005) result in a lack of household preparedness initiatives directed towards men, who are therefore often underprepared in the case of a disaster. It was also shown that women feel uncertain if they should evacuate when having children, in part due to their vulnerabilities based on the absence of private and separate spaces and a safe reporting system for abuse in the evacuation shelters. Public gender roles were shown to affect women in terms of their under-representation in disaster management, as notions of female leadership are still rare in Japan's public DRR discourses (Ear, 2017). Chapter 8 concluded that traditional discourses around gender roles are still present today and impact both content and context of current disaster initiatives, further perpetuating disaster vulnerabilities of women.

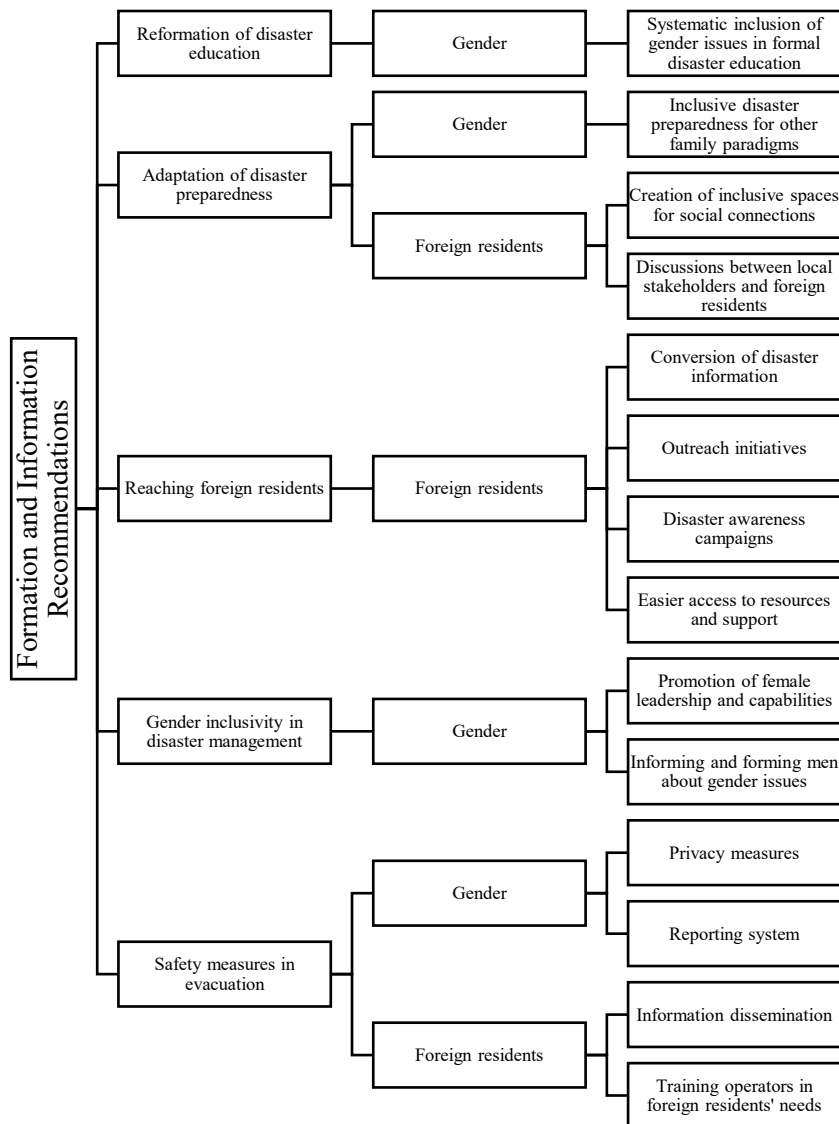
A similar approach was taken in Chapter 9 to identify and better understand disaster vulnerabilities of foreign residents in Kansai, Japan. Results suggested that the main

challenges in disaster preparedness for foreign residents are language barriers, social isolation, lack of effective disaster education, insufficient information, and stereotypes of foreign residents as “temporary guests” in Japan. Chapter 9 highlighted the negative impact of foreigners’ isolation from local communities as well as their different cultural views of disasters in general. The results from Chapter 9 inform research on disaster resilience of ethnic minorities by going beyond mere linguistic issues (Uekusa, 2019). In fact, these results confirm recent reports on foreign residents on the necessity to further integrate them into local communities (IOM & Ministry of Internal Affairs of Japan, 2021), and also the importance of cultural aspects of disaster preparedness (Davidson et al., 2013) to pursue the goal of “sustainable and cities and communities” (SDG 11). Foreign residents, the study showed, are exposed to disaster vulnerabilities because of them often lacking individual self-help strategies. This study confirms the argument that foreign residents are less prepared for disasters than locals (Matsuura, 2021), by suggesting one reason is foreign residents underestimating the probability of a disaster and their overreliance on external help and support from Japanese acquaintances or local authorities. Some challenges experienced exclusively by foreign women were also highlighted. Although there are studies on women in disaster preparedness (Bateman & Edwards, 2002; Meyer et al., 2018), there are few that consider how being a foreign woman might impact disaster resilience. Disaster strategies to support women are often available only in Japanese or difficult to retrieve in other languages before and during a disaster. Finally, the study also highlighted that disaster preparedness challenges often derive from inequalities within Japan’s socio-cultural and economic structures, especially impacting non-English speaking foreign residents of lower socio-economic status living in the countryside. These results support the idea that the notion of *Japaneseness* (Lie, 2015), i.e. the ethnic-centred vision used to organise socio-economic structures and source of racial inequality in Japanese society, is an important element of disaster vulnerability of foreign residents. Chapter 9 concluded that the separation between foreign and local communities as well as social and economic inequalities in society can lead to inefficient disaster preparedness outcomes and increased disaster vulnerabilities.

10.3 Policy Recommendations

In this section, some general policy recommendations are made, targeting the practical purpose of *forming* professionals and *informing* the public (fifth element of the structure – Figure 10.1). Figure 10.2 gives an overview of the recommendations extrapolated from the main findings in this thesis.

Figure 10.2 Overview of recommendations in formation and information © author



10.3.1 Reformation of disaster education to include gender-based disaster risks

Although gendered stereotypes in Japan are being challenged in corporate management and politics, the limiting gender discourses and stereotypes are still visible in disaster education, disaster management and emergency situations. Informing the public about the nature of gender-based disaster vulnerabilities is crucial to increase community resilience. Disaster preparedness policies should address the problem of identification with gender-based disaster risk *before* a disaster happens rather than focusing on gender risks only *after* a disaster. The first recommendation of this thesis, therefore, is to promote the **systematic inclusion of gendered disaster vulnerabilities into formal disaster education**. This process could include the integration of broader examples of gender-based vulnerabilities in formal and informal DRR strategies, in schools as well as in the workplace. Currently, notions of gender in disaster education are only included in informal and non-formal disaster education strategies. To “mainstream gender” in DRR, it is necessary to educate new generations through the systematic inclusion of gender-based disaster vulnerabilities and capabilities into Japan’s formal disaster education.

10.3.2 Adaptation of disaster preparedness contents for gender and cultural minorities

Improving training of rescue operators and local policy-makers could provide a more comprehensive understanding of social vulnerabilities based on gender and cultural differences. In the matter of gender, **inclusive disaster preparedness strategies** should be promoted to give non-traditional family paradigms – such as full-time working women, single fathers and mothers – equal access and opportunities to define their own personal roles during and after a natural hazard-induced disaster. As regards to foreign residents, facilitating **discussions between foreign residents and local disaster operators and stakeholders** could strengthen the mutual understanding of the needs and worries of foreign residents about experiencing an emergency situation in Kansai, Japan. Furthermore, these discussions should actively challenge the discourse of foreigners as “temporary” residents. In addition to current ad-hoc disaster preparedness events, local governments and NGOs should create **inclusive spaces and opportunities** for locals and foreign residents to promote the inclusion of foreign residents into community life before

a disaster. This could increase overall community resilience, improve information-sharing and establish safety networks among foreign and local residents.

10.3.3 New strategies to reach foreign residents

With regards to the development of resilient foreign communities, an important aspect of better disaster communication could be the **adaptation of disaster information to target foreign residents**. This means not only the translation of materials, but also to consider issues that might be irrelevant to Japanese citizens: for example, how to repatriate after a disaster, how to communicate with family back home. Also, there is a need for adaptive disaster preparedness strategies for people from individualistic societies, who seem to have a lower motivation for disaster preparedness. Since foreign residents from individualistic countries tend to have fewer social networks (Santos et al., 2017), it is important to devise new **outreach initiatives** to include foreigners in disaster preparedness activities, for example by targeting workplaces, training schools and universities.

To increase the resilience of foreign residents it is crucial to focus these activities on increasing risk awareness and foster their perception of self-efficacy in reducing risk. To do so, **disaster awareness campaigns** targeting foreign nationals should be promoted to increase the awareness of disaster risks and inform the foreign residents about their individual risks. To address self-efficacy, it is especially important to promote awareness of individual capabilities and foster the notion that foreign residents' opinions on disaster risk and vulnerabilities are valuable for the authorities and policy makers. To do so, **existing disaster preparedness resources and expertise should be made available** to foreign residents using multiple communication platforms and channels.

10.3.4 Gender inclusivity of disaster management

A more gender inclusive disaster management approach could help to achieve the goal of mainstreaming gender in DRR, as expressed in the Sendai Framework (IFCR, 2011; International Recovery Platform, 2009; UNISDR, 2015; UNISDR, UNDP and IUCN, 2009). The **promotion of female leadership and capabilities**, not only at the highest levels of disaster management, but starting at the lower management levels (e.g. local

evacuation shelters and community) helps/would integrate women's concerns and experiences in disaster policies and programmes. At the same time, **informing men about gender issues**, especially in relation to household and emergency preparedness strategies, is needed to promote a gender inclusive notion of gender-based disaster risks, making sure that gender equality is promoted in DRR while equally benefiting men and women (UN Economic and Social Council for 1997 (ECOSOC), 1997; UNISDR, UNDP and IUCN, 2009). Here, academia can play an important role in providing **information on the complex understandings of disaster risks and social vulnerabilities** to address the problems of gender-based disaster risks.

10.3.5 Safety measures during evacuation for vulnerable groups

A crucial disaster vulnerability of women in Kyushu is their perceived lack of safety in the evacuation shelters. This vulnerability was not only found in the literature (Parkinson, 2019; Parkinson & Zara, 2013) but also confirmed by results in Chapter 8 illustrating that safety is a concern for both public officials and residents (Section 8.2.2). To ensure safety for everyone in evacuation shelters, **privacy measures** and a reliable **abuse reporting system** are needed to be developed.

Regarding foreign residents' vulnerabilities during the evacuation phase, results of Chapter 9 highlighted that foreign residents have little information on how to be better prepared and what to expect in the case of a disaster or at the evacuation shelter (Section 9.3.2). These results suggest that policy-makers and NGOs should continue to focus on **disseminating information** to the foreign residents on what to bring and what to prepare for the evacuation shelter. In terms of training, the study suggested that foreign residents might experience isolation or have different dietary and personal needs compared to Japanese people. To address these differences, **training** of local disaster management and volunteers should also include open discussion on the needs of foreign national evacuees with local foreign residents, for example in terms of religious needs, cultural norms regarding sharing spaces and services, as well as linguistic issues.

10.4 Limitations of the Study

10.4.1 Participants

A limitation of the study is its targeted participant recruitment. In the case of the analysis of gender-based risk, most survey respondents and interview participants were women. Most gender-oriented disaster events, where data was collected, are women-led and women-oriented, making it difficult to engage with male respondents. In order to develop a more holistic understanding of gender-based disaster risks, it is important to investigate gender-based disaster risks and social vulnerabilities in ways that also include male perspectives. In the study of foreign residents' social vulnerabilities, the majority of survey respondents were university students, mainly due to restrictions imposed by the COVID-19 pandemic. As social vulnerabilities are influenced by socio-economic factors, it is crucial to remember that most international students find themselves in a relatively stable social and economic environment, compared to more vulnerable groups of foreign residents, such as trainees and small business owners.

10.4.2 Location

Another limitation of the study was its focus on urban areas in Japan. As social vulnerabilities are shaped by local characteristics, such as employment and community relations, different regions across Japan might present different disaster risks and perceptions. To further explore the relation between social vulnerabilities, risk perceptions, and socio-cultural discourses, it is necessary to further explore the potential rural-urban divide.

10.5 Future Research

As for gender-based social vulnerabilities, this study aimed to contribute to the literature on disaster vulnerabilities of women by highlighting the paradox of women's role in disaster resilience in Japan: women are the main target of household preparedness and child-care disaster information, but are mostly absent from decision making processes in DRR policy and management. Their contribution is limited to activities at women-only spaces that can improve individual preparedness but have a limited reach to address more

structural problems in DRR management. In fact, women-only spaces often result in further division between men and women, with men often being excluded. Moreover, female voices in disaster preparedness at the local communities are often ostracised by gender norms and rules of respect and hierarchy. More research is needed to explore how women's capabilities are expressed at the level of the household and local communities and how to formally transfer these skills to disaster management platforms. Furthermore, more research is needed to understand how men perceive gender-based disaster risk in Japan to promote inclusive disaster resilience. This study suggested that men do not identify with gender-based disaster risk. Hence, it is necessary to investigate how men are receiving messages of gendered DRR initiatives and public discourses promoting an inclusive notion of gender, and to identify challenges based on different age and socio-economic status.

When it comes to foreign residents' vulnerabilities, moving disaster research beyond linguistic issues to include more comparable and robust data on gender and cultural differences would help to better understand how foreign residents perceive disaster risks and engage with disaster information. In particular, the fact that the country of origin seems to have an important impact on people's motivation and perceptions suggests that socio-cultural aspects of the foreign population require further investigation. Also, the gender aspect requires further study, to clarify the reasons behind gender differences in foreign risk perceptions related to cultural and social roles. Further exploring these socio-cultural discrepancies in culture and gender is urgently needed to promote truly inclusive and diverse disaster preparedness strategies. Hopefully, this study will help reaching this goal.

Appendices

Appendix 1 Surveys

Appendix 1.1a Survey details for gender-based disaster risks (Ch. 4-5)- EN

Please answer the questions by ticking the squares or by selecting a number from (1) to (5): (1) Strongly disagree - (2) Disagree - (3) Somewhat Disagree (4) I am not sure - (5) Somewhat Agree - (6) Agree (7) Strongly agree. The survey is anonymous.

Section 1: demographic variables

a) Gender _____ b) Age _____ c) Nationality _____

Section 2: Experiential variables

Previous disaster experience

I have knowledge of this issue from past experience of disaster (1)-(2)-(3)-(4)-(5)-(6)-(7)

Information sufficiency

I already received all the information I need about this issue (1)-(2)-(3)-(4)-(5)-(6)-(7)

Confidence

I am confident about my knowledge on this issue (1)-(2)-(3)-(4)-(5)-(6)-(7)

Section 3: risk perception

Problem recognition

Q1-PR1 Disaster risk vulnerability is not the same for everyone. It depends on various factors, such as: gender, age, social relations, income, physical abilities etc. (1)-(2)-(3)-(4)-(5)-(6)-(7)

Q2-PR2 In addition to general disaster risk preparedness, the government should do something about specific these above vulnerabilities before the next disaster (1)-(2)-(3)-(4)-(5)-(6)-(7)

Involvement recognition

Q3-IR(Self) I feel vulnerable during disaster (1)-(2)-(3)-(4)-(5)-(6)-(7)

Q4-IR(Other) Someone close to me is particularly vulnerable to disaster risk (1)-(2)-(3)-(4)-(5)-(6)-(7)

Constraint recognition

Q5-CR1 I can do something by myself to be better prepared if a disaster happens (1)-(2)-(3)-(4)-(5)-(6)-(7)

Q6-CR2 If I contact the local authorities about my individual disaster risks, they will consider my input (1)-(2)-(3)-(4)-(5)-(6)-(7)

Situational motivation

Q7-SM1 I want to receive information about how to overcome my individual disaster risks (1)-(2)-(3)-(4)-(5)-(6)-(7)

Q8-SM2 I am willing to actively learn about how to overcome my individual disaster risks (1)-(2)-(3)-(4)-(5)-(6)-(7)

Appendix 1.1b Survey details for gender-based disaster risks (Ch. 4-5) - JP

	1 全く そう 思わ ない	2 そ う 思 わ な い	3 あ ま り そ う 思 わ な い	4 ど ち ら と も い え な い	5 や や そ う 思 う	6 そ う 思 う	7 と て も そ う 思 う
年齢 _____							
性別 _____							
トピック 1：災害発生時における、「母親」「女性」の持つニーズに関する情報について、どうお考えですか（このセクションはセクション1に関する情報が、人々に十分に提供され認知されているかを調査するためのものです。この結果は、自然災害に対する女性と母親の準備を改善するための追加情報が必要かどうかを明示します。）							
1) 自分の過去の経験や知識によって、この課題に関する情報をもっている。	0	0	0	0	0	0	0
2) この課題について、判断をするのに十分な情報を、これまでに得ている。	0	0	0	0	0	0	0
3) この課題について、十分な知識があり、対応する自信がある。	0	0	0	0	0	0	0
トピック 2：自然災害時において、女性、特に子を持つ女性はより高いリスクをもつ。（女性は、脱出時の身体的なダメージ、避難時の区別の仕方やストレスに対し、より苦しむ傾向があるということが研究によって明らかになっています。）							
1) これは深刻な問題だと思う。	0	0	0	0	0	0	0
2) この課題に対して、次の災害に備えて何か改善策を取るべきだ。	0	0	0	0	0	0	0
3) 私の考えや意見は、この課題に取り組む地方の行政や政府機関の役に立つ。	0	0	0	0	0	0	0
4) 自分の取る行動は、この課題に改善や変化をもたらし得ると考える。	0	0	0	0	0	0	0
5) 自分自身とこの課題の間に直接的な関係がある。	0	0	0	0	0	0	0
6) この課題は身近な人に関係することである。	0	0	0	0	0	0	0
7) この課題をよりよく理解したい。	0	0	0	0	0	0	0
8) 私はこの課題に関心がある。	0	0	0	0	0	0	0
9) 自分の過去の経験や知識によって、この課題に関する情報をもっている。	0	0	0	0	0	0	0
10) この課題について、判断をするのに十分な情報を、これまでに得ている。	0	0	0	0	0	0	0
11) この課題について、十分な知識があり、対応する自信がある。	0	0	0	0	0	0	0

Appendix 1.2 Survey details STOPS model for foreign residents' social disaster vulnerabilities (Ch. 6-7)

Please answer the questions by ticking the squares or by selecting a number from (1) to (5): (1) Strongly disagree - (2) Disagree - (3) I am not sure - (4) Agree - (5) Strongly agree. The survey is anonymous.

Section 1: Demographic Variables

- a) Nationality _____ b) Gender _____ c) Age _____
d) Length of stay in Japan: less than 1 year 1-2 years more than 2 years
e) Occupation: employed worker self-employed student retired unemployed self-describe:
f) Living status: living alone living with spouse living with spouse and children living with children
g) Proficiency level of Japanese language: not at all beginner daily conversation business level native speaker

Section 2: What do you think about disaster risk and the available disaster information?

Previous disaster experience

I learned about what to do and how to prepare for natural disaster from a past disaster experience. (1)-(2)-(3)-(4)-(5)

Information sufficiency

In Japan, I received sufficient information about disaster preparedness (1)-(2)-(3)-(4)-(5)
It was in a language I understood Yes No

Confidence

I am well prepared in case of an emergency situation. (1)-(2)-(3)-(4)-(5)

Section 3: In addition to general disaster risks, everyone has individual disaster vulnerabilities during and after a disaster.

Problem recognition

Q1-PR1 Disaster risk vulnerability is not the same for everyone. It depends on various factors, such as: gender, age, social relations, income, physical abilities etc. (1)-(2)-(3)-(4)-(5)

Q2-PR2 In addition to general disaster risk preparedness, the government should do something about specific these above vulnerabilities before the next disaster (1)-(2)-(3)-(4)-(5)

Involvement recognition

Q3-IR(Self) I feel vulnerable during disaster (1)-(2)-(3)-(4)-(5)

I am vulnerable due to [Tick all boxes that apply] Gender Age Physical abilities Lack of social relationship (friends/neighbours) Income Building vulnerability Language/Understanding

other: _____ None of the above, I don't feel particularly vulnerable

Q4-IR(Other) Someone close to me is particularly vulnerable (1)-(2)-(3)-(4)-(5)

They are vulnerable due to [Tick all boxes that apply] Gender Age Physical abilities
 Relationship with friends/neighbours Income Building vulnerability
Language/Understanding
 other: _____ None of the people close to me
are particularly vulnerable

Constraint recognition

Q5-CR1 I can do something by myself to be better prepared if a disaster happens (1)-(2)-(3)-(4)-(5)

Q6-CR2 If I contact the local authorities about my individual disaster risks, they will consider my input (1)-(2)-(3)-(4)-(5)

Situational motivation

Q7-SM1 I want to receive information about how to overcome my individual disaster risks (1)-(2)-(3)-(4)-(5)

Q8-SM2 I am willing to actively learn about how to overcome my individual disaster risks (1)-(2)-(3)-(4)-(5)

Appendix 1.3 Socio-economic frequency tables for foreign residents' survey

Frequencies for Occupation

Occupation	Frequency	Percent Valid	Percent	Cumulative Percent
employed worker	26	25.000	25.000	25.000
music composer	1	0.962	0.962	25.962
religious order	2	1.923	1.923	27.885
researcher	1	0.962	0.962	28.846
retired	1	0.962	0.962	29.808
self-employed	13	12.500	12.500	42.308
student	54	51.923	51.923	94.231
unemployed	6	5.769	5.769	100.000
Missing	0	0.000		
Total	104	100.000		

Frequencies for Living status

Living status	Frequency	Percent	Valid Percent	Cumulative Percent
alone	65	62.500	62.500	62.500
living in a student hall	1	0.962	0.962	63.462
living wiith spouse and children	2	1.923	1.923	65.385
living with children	4	3.846	3.846	69.231
living with friend	1	0.962	0.962	70.192
living with others/convent	3	2.885	2.885	73.077
living with parents	1	0.962	0.962	74.038
living with roommate	3	2.885	2.885	76.923
living with spouse	16	15.385	15.385	92.308

Frequencies for Living status

Living status	Frequency Percent		Valid Percent	Cumulative Percent
living with spouse and children	8	7.692	7.692	100.000
Missing	0	0.000		
Total	104	100.000		

Frequencies for Length of stay of Japan

Length of stay of Japan	Frequency Percent		Valid Percent	Cumulative Percent
Less than 1 year	14	13.462	13.462	13.462
Between 1 and 2 years	29	27.885	27.885	41.346
More than 2 years	61	58.654	58.654	100.000
Missing	0	0.000		
Total	104	100.000		

Appendix 2 Interviews' overview

Appendix 2.1 Overview of the interviews of (Chapter 5 and 8)

Code	Date	Role	Gender	Age
Interview 1a	28/08/19	Chief GEAD, Fukuoka City	F	48
Interview 1b	28/08/19	Assistant Chief, GEAD, Fukuoka City	M	41
Interview 2	21/08/19	Coordinator GEAD Official from Kodomo Plaza	F	43
Interview 3	21/08/19	Community member, volunteer at Kodomo Plaza	F	32
Interview 4	25/08/19	Chief, GEAD Official Intervention at Genki-Juku event	F	48
Interview 5	12/08/19	Firefighter, working at Citizens' centre for disaster prevention	M	35
Interview 6	20/08/19	Firefighter, working at Citizens' centre for disaster prevention	F	37
Interview 7	01/09/19	NPO member, organiser of the simulation event Director Egaonokai	F	57
Interview 8a	13/09/19	Community member, mother of two	F	35
Interview 8b	13/09/19	Community member, mother of one		34
Interview 9	07/09/19	Community member, grandmother of two, owner of small business	F	65
Interview 10	05/09/19	Manager of the Province Disaster Prevention Office, Fire Defence and Disaster Prevention Division, Disaster Prevention and Crisis Management Bureau, Fukuoka Prefecture	F	26

Appendix 2.2 Overview of the interviews of (Chapter 9)

Code	Date	Role	Gender	Affiliation
Interview 1	27/05/2019	Researcher	F	DRI
Interview 2	27/05/2019	Researcher	F	DRI
Interview 3	27/05/2019	NPO volunteer	F	Takatori NPO
Interview 4	03/06/2019	Researcher	F	University
Interview 5	15/11/2019	Policy-maker	M	Kyoto City Hall
Interview 6	21/01/2020	Professor	F	University of Colorado Boulder
Interview 7	13/02/2020	Professor	M	Kyoto University
Interview 8	27/02/2020	Researcher	F	DRI
Interview 9	19/05/2020	Foreign resident	M	University
Interview 10	19/05/2020	Foreign resident	F	University
Interview 11	21/05/2020	Foreign resident	F	University
Interview 12	21/05/2020	Foreign resident	F	University
Interview 13	22/05/2020	Foreign resident	M	University
Interview 14	22/05/2020	Foreign resident	F	University
Interview 15	08/08/2020	Foreign resident	F	Not Available (NA)
Interview 16	18/08/2020	Foreign resident	M	NA
Interview 17	08/09/2020	NPO worker	M	Osaka International Foundation
Interview 18	15/01/2021	Foreign resident	F	NA
Interview 19	29/01/2021	NPO worker	F	NPO PBV
Interview 20	18/02/2021	Foreign resident	F	NA
Interview 21	07/06/2021	NPO worker	F	NPO

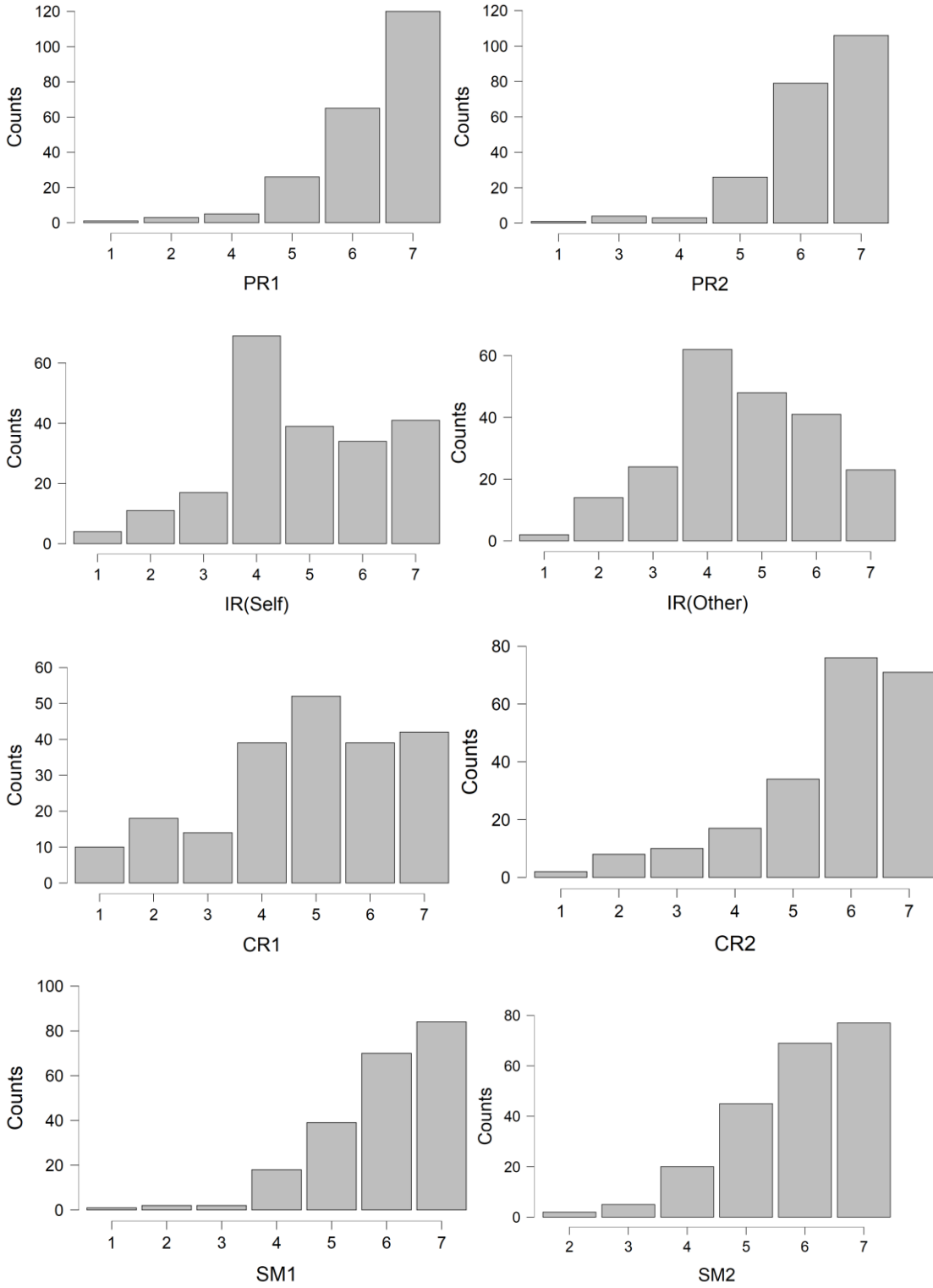
Appendix 3

Appendix 3.1 List of Disaster Preparedness Challenges (complete)

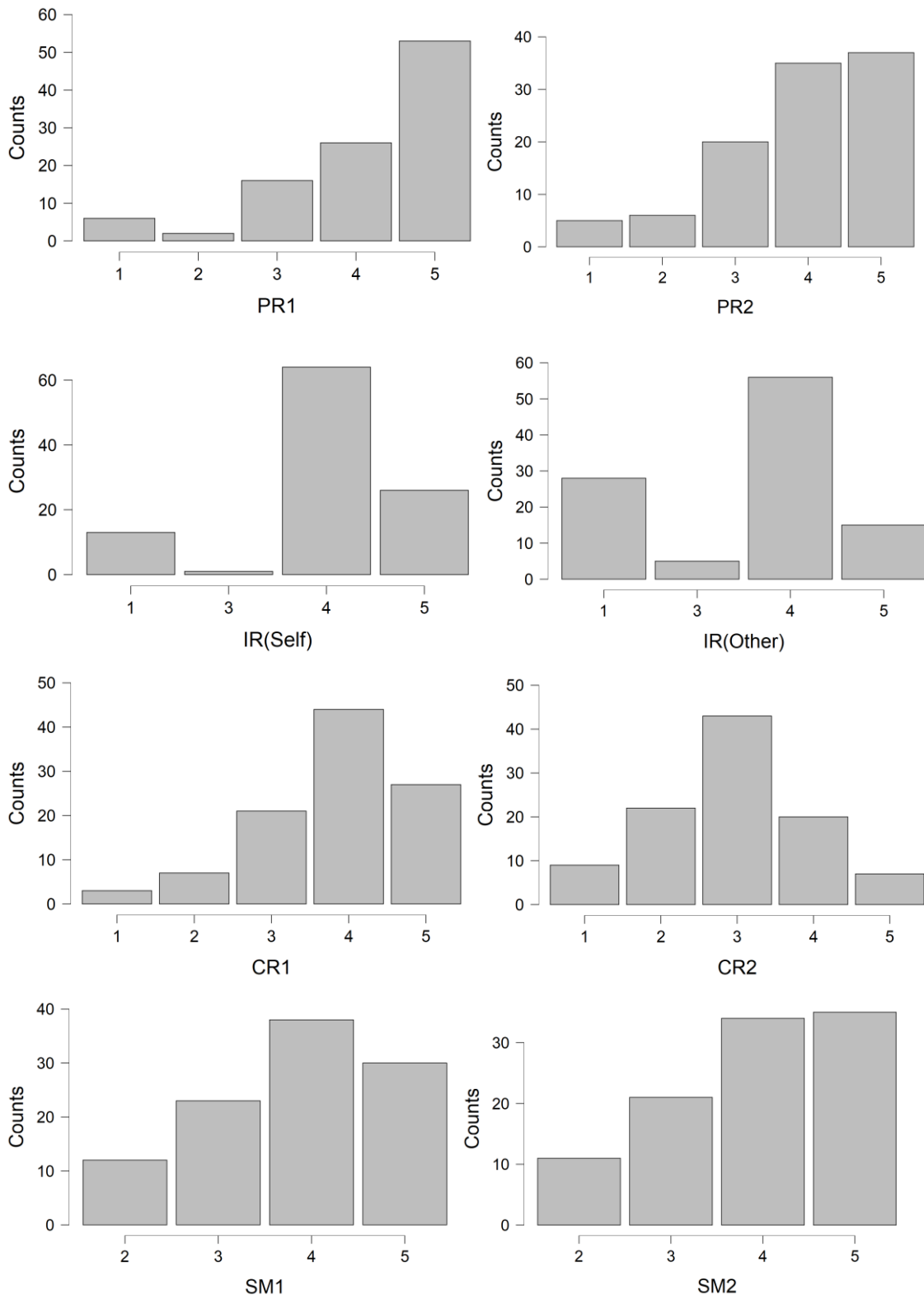
1. Identity bias
2. Lack of emergency measures
3. Optimistic bias
4. Lack of localised assistance
5. Lack of basic disaster education
6. Invisible foreigners
7. Social isolation
8. Disaster culture
9. Lack of individual resilience
10. Gender issues
11. Insufficient available information
12. Foreign residents dispersion
13. Discrimination
14. Moral hazard
15. High level of preparedness
16. Immigration
17. Foreigners are more resilient than they think
18. Lost in translation
19. Micro-aggressions
20. Foreigners' capabilities
21. Economic problems
22. Food stock
23. Health issues
24. Government trust
25. Transportation
26. Children's safety
27. Infrastructure
28. Other people deserve to evacuate more
29. Electricity
30. Slow policy changes

Appendix 4

Appendix 4.1 Distribution plots for gender-based disaster risks



Appendix 4.2 Distribution plots for foreign residents' disaster risks



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