

VULNERABLE PEOPLE AND FLOOD RISK MANAGEMENT POLICIES

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Abstract

The main goal of this study is to evaluate the measures for vulnerable people in Disaster Risk Management (DRM) policies focusing on floods. There are many groups of potentially vulnerable people (e.g., older adults, people with disabilities, people living in poverty) whose characteristics are not accounted for in emergency plans; vulnerable people require more attention if they are to experience an equal disaster risk level.

The original contributions of this study are as follows: a proposal of definitions for vulnerable people and groups of potentially vulnerable people; a theoretical framework with indicators focusing on six groups of vulnerable people; an overview of the potentially vulnerable people for flood hazards in the Netherlands, Japan, and the United States; and a metric designed to evaluate DRM policies, from national to subnational and regional levels.

The results reveal that the top 10 indicators account for 80% of all (gross sum of) potentially vulnerable people, 7 of which are identical. These top 10 indicators can serve as a starting point in order to increase the resilience of the vulnerable population. These 3 countries can learn from each other's measures regarding the 7 identical indicators, and possibly apply them in their own area. The metric shows that DRM laws rarely anticipate a future increase in the number of potentially vulnerable people, and none of the laws were created by involvement of potentially vulnerable people. We count on our governments to make equitable policies, but this has clearly not yet been established in these developed, democratic countries.

Keywords: Disaster Risk Management, disaster law, vulnerable people, social vulnerability, flood, evacuation

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List of Abbreviations

ADA	Americans with Disabilities Act
ADPC	Asian Disaster Preparedness Center
CEMP	Comprehensive Emergency Management Plan
CIA	Central Intelligence Agency
CMS	Consumable Medical Supplies
CRED	Centre for Research on the Epidemiology of Disasters
CVCA	Community-Wide Vulnerability and Capacity Assessment
DME	Durable Medical Equipment
DRI	Disaster Resilience Indicators
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
EFD	European Flood Directive
EM-DAT	Emergency Events Database
EVI	Environmental Vulnerability Index
EWS	Early Warning System
FEMA	Federal Emergency Management Agency
FNSS	Functional Needs Support Services
FRI	Flood Risk Index
FVI	Flood Vulnerability Index
GCVI	Governance and Climate Vulnerability Index
GEJET	Great East Japan Earthquake and Tsunami
GFRI	Global Flood Risk Index
GIS	Geographic Information Systems
GNCSDR	Global Network of Civil Society Organizations for Disaster Reduction
GP DRR	Global Platform for Disaster Risk Reduction
GRIPS	National Graduate Institute for Policy Studies
HDI	Human Development Index
HFA	Hyogo Framework for Action
HUD	Housing and Urban Development
ICHARM	International Centre for Water Hazard and Risk Management
IFRC	International Federation of Red Cross and Red Crescent
IHE	Institute for Water Education
IPCC	Intergovernmental Panel on Climate Change
LTED	Long Term Economic Deterioration

NGO	Nongovernmental Organization
NRC	National Research Council
PAR	Pressure and Release
PAS	Personal Assistance Services
PWRI	Public Works Research Institute
RI	Risk Index
RMI	Risk Management Index
RVM	Regional Vulnerability Maps
SMART	Specific, Measurable, Achievable, Realistic, Time-bound
SpNS	Special Needs Shelters
SREX	Special Report on Extreme Events
SSED	Sudden and Severe Economic Dislocation (LTED)
SVI	Social Vulnerability Index
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNISDR	United Nations International Strategy for Disaster Reduction
UNOCHA	United Nations Human Rights Office of the High Commissioner
UNU	United Nations University
UNU-WIDER	United Nations University-World Institute for Development Economics Research
VI	Vulnerability Index
VNL	Vulnerability at National Level
WFD	Water Framework Directive
WWAP	World Water Assessment Programme

List of Definitions

These definitions are based in part on the terminology from the United Nations International Strategy for Disaster Reduction (UNISDR) on Disaster Risk Reduction (DRR) (UNISDR, 2009) and entries in the online dictionary from Lexico Publishing (Lexico Publishing Group, 2011).

Coping Capacity: The ability of people or organizations to use resources and abilities to handle situations before, during, or after disasters in such a way that livelihoods are sustained or rebuilt to previous or improved standards.

Culture: Set of traditional beliefs and routines, particularly for a group of people bound by social, ethnic, or age group.

Disaster: A serious disruption of the functioning of a community or a society caused by the combination of hazards and conditions of vulnerability while causing widespread human, material, economic, or environmental losses that exceed the ability of the affected community or society to cope using its own resources.

Disaster Risk Management: Processes for designing, implementing, and evaluating strategies, policies, and measures to improve the understanding of disaster risk, foster disaster risk reduction and transfer, and promote continuous improvement in disaster preparedness, response, and recovery practices, with the explicit purpose of increasing human security, well-being, quality of life, resilience, and sustainable development.

Disaster Risk Reduction: The systematic development and application of policies, strategies, and practices to minimize vulnerabilities, hazards, and the unfolding of disaster impacts.

Exposure: People, property, environments, or other elements present in hazard zones that are thereby subject to potential losses.

Flood: An overflow of water covering land not normally covered by water, outside the usual boundaries.

Government: Political structure ruling a nation by designing and overseeing the enforcement of laws and policies applicable to the actions of the members, citizens, or

inhabitants of communities, societies, and states.

Group of Potentially Vulnerable People: A group of people of which all members have an aspect that distinguishes the group (such as age or ethnicity); the majority of the group members have one or more characteristics of vulnerable people, but which individual has the characteristic(s) is unidentifiable.

Hazard: A potentially damaging physical event, phenomenon, or human activity that may cause the loss of life or injury, property damage, social and economic disruption, or environmental degradation.

Indicator: A sign or a cause of something.

Law: The principles, rights, and regulations established in a community, that are applicable to its people, whether in the form of legislation or of custom and policies recognized and enforced by judicial decision.

Policy: A course of action adopted and enforced by a government, proscribing how society should be built up and managed.

Resilience: The ability of a system and its components to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner.

Risk: The probability that harmful consequences, or expected losses, will result from interactions between natural or human-induced hazards and vulnerable conditions.

Susceptibility: Capacity for incurring damage; this differs between individual people, properties, environments, or other elements.

Vulnerability: Weakened conditions of physical, social, economic, and environmental factors or processes that indicate a lowered coping capacity and increase the susceptibility of a person or community to the impact of hazards.

Vulnerable People in a Community: People who have one or more characteristics that make them more susceptible than others in a community and who therefore require extra DRM measures in order for them to have the same level of risk as others.

1. Introduction¹

“A ship is safe in harbor, but that’s not what ships are for.”

William Shedd

1.1. Background and Problem Statement

1.1.1. Exposure versus vulnerability

Globally, hazards are increasing in both frequency and intensity. The number of people affected by natural hazards is increasing and has already averaged 231 million people annually, according to the Emergency Events Database (EM-DAT, 2012). Floods are a major contributor to both loss of life and economic loss from disasters, and the Intergovernmental Panel on Climate Change (IPCC, 2012) expectations are that the frequency and intensity of floods will increase in the future. Trends show that loss of life due to floods is decreasing while economic loss is increasing (EM-DAT, 2011). However, not all people are affected equally, for the extent of mortality risk may depend on intrinsic vulnerability to floods. To formulate effective policies and procedures to increase resilience, disaster managers must understand the natural and societal factors that influence vulnerability (Thomalla, Downing, Spanger-Siegfried, Han, & Rockström, 2006).

Managers and analysts often assume that exposure and vulnerability are either synonymous or highly related. There are many vulnerability studies that treat vulnerability as exposure and forego differentiating between people’s characteristics and circumstances that are independent of exposure. For instance, a global exposure study (Jongman, Ward, & Aerts, 2012) assessed vulnerability as exposure. Another example includes assessments that do consider a difference between exposure and those experiencing damage but that neglect to consider why affected people experience damage (Vörösmarty et al., 2013).

The focus of this study is on measures for vulnerable people in exposed areas. The UNISDR (2009) definition of vulnerability is adopted, which distinguishes vulnerability from exposure (Figure 1.1.1). While part (or even all) of a given area (country, region, river basin, or community) can be exposed to a certain hazard, the population can be seen as consisting of vulnerable people and self-reliant people. Different parts of an area and different people can be exposed and vulnerable to different hazards.

The reasoning behind the separation of exposure and vulnerability is that assuming

¹ The terminology used in this research is explained in the List of Definitions located in the preceding pages. Where Disaster Risk Management (DRM) laws are mentioned, policies are included unless indicated otherwise.

identical vulnerability across all exposed people may oversimplify the inherently variable nature of vulnerability. As vulnerability can be intrinsic to the individual, it may vary across an exposed population (Cardona, 2003). Definitions of vulnerability should encompass the intrinsic vulnerability of individuals, including that of non-self-reliant people, and should be distinct from exposure. Vulnerability must not only relate to exposure or the susceptibility of the exposed elements but also to social characteristics (Manyena, 2006). Therefore, it is necessary to have a distinction between physical vulnerability arising from exposure and social characteristics related to vulnerable people existing in exposed areas (Yarnal, 2007). However, what these social characteristics are remains a subject of debate.

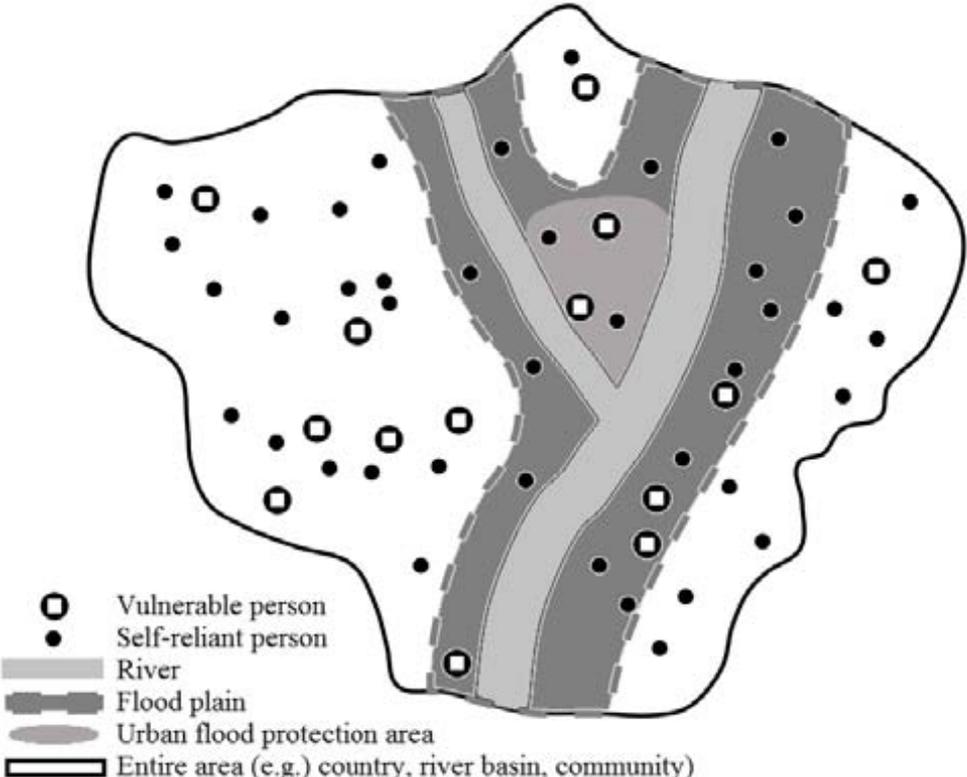


Figure 1.1.1. Schematic visualization of vulnerable people in an area exposed to floods.

There are several identified individual characteristics associated with increased susceptibility to harm from natural disasters. For instance, Lindsay (2003) referred to social, economic, and physical characteristics; the UNISDR (2009) cited the characteristics and circumstances of a community, system, or asset that make it susceptible to the damaging effects of a hazard; and Wisner, Gaillard, and Kelman (2012) described detailed examples including gender, age, physical and mental health status, occupation, marital status, sexuality, race ethnicity, religion, and immigration status. Up till now there has been no consensus on which characteristics influence vulnerability and therefore on who are

considered to be vulnerable people. To create effective Disaster Risk Management (DRM) policies, the population vulnerable to possible hazards has to be identified.

In this research, vulnerable people are defined as those who have one or more characteristics that make them more susceptible than others in a community, and who therefore require extra DRM measures to have the same level of risk as others (Vink & Takeuchi, 2013). Additionally, a group of potentially vulnerable people is defined in this study as a group of people who share an aspect that distinguishes the group, such as age or ethnicity, and a majority of who have one or more characteristics of vulnerable people. The word *potential* in this definition indicates that while there are many individuals in the group who have one or more characteristics of vulnerable people, it is unidentifiable which individuals have the characteristics. Many of the indicators used to measure social vulnerability are factors that only refer to groups of *potentially* vulnerable people. Further definitions are explained in Chapter 3.

1.1.2. Vulnerability and mortality

There is a remarkable difference when comparing risk tolerance and treatments of vulnerability across different fields of study. For instance, in public health and environmental risk assessment, the goal is to prevent damage by chemical compounds to either the environment or all humans equally. To enable this, a no-effect concentration of a compound is calculated for vulnerable populations such as infants, and a safety factor of 10 is applied for every unknown step (Crawford-Brown, 1999). In this way, risk assessment addresses the needs of the most vulnerable sectors of the population.

By contrast, disaster risk studies often assume the average vulnerability of an entire population. Past disaster data shows that the convention of basing policy decisions on the average vulnerability of a population may not sufficiently protect the most vulnerable and may lead to gross inequity with regard to disaster risk. For instance, data from disasters in the Netherlands, Japan, and the United States (Brunkard, Nuamulanda, & Ratard, 2008; Honkawa, 2011; Kuijvenhoven, 2005; Statistics Bureau, 2013; United States Census Bureau, 2012) showed that certain ages are associated with a higher mortality rate (see Figure 1.1.2).

In the Netherlands, the 1953 flood was the biggest and most recent flood disaster that impacted society to such an extent that the government introduced a new policy aimed at zero flood deaths afterward by means of a great infrastructure project called the Delta Works. Over 1,800 people died during this disaster. In the municipalities Oude-Tonge and Nieuwe-Tonge, the majority of the inhabitants died. For these two municipalities, a more detailed analysis of the exact age groups has become available (Kuijvenhoven, 2005). Kuijvenhoven compared these data to the population data from 1947. What can be clearly

seen is that children and older adults had a higher mortality rate during this disaster. The exact causes for their higher mortality rates remain unknown, though it is clear that many people were suddenly overtaken by the storm and consequent flood, which occurred at night and in February, a cold winter month. Sex-specific statistics show a significant difference in mortality in the 30–44 age group: 5.4% and 4.8% male versus 9.4% and 15.2% female (Kuijvenhoven, 2005).

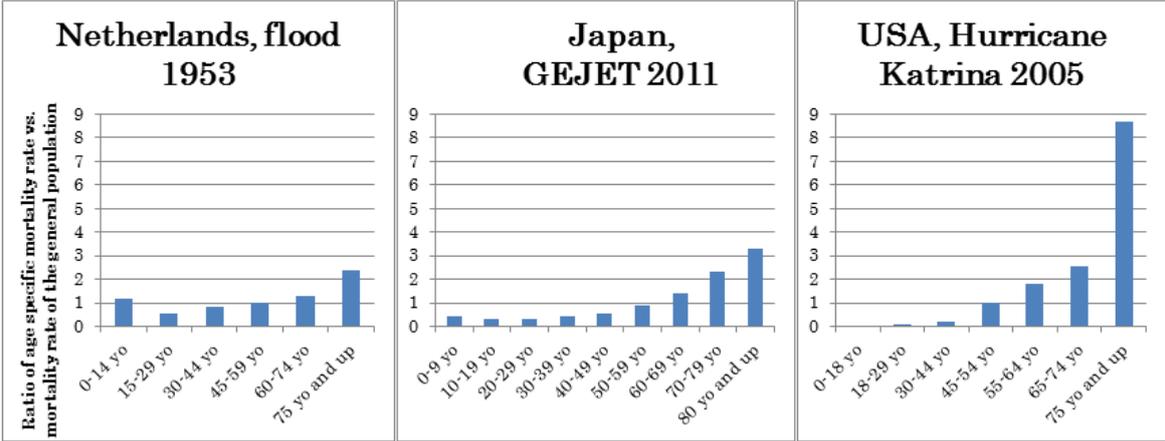


Figure 1.1.2. Ratio of age-specific mortality rate compared to mortality rate of the general population from three disasters in the Netherlands (Kuijvenhoven, 2005; Oude & Nieuwe Tonge); Japan (Great East Japan Earthquake and Tsunami GEJET, coastal cities in the prefectures Iwate, Miyagi, and Fukushima); (Honkawa, 2011; Statistics Bureau, 2013); and the United States (New Orleans Parish) (Brunkard et al., 2008; United States Census Bureau, 2012).

Statistics from the Great East Japan Earthquake and Tsunami (GEJET) in 2011 also showed a distinctive higher proportion of victims among older adults. At the time of the tsunami, the retirement age was 60 years old. Data from the National Police Agency and the Reconstruction Agency, the Disaster Management White Paper, and the National Population Census (Honkawa, 2011) and the three prefectures with the most victims (18,614 of 18,658) and all missing people is compared to the population data from 2010 of the coastal cities in those prefectures (Statistics Bureau, 2013) to obtain the mortality rates. Data from individual municipalities in the Iwate prefecture are also available from Sagara (2011) and show that in many towns, the older adults have a higher mortality rate. Research from Sawai (2011) stated that the cause of the higher mortality rate in older adults lies in their decreased mobility and the traffic jams that occurred when people evacuated by car. Tatsuki (2013) suggested the higher mortality rate in one of the three prefectures (Miyagi) was due to the high number of older adults living in communities rather than in institutions. This implies that older adults living in institutions were able to evacuate on time whereas those living in

communities did not receive a warning in time or were otherwise incapable of evacuating themselves.

In the United States, Hurricane Katrina left a great number of elderly victims in 2005. Brunkard et al. (2008) examined the mortality rate of Orleans Parish, where most deaths occurred (681 people). The victim data was compared to the U.S. Census Bureau (2012) population statistics from 2000. Although there was no given definition of older adults, the retirement age at that time was at 65. Explanations from both Brunkard et al. and Ripley (2008) as to why older adults chose not to evacuate include a combination of negative experiences with previous evacuations, loss of daily routine and medications, confidence in housing structure to withstand the storm, and fear of looting. On the contrary, many young people did choose to evacuate, possibly contributing to the low mortality rates for people below 45.

These mortality figures indicate that there are certain groups of people who have a greater chance of dying during disasters. Old and young were also found to have an increased mortality risk in Sawai (2011). Other studies have revealed characteristics that influence mortality, including gender (Neumayer & Plümper, 2007; Sawai, 2011), ethnicity (Brunkard et al., 2008), and living in a developing country (Laframboise, 2012). This accumulated evidence suggests that with regard to age, and compared to other fields of risk assessment, DRM is not yet fully concerned with developing policies based on protecting those people who have the highest mortality ratios. Regarding older age, people may support the opinion that a higher mortality ratio is part of the natural process of life and death at a certain age. However, the question arises whether it is still acceptable to see higher mortality rates linked to certain social characteristics. If such inequality is present for people with a certain race, income level, disability, or gender, is it still acceptable?

1.1.3. Vulnerability and equity

To what extent should governments execute measures to reduce people's vulnerability? A court case held by the European Court of Human Rights in 2008 ruled that governments are responsible for protecting citizens from disasters preventively (Carnalt & Dale, 2012). In this case the Russian government failed to protect citizens against mudslides by taking no action in an area historically known to be prone to mudslides. The Court ruled the Russian government had the obligation to protect life by protection against physical hazards. This indicates governments should not only act once disasters are imminent or have taken place, but should also make efforts to preventively reduce vulnerability. Does this imply governments should strive to protect all people equally?

DRM equity does not translate to an equal level of protection or vulnerability for

everyone; rather, it advocates guaranteeing a minimum level of safety or resilience. It might seem unfair to pay for others living or working in unsafe conditions, as spending money on measures taken in floodplains only benefits those people directly, as found in Boyce (2000). However, indirectly, the nation is supported by those people living and working in those locations. To guarantee every citizen has the same minimum level of safety, or an equal minimum level of resilience, vulnerable people need extra help.

This difference between equality and equity is depicted in Figure 1.1.3. People of different sizes are attempting to watch a baseball game. This could be analogous to people with varying degrees of vulnerability attempting to reach a minimum level of safety from disasters. If the government were to apply a similar measure to the entire population (equality), some people would benefit when they did not require additional measures to reach the minimum safety level (person on the left), whereas others still cannot reach the minimum safety level with the general measure (person on the right). However, if the government were to apply measures based on people's characteristics (equity), some people receive more measures than others, which leads to all people acquiring the minimum level of safety. People remain free to use additional resources they might have to increase their safety level beyond the minimum level.

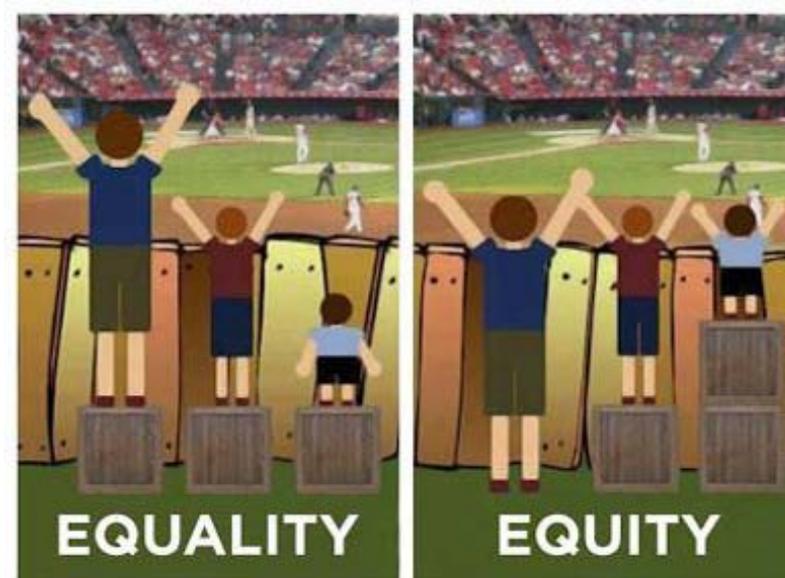


Figure 1.1.3. The difference between equality and equity (Common Action, n.d.).

Regarding intrinsic and extrinsic vulnerability, the understanding applied in this study is that some vulnerability factors are innate, such as age or certain medical conditions or intelligence levels; and, therefore, cannot be cured or improved (intrinsic vulnerability). Other factors are brought into existence through culture, such as discrimination leading to

differences in income, medical care, education, and/or social networks (extrinsic vulnerability). Either intrinsic or extrinsic factors or a combination of these can lead to an amount of vulnerability. This vulnerability can be countered by either reducing vulnerability (which is not possible for intrinsic factors) or increasing resilience (which means the original vulnerability still exists, but a coping method has been found). As an example, people requiring assistance during evacuation could be helped by members in their community. While the people requiring assistance retain their vulnerability, their resilience is increased by the aid of the community members.

1.1.4. Problem statement

This study addresses multiple issues relating to the treatment of vulnerable people in DRM. A great shortcoming of DRM policies is that the social characteristics leading to vulnerability remain largely unaddressed. Evacuation plans are often based on the assumption that exposed people are physically and mentally able to evacuate themselves and have access to certain resources and information. A survey in the United States showed that 80% of emergency managers had not adapted their plans by implementing measures for people with disabilities (Alexander, Gaillard, & Wisner, 2012). Japan has only recently begun to pay attention to people with different physical conditions and evacuation awareness (Hada, Nakamura, & Okaki, 2013). If we truly want to realize an equal minimum level of safety for all exposed people, the root causes of vulnerability must be addressed by investigating these social characteristics in more detail. As of yet in many areas, it remains unknown how many vulnerable people exist, and therefore what type of policy measures should be taken. If this number of people is a significant part of the population, it may help justify the application of measures for specific groups of vulnerable people.

While there are numerous vulnerability indices that take social characteristics into account when calculating the average vulnerability of a population (Dinh, Balica, Popescu, & Jonoski, 2012; Kahn & Salman, 2012; Vincent, 2004), these do not use the characteristics as indicators to estimate the number of potentially vulnerable people in a population. Not many studies report on the number of evacuating people with corresponding vulnerability characteristics. One study from Zhai and Ikeda (2006) showed that on average, only 26% of Japanese people will evacuate if they are officially ordered to do so. Furthermore, sociodemographic variables such as sex, age, marital status, income, or number of family members did not determine whether people would attempt an evacuation. It was not mentioned in this study whether these factors affect the success of evacuation. The lack of studies makes it difficult to verify the indicative estimates of the number of vulnerable people (MacDonald, 2013).

Furthermore, most countries regard safe living environments as a human right, to be ensured by governmental laws and policies, and the goals of DRM laws and policies are aimed at preserving human life and livelihoods. When regarding the actual measures for vulnerable people in DRM laws, vulnerable people are not well defined and do not have supportive measures during all phases of the DRM cycle. The Hyogo Framework for Action (HFA) (UNISDR, 2007) called for the development of standards, indicators, and indices for disaster risk and vulnerability. While this has prompted countries to develop laws and policies to reduce vulnerability, there is as of yet no tool to evaluate the effectiveness of these laws in reducing the vulnerability of vulnerable people.

1.2. Objectives and Scope

1.2.1. Objectives

The main goal of this research is to evaluate the measures in flood DRM policies for vulnerable people and to make policy recommendations in accordance with the results. To achieve this, several objectives for the present study are identified. It is necessary to define both vulnerable people and groups of potentially vulnerable people. To know the number of people requiring policy measures, it is necessary to construct and evaluate indicators of people's vulnerability. From these indicators the number of potentially vulnerable people can be estimated by using census data and other governmental sources. Existing DRM laws need to be identified on a national and regional scale as national policies have to be adhered to on regional levels. Therefore, a policy evaluation method needs to be proposed to evaluate the laws from different scales. The next step is to compare DRM and vulnerability-related policies in the three case study countries, scoring each policy according to the thoroughness of measures taken to assist vulnerable people. These results will lead to policy recommendations.

1.2.2. Scope

In this study the focus lies on the hazard of flooding and the response phase of DRM, assuming an exposed population for whom horizontal evacuation has been ordered. This study provides the necessary first step to look into the potential improvement of DRM policy measures for vulnerable people. It provides an objective assessment methodology of the status quo of DRM policies. However, there are many issues this topic touches upon that are beyond the scope of this analysis and are elaborated upon in the discussion. The main point of focus is explained here.

Regarding the focus of hazard type, floods and storms affect a disproportionate rate of

people compared to other hazards (Figure 1.2.2-1). Therefore, this research places special attention on flood DRM laws in combination with the basic DRM laws, focusing on measures prescribed for the response phase. This is not to say that reducing people’s vulnerability to floods should be viewed as separate from that of other hazards. This study focuses on horizontal evacuation, as vertical evacuation is not possible in all locations; and, even where it is, a prolonged successful vertical evacuation depends heavily on people’s preparation, flood duration, and the occurrence of extreme weather temperatures.

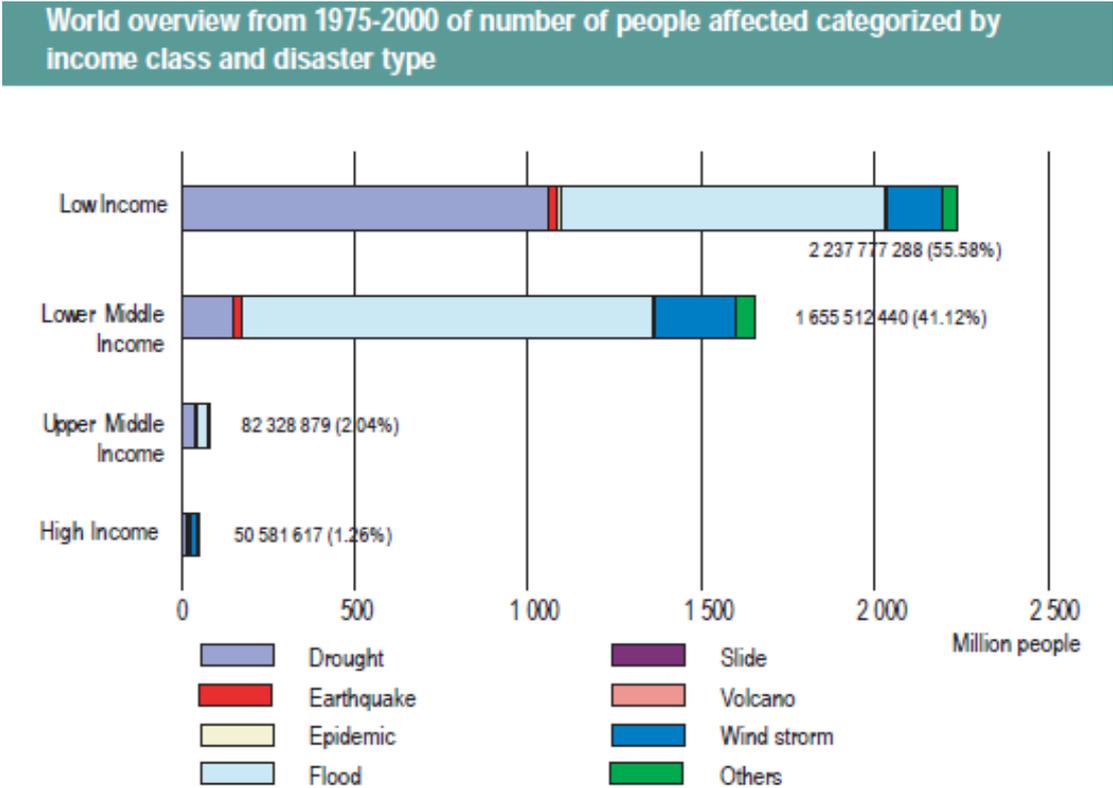


Figure 1.2.2-1. Total affected people per hazard in the period 1975–2000 (UNISDR, 2002).

Regarding the focus of the DRM phase, events leading up to and following disasters differ in nature. Many different phases are recognized by the various organizations involved in DRM. Examples include the disaster itself, immediate emergency response, recovery, rehabilitation, mitigation, reconstruction, development, risk reduction, prevention, mitigation, preparedness, and evacuation. Actions taken before a disaster can be classified as prevention and preparation, whereas actions taken after a disaster can be called response and recovery. A certain amount of overlap of phases is possible, especially when considering multiple disasters. In this research the actions involving disaster management were grouped into four phases: response, recovery, prevention, and preparation (see Figure 1.2.2-2). Table 1.2.2 provides a general description of what types of events are considered to belong in each

phase. These phases are very distinct in the purpose of measures taken and can thereby help to classify measures taken on behalf of vulnerable people. Incidentally these are also the four phases currently recognized by the European Union (European Commission Enterprise and Industry Directorate-General, 2012), which is developing an international disaster management demonstration program focusing on prevention, preparedness, and response. In the E.U. documentation, “prevention” is termed “prevention and protection.”

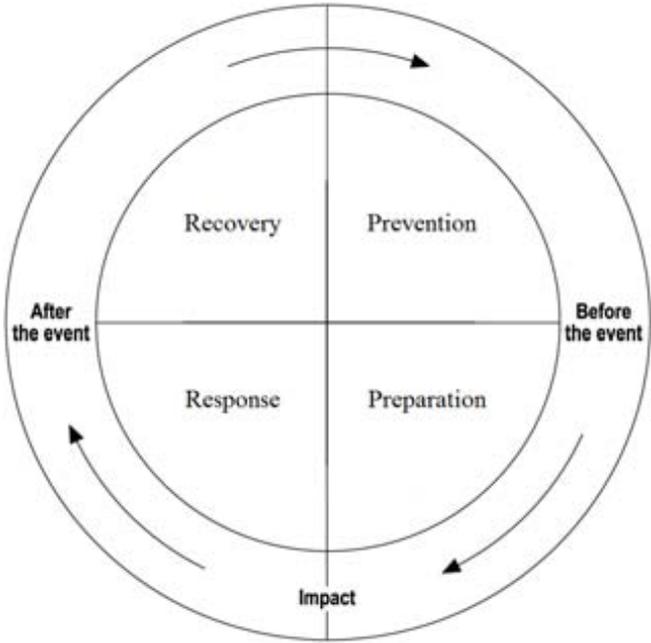


Figure 1.2.2-2. Phases of disaster management (Based on Alexander, 2002).

Table 1.2.2. The four phases of disaster management: prevention, preparation, response and recovery with example measures.

Phase	Measures	Examples
Prevention	Measures taken to prevent or reduce damage from disasters	Land-use regulations Constructing dams and levees
Preparation	Measures taken to anticipate inevitable damage from disasters	Designing hazard maps Education and drills
Response	Measures taken immediately before and after an imminent disaster as emergency response	Evacuations based on EWS Closing levee breaches
Recovery	Measures taken to recover lifelines, livelihoods, and daily activities	Disaster-resistant reconstruction such as safer housing

For this research, the indicators are limited to the response phase for two main reasons. It is assumed that the response phase has the highest associated mortality related to it. It must be noted that recent studies on the GEJET from 2011 have indicated more people died in the Fukushima prefecture in the three-year period following the disaster (1,656) than

during the disaster itself (1,606) (Parungao, 2014), and the recovery phase cannot be said to be over yet, as many people remain in temporary houses, and towns have not been fully rebuilt. The second reason is that DRM policies at the very least cover the response phase (as it is a disaster) and the response to it, which often triggers their coming into existence. Combined with this, it is expected that the root causes of vulnerability are often addressed by laws other than DRM laws, such as human rights, finance, spatial planning, health, and education. Such fields are beyond the scope of this study.

1.2.3. Assumptions

The conceptual premises in this research are that vulnerable people can be identified and that measures for vulnerable people in DRM laws exist. Further assumptions regarding data availability include the following:

1. A sufficient number of indices related to vulnerability and law evaluation models exist as a basis for generating relevant indicators for the present study.
2. Statistics on vulnerable people are available, or calculations as to their current and future number can be made.
3. DRM laws and policies are available in accessible languages and cover measures for vulnerable people.

1.2.4. Expected outcome and significance

The concrete output of this research includes the following:

1. Definitions of vulnerable people and groups of potentially vulnerable people
2. A framework of vulnerability with indicators attuned to a specific hazard (floods and evacuation)
3. Estimations of the current number of vulnerable people in case study countries
4. An overview of DRM policies and measures for vulnerable people in the case study countries
5. An evaluation method of measures taken for vulnerable people in DRM policies
6. Policy recommendations in view of current policy trends

As there currently is no method to evaluate the measures taken for vulnerable people, this is a solid contribution to DRM policy research. The evaluation method can also be applied in other countries, if enough local data is available. The results of the evaluation can be used to point out potential points of improvement for DRM legislation. When applied to multiple countries, it can be used to point out differences between legal DRM measures for vulnerable people taken in the different countries.

The recommendations mention improvements to the current DRM laws. This may lead

to more measures for vulnerable people, making them more resilient and thus less likely to lose their lives or livelihoods.

1.3. Case Study Areas

Whereas disasters give no heed to national borders, laws and policies do. To narrow the scope of the study, three case study countries are selected. The selection is based on criteria of case study countries on both expected increasing amounts of vulnerable people as well as sufficient financial means, political will, and resources to accomplish enactment and enforcement of DRM laws. According to Ian Burton's Forensic Disaster Investigations Case Study Model, different cases (countries or regions) should be "different but essentially comparable places with similar event characteristics, where the sequence of action, decisions, policies, (...) are cross-examined in comparative fashion" (Burton, 2010, p.39).

The Netherlands, Japan, and the United States of America were selected as case study countries. The United States and Japan have experienced major disasters in the past 10 years, and the Netherlands was ranked as the country with the highest exposure risk by the World Risk Report (Alliance Development Works, 2012). These developed countries have a comparable three-tiered governmental system. These democratic societies also prioritize social rights and have long histories of DRM laws. Like many countries, they are facing urbanization in disaster-prone areas, aging societies, and the effects of climate change. For all three countries, it is expected that the number of potentially vulnerable people in the older adult group will increase sharply in the future (see Chapter 4.2). Additionally, information on relevant DRM policies and reliable data sources for evaluation of most indicators is available.

1.3.1. The Netherlands

The Netherlands has not experienced any major disasters since 1953. The potential damage is comparable to that in Japan due to the population and industrial density in areas below sea level. The worst-case scenario studies of a potential dike breach in the west of the country estimate 200,000 deaths and over €400 billion in damage (National Institute for Public Health and the Environment (RIVM), 2004a). While the safety norms are very high, the inhabitants are not prepared for a disaster, believing that the government will protect them (and demanding it to do so) (RIVM, 2004b).

The Netherlands lies in Western Europe at the end of the four watersheds from the rivers Rhine, Meuse, Scheldt, and Ems. The main natural hazard in the Netherlands is flooding, as 25% of the country lies below mean sea level, and over 65% would flood if

there were no dykes and dunes (Huisman, Cramer, Van Ee, Hooghart, Salz, & Zuidema, 1998). Floods can come from either the ocean or the rivers (ice melt and heavy rain). Heavy storms can also lead to (additional) urban flooding or snowfall. Since about 1200 AD, 6,000 km² of land have been reclaimed. One of the 12 provinces, Flevoland, was nearly completely reclaimed from the ocean in the last century. The population density is the highest in the western part of the country, in the cities Utrecht, Amsterdam, Den Haag, and Rotterdam. This is an area collectively called the Randstad, which has 7.6 of the nearly 17 million citizens (Dutch National Government, Regio Randstad, 2007), and also the greatest risk of flooding (Figure 1.3.1-2).

The most influential natural hazards were the 1953 flood, during which more than 1,800 people died, and the 1995 storm, which led to the evacuation of 250,000 people. Earthquakes induced by the drilling for natural gas are becoming more frequent and problematic in the northern province of Groningen.

The two case study areas (see Figure 1.3.1-1) are Rotterdam-Rijnmond (1.2 million inhabitants) in the Western Netherlands, with the world's fourth-largest port; and Twente (0.6 million inhabitants) in the Eastern Netherlands, serving as a shelter area. Both areas have experienced urban flooding from storms in recent years. In Rotterdam this is often preceded by governmental warnings so that merchants might flood-proof their establishments and people can timely remove their cars from riverfront parking places. In Twente, the main international highway A1 running from Amsterdam to Moscow, Russia is often affected, which leads to significant traffic delays in the transportation sector, as well as for personal travel.



Figure 1.3.1-1. Two case study areas in the Netherlands: Rotterdam-Rijnmond (left) and Twente (right).

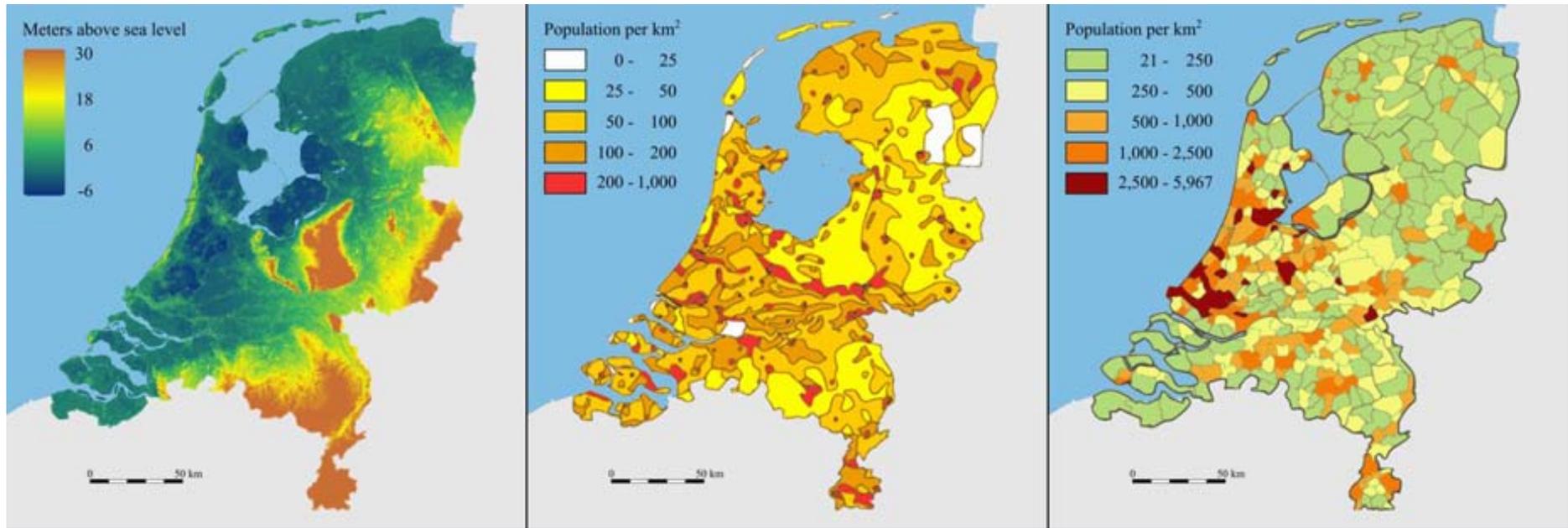


Figure 1.3.1-2. Map of the topography and population density of the Netherlands (1900, 2010) in people per square kilometer (adapted from the Actueel Hoogtebestand Nederland, 2014; Centraal Bureau voor de Statistiek, 2010; Nieuwe Rotterdamsche Courant, 2014).

1.3.2. Japan

Japan experienced a triple disaster on March 11, 2011: an earthquake triggered a tsunami, which brought enormous damage to a nuclear power facility. The destruction was beyond expectations. Informally organized relief by yakuza (Japanese mafia) reached the disaster site before bureaucratic government support was set up (Jones, 2011). Affected people are finding new livelihoods, but many still have no financial means of support as it remains unclear whether they can return home, or where they can start a new life. Up till now only 3.5% of the new housing promised has been built in Iwate and Miyagi prefectures, and 100,000 of the 270,000 evacuees are still living in temporary housing (Ozawa, 2014).

Japan shares no land borders and no river basins with other countries. There are 109 class A rivers in Japan, ranked for their size. Their maintenance falls under the care of the national government. A further 2,691 rivers are class B, which are governed by the prefectural governments. Tributaries of class A and B rivers are governed at a municipal or town level (Ministry of Land, Infrastructure, Transport, and Tourism, n.d.). Most rivers are relatively short with the longest (Shinano river in Niigata prefecture) being 367 km. The second largest river basin is the Tone basin, covering nearly 17,000 km².

Over 73% of the country is mountainous (United States Department of State, 2014), rendering it unsuitable for habitation or agriculture. The Northern island Hokkaido has a subarctic climate and an average temperature of only 8 degrees Celsius (WebJapan, n.d.), making it unappealing to inhabit. The majority of the population is living in the lowest areas of the country, which coincide with the floodplains (Figure 1.3.2-2). Over 55 million people, or 41% of the total population, are living in a flood-prone area (Institute for Water Resources, 2011). Moreover, 45% of the entire national population is concentrated in a 50-kilometer radius from the centers of the three largest cities of Tokyo, Osaka, and Nagoya, respectively (comprising 6.1% of Japan's total land area). The population density measures 4,158 persons per square kilometer in the Tokyo area; 2,094 in the Osaka area; and 1,204 in the Nagoya area (Statistics Bureau, Ministry of Internal Affairs and Communications (MIC), n.d.). Japan has been affected by storms, floods, and earthquakes, and most people who die from a natural hazard have died from earthquakes (Emdat, n.d.).

The two case study areas (see Figure 1.3.2-1) are Sanjo city (over 100,000 inhabitants) in the Niigata prefecture, along the Shinano river; and Chikusei city (over 100,000 inhabitants) in the Ibaraki prefecture, in the Tone river basin. In 2004 about 2,500 hectares flooded in the Sanjo city area, due to a typhoon. The damage was massive as over 5,000 buildings were partially destroyed and 9 people died, 7 of which were older adults. After a revised river management scheme and improved levees, in 2011 the area again suffered a typhoon. While 10 buildings were totally destroyed, only 400 were partially destroyed, and

1 person died.

The Chikusei area last suffered a flood 1986, during which the Kokai river inundated 4,300 hectares. Approximately 4,500 houses were flooded. This resulted in a massive relocation of houses and industries to an especially designed higher ground area and intensive yearly flood drills.



Figure 1.3.2-1. Two case study areas in Japan: Sanjo (left) and Chikusei (right).

1.3.3. United States

The United States of America's response to Hurricane Katrina has proven that having resources and disaster policies and plans alone is not enough. Communication was an important hampering factor as it took the Director of the Federal Emergency Management Agency (FEMA) two days to learn there were people taking shelter in the New Orleans convention center (Miller & Goidel, 2009). During Hurricane Sandy in 2012, the governor of Maryland called fatalities inevitable even before the storm hit (US governor warns of Sandy fatalities, 2012); this is a prime example of the American preference for recovery measures over prevention.

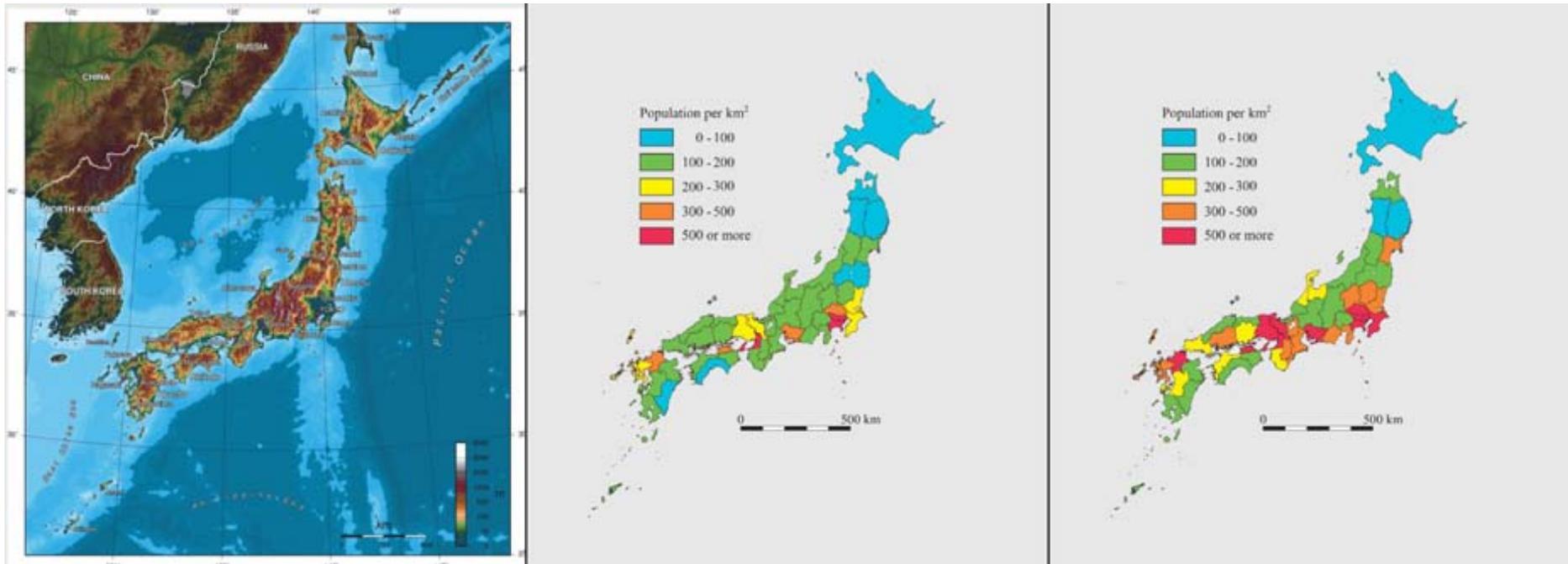


Figure 1.3.2-2. Map of the topography and population density of Japan (1950, 2010) in people per square kilometer (adapted from the Generic Mapping Tools, 2013a; Statistics Bureau, Ministry of Internal Affairs and Communication (MIC), 2011; Statistics Bureau, Ministry of Internal Affairs and Communications (MIC), 2014).

The United States spans a continent and has several disconnected areas as well, including Alaska and Hawaii (not shown in Figures 1.3.3-1–1.3.3-3). The river basins in the United States are connected to the Atlantic, Pacific, and Arctic Oceans, as well as the Hudson Bay and Gulf of Mexico (see Figure 1.3.3-1) (Atlas of Canada, Instituto Nacional de Estadística, Geografía e Informática, & National Atlas of the United States, 2006).

Many natural hazards occur, such as earthquakes, wildfires, river floods, and hurricanes. The largest river basin is the Mississippi-Missouri basin, which reaches 31 of the 50 states. It is ranked as the world’s fourth-longest river and has New Orleans as its river mouth.

Many heavily populated areas consist of reclaimed land, including New Orleans, San Francisco, Chicago, Boston, and New York City. Most people live in low-lying areas or near water sources, including capitals near smaller water sources in the Midwest (Figure 1.3.3-2). The United States Census Bureau (2002) shows the population as relatively widespread, with 9 cities having more than 1 million inhabitants. A further 276 municipalities have populations ranging from 100,000 to 1 million inhabitants.

The natural hazards affecting the highest number of people are storms and floods. Historically, storms and earthquakes have caused the most deaths (EM-DAT, n.d.).



Figure 1.3.3-1. River basins in the continental United States (Infospace LLC, n.d.).

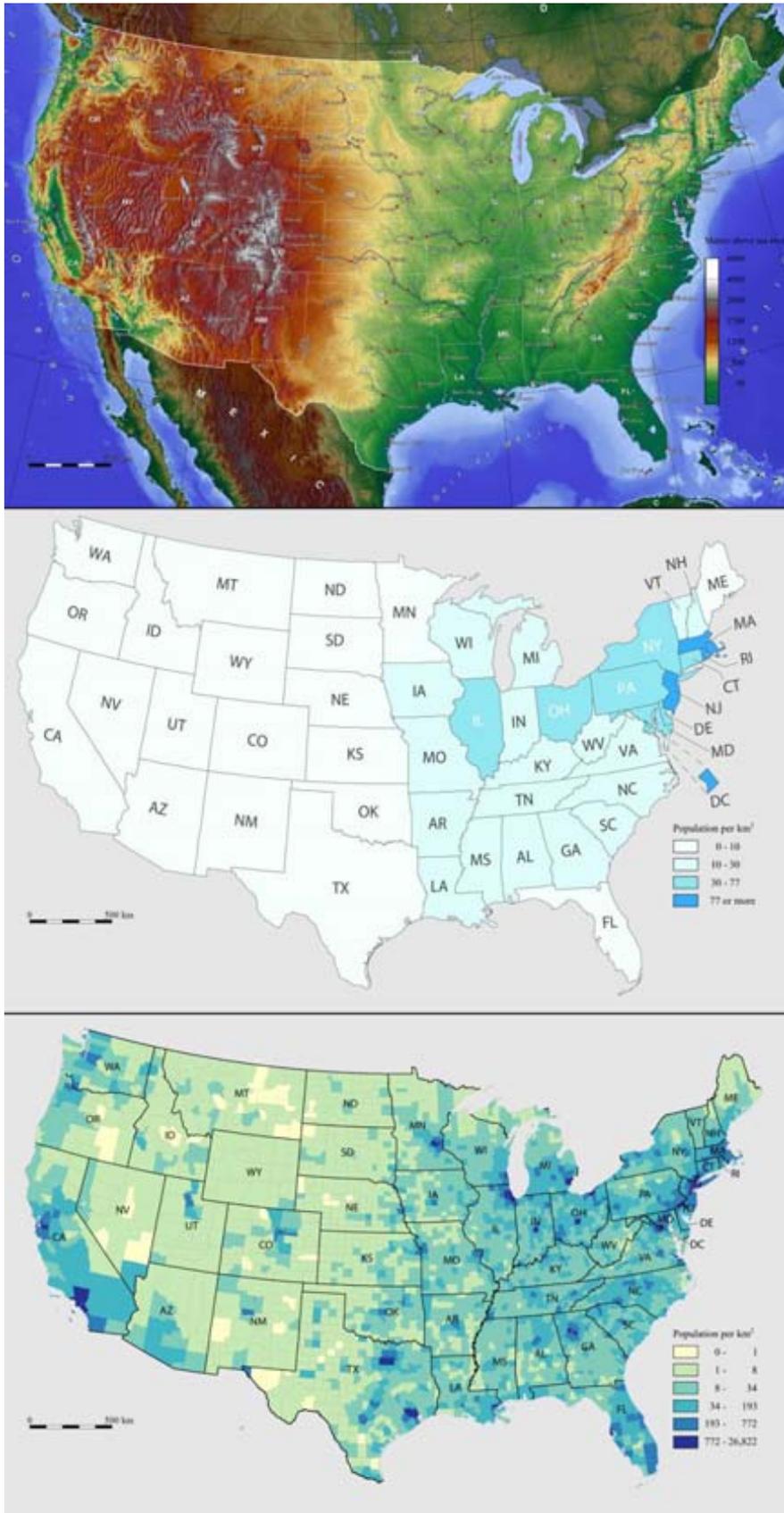


Figure 1.3.3-2. Map of the topography and population density of the continental United States (1900, 2010) in people per square kilometer (adapted from the Generic Mapping Tools, 2013b; United States Census Bureau, 2013a; United States Census Bureau, 2013b).

The two case study areas (see Figure 1.3.3-3) are New Orleans (over one million inhabitants), at the Mississippi river mouth in Louisiana; and Hillsborough County (over one million inhabitants), along the west coast of Florida, bordering the Gulf of Mexico. Louisiana suffered greatly from Hurricane Katrina (2005), with 682 deaths in New Orleans parish alone. Over 80% of the entire city was flooded. While many people evacuated, tens of thousands had to be rescued or went to shelters of last resort. One month later, Hurricane Rita flooded parts of the city again. Hillsborough County has the potential to be flooded by coastal, urban, or river flooding. The most influential is urban flooding, but typhoons also take their toll. In 2004 Hurricane Frances caused 23 deaths across four counties in the Florida area.



Figure 1.3.3-3. Two case study areas in the United States: New Orleans (left) and Hillsborough County (right).

2. Literature Review

“Not everything we count counts. Not everything that counts can be counted.”

Dr. Stephen Ross (1966)

2.1. Definitions of Vulnerability

Measures for vulnerable people can only be created if it is clear who can be categorized as vulnerable people. The exact definition of vulnerable people differs from country to country, depending on what society views to be a decent life, as guaranteed by the constitution. For instance, the Community-Wide Vulnerability and Capacity Assessment (Government of Canada, 2001) (Appendix 2) also lists pet owners as people who may be considered as vulnerable; these people are not typically found in developing countries. Table 2.1 contains an overview of recent perspectives on vulnerability from governmental and scientific points of view.

Table 2.1. Overview of recent perspectives on vulnerability.

Definitions of vulnerability
Flood vulnerability depends on exposure, susceptibility and resilience. Exposure is the elements at risk and characteristics of flood; susceptibility is awareness/preparedness before floods and the capability to cope during floods; resilience is coping capacity and recovery capacity (United Nations Educational, Scientific and Cultural Organization - Institute for Water Education (UNESCO – IHE), 1999)
Vulnerability is determined by social, economic and physical characteristics. These factors influence not only how people cope in crisis but also the resources for everyday living – sometimes called their health. Determinants of health: income and social status, social support networks, education, employment and working conditions, social environments, physical environments, biology and genetic endowment, personal health practices & coping skills, healthy child development, health services, gender, culture (Lindsay, 2003).
Vulnerability may be defined as an internal risk factor of the subject or system that is exposed to a hazard and corresponds to its intrinsic predisposition to be affected, or to be susceptible to damage (Cardona, 2003).
[Vulnerability is] the characteristics of an element exposed to a hazard that contribute to the capacity of that element to resist, cope with and recover from the impact of a natural hazard (Dwyer et al., 2004).
Factors influencing vulnerability: joint impact of market penetration, population growth, the rise of the modern state system providing services, privatization of land and degradation of common lands, loss of diversity in livelihoods and a declining health status (Adger et al., 2004).
Vulnerability is related to exposure and to social frailties and the degree of resilience of the prone community (Manyena, 2006).
[Vulnerability is] the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity (IPCC,

2007).
Vulnerability is a function of three components. Exposure is the degree to which people and the places or things they value are open to a potentially harmful event. This includes economic, cultural, spiritual, personal values and social infrastructure. Sensitivity is the degree to which people and the places or things they value can be harmed by exposure. Adaptive capacity includes physical, social, economic, spiritual and other resources; education, access to information/technology, coping capacity and resilience (Yarnal, 2007).
[Vulnerability is] the characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard (UNISDR, 2009).
[Vulnerability is] a multi-dimensional concept that relates to risk. In Economics, vulnerability is dealt with both at the micro and macro levels. At the micro-level it most often refers to the vulnerability to poverty, i.e. the probability that a household or individual will fall into or remain in poverty (United Nations University - World Institute for Development Economics Research (UNU-WIDER), 2009).
[Vulnerability is] the extent of harm, which can be expected under certain conditions of exposure, susceptibility, and resilience. More specifically in the case of floods, a system is susceptible to floods due to exposure in conjunction with its capacity/incapacity to be resilient, to cope, recover or adapt to the extent (Balica, Van der Meulen, & Wright, 2012).
[Vulnerability is] the degree to which one's social status (e.g. culturally and socially constructed in terms of roles, responsibilities, rights, duties and expectations concerning behavior) influences differential impact by natural hazards and the social processes which led there and maintain that status. Thus, depending on the society and situation, social characteristics such as gender, age, physical and mental health status, occupation, marital status, sexuality, race ethnicity, religion and immigration status may have a bearing on potential loss, injury or death in the face of hazards – or resources made to be hazards – and the prospects and processes for changing that situation (Wisner et al., 2012).

2.2. Identified Groups of Potentially Vulnerable People

In addition to definitions of vulnerability and vulnerable people, the literature on definitions of groups of potentially vulnerable people, their characteristics, and circumstances is examined (Table 2.2). Whereas some literature sources clearly state that they are describing groups of (potentially) vulnerable people, others do not differentiate between groups, characteristics, or circumstances leading to (potential) vulnerability.

Table 2.2. Overview of identified groups of potentially vulnerable people, their characteristics, or circumstances.

Source	Identified potentially vulnerable groups and characteristics and/or circumstances influencing vulnerability
Comfort et al., 1999	The groups include women, ethnic minorities, people with disabilities, the very old, and the very young.
Morrow, 1999	The groups and circumstances include people living in poverty, older adults, woman-headed households, recent residents, gender, race, ethnicity, single-parent households, human or personal resources (education), family and social resources (networks of reciprocity), political resources (power, autonomy), residents of group living facilities, people with physical or mental disabilities, renters, poor

	households, large households, large concentrations of children/youth, homeless, tourists, and transients.
McEntire et al., 2002	The groups include women, children, older adults, people with disabilities, minority groups, tourists, and people living in poverty. Circumstances include people's values, attitudes, and practices.
Cardona, 2003	Circumstances include fragility of the family and the collective economy, the absence of basic social utilities, lack of access to property and credit, the presence of ethnic and political discrimination, polluted air and water resources, high rates of illiteracy, and the absence of educational opportunities. The groups include older adults, children, and women.
Brooks, 2003	Circumstances include poverty, inequality, health, access to resources, and social status. Adaptation depends on health, education, access to information, financial and natural resources, social networks, and absence of conflict.
Dwyer et al., 2004	Circumstances include age, income, residence type, tenure, employment, English skills, household type, disability, house insurance, health insurance, debt and savings, car, and gender. Qualitative indicators include sense of community, emotional capacity, psychological capacity, trust in authority figure, understanding of natural hazard, perception of risk, capacity for change, core beliefs and values, preparedness, and capabilities of local government.
Vincent, 2004	Circumstances include economic well-being and poverty, demographic structure, institutional stability and strength of public infrastructure, global interconnectivity, and natural resource dependence. Specific indicators include population below income poverty line, population that is < 15 or > 65, adults aged 15–49 living with HIV/AIDS, and % of the rural population.
Adger et al., 2004	Circumstances include public health expenditure, disability-adjusted life expectancy, maternal mortality, AIDS/HIV infection, calorie intake, education expenditure, and literacy rate.
Leichenko et al., 2004	Circumstances include agricultural dependency, vulnerability of agricultural workforce, adult literacy rate, if < 48.5% of the population in the 0–6 age group is female, and female literacy rate.
Rygel et al., 2006	Circumstances include poverty, gender, race and ethnicity, age, and disabilities.
Thomalla et al., 2006	The groups include women, older adults, children, ethnic/religious minorities, single-headed households, people engaged in marginal livelihoods, socially excluded groups (“illegal” settlers and others whose rights and claims to resources are not officially recognized), and those with inadequate access to economic (credit/welfare) and social (networks/information/relationships) capital.
National Research Council, 2006	Circumstances include gender, age, education, profession, income, ethnicity, class, number of dependents, lack of access to resources, limited access to political power and representation, certain beliefs and customs, demographic characteristics, built environment, infrastructure, and urbanization.
Naudé et al., 2007	Circumstances and groups include population density, urbanization rate, human development index, people in poverty, unemployment rate, volatility in income, and people with HIV.
Yarnal, 2007	The groups include people living in poverty, the weak, the sick, older adults, people who are unemployed, people who are and friendless, the very young, people who are physically or mentally challenged, poorly

	educated or non-English speakers, women, single-mother households, and minorities.
Rovins, 2009	Circumstances include the impacts to the social structure such as injury and death, demographics, and the psychological effects on the populous.
Laukkonen et al., 2009	Circumstances and groups include the location of settlements, how settlements are serviced, capabilities of local governments, coping skills of communities, poor communities, urban poor, women, older adults, and children.
Cutter et al., 2010	Circumstances and groups include education, those who are not older adults, those owning vehicles or phones, those with language competency, people without sensory/physical/mental disability, those with health insurance coverage, homeownership, the employed, those with flood insurance (Note: these are factors judged as increasing resilience).
Kahn & Salman, 2012	Circumstances include population density, illiteracy, lack of decent housing, lack of decent standard of living, dependence on agriculture/livestock, and casual labor/lack of industrial base.
Dinh et al., 2012	Circumstances and groups include growing coastal population, shelters, % of people with disabilities, children and older adults (< 14, > 65), awareness and preparedness.
Jubeh & Mimi, 2012	Circumstances include the < 5 mortality rate, educational level, government effectiveness, political stability and absence of violence, voice and accountability, rule of law, and control of corruption.
Balica et al., 2012	Circumstances include cultural heritage, number of shelters, % of people with disabilities (< 14, > 65), awareness and preparedness, and recovery time.
Rubin, 2010a	The groups include ethnic minorities, women, children, people with disabilities, older adults, those with limited proficiency in English, and individuals housed in institutions such as hospitals or prisons.
Adikari et al., 2013	The groups and circumstances include older adults, children, literacy, awareness, and building code reinforcement.
GP DRR, 2013	The groups include the most at-risk people, particularly low-income households, women, children, displaced, older adults, and people with disabilities.
MacDonald, 2013	People of different racial and socioeconomic groups, communities of color, recent/low-income immigrants limited by economic/political/social resources.
GNCSDR, 2013	The groups include people from developing countries, women, children, older adults, the most at risk (poorest and marginalized people), youth, displaced, and people with disabilities.
Lee et al., 2014	Circumstances and groups include the age-related dependency ratio (those < 15, > 64), unplanned urbanization, political corruption, capacity for early warning, community solidarity, and DRR education.

2.3. Evaluation of Vulnerability Indices

This section discusses the relevance and usefulness of several indices covering environmental vulnerability, risk management, or flood disaster vulnerability. Out of the available literature, ten indices were chosen for evaluation based on their relevance to the

topics of local vulnerable people, governance and law evaluation, as well as completeness of the description of the selected methods for data gathering and analysis. The indices were evaluated based on their theoretical understanding of vulnerability, definitions, selection of indicators, and drawbacks.

2.3.1. Environmental Vulnerability Index

The Environmental Vulnerability Index (EVI) (Kaly, Pratt, & Mitchell, 2004) measures a country's environmental vulnerability, or the extent to which the natural environment is prone to damage and degradation. The EVI does not address the vulnerability of the social, cultural, or economic systems, or human-dominated environments such as farms and cities. The EVI treats resilience as the opposite of vulnerability and defines vulnerability as the potential for attributes of any system, human or natural, to respond adversely to events.

The EVI evaluated 30 indices and indicators from four major groups: state of the environment, sustainable development, ecological footprint, and vulnerability. The indicators are so-called "SMART" (Specific, Measurable, Achievable, Realistic, Time-bound) or "end-point" indicators, meaning they cover conditions and processes that only operate well if the causes leading up to them are also operating well. This minimizes data requirements. The main benefit of this index is that, rather than a global ranking, countries can assess their individual environmental vulnerability and the individual indicators as well.

As with all indices, if different indicators are chosen, different results may be obtained. Data quality and interpretation by users affect the results. Some data was nonexistent, difficult to obtain, or was even withheld by responsible agencies. Some processes or conditions were represented by proxy indicators as they could not be measured directly. The EVI has indicators that are of little use for the current research on vulnerable people, but the transformation to scales could prove useful. Displaying data as individual vulnerability scores is more relevant and useful than comparative ranking.

2.3.2. Social Vulnerability Index

The Social Vulnerability Index (SVI) (Dwyer, Zoppou, Nielsen, Day, & Roberts, 2004) is a methodology for identifying individuals at risk to natural hazards in urbanized areas, based on a risk pyramid where $\text{risk} = \text{hazard} * \text{elements exposed} * \text{vulnerability}$. The authors viewed vulnerability to disasters as "the characteristics of an element exposed to a hazard (...) that contribute to the capacity of that element to resist, cope with and recover from the impact of a natural hazard." (Dwyer et al., 2004, p.3) Social vulnerability can be viewed on four different scales: individual, community, regional/geographical, and administrative/

institutional. In this research social vulnerability refers to the first: the ability of an individual within a household to recover from a natural hazard impact.

The authors selected 13 vulnerability indicators (socioeconomic variables related to individual characteristics) and 2 hazard indicators (variables related to the impact of hazard) based on a literature review, researcher discussion, and relevance to the research topic. Whereas individual characteristics were available, such as age or little income, it was not possible to obtain information concerning a combination of such factors (e.g., people over 55 and low-income individuals). In these cases, synthetic estimation with microsimulation models was used.

The authors constructed a questionnaire of indicators of social capital, including trust in government, feeling safe in your neighborhood, engaging with your neighbors, volunteering, tolerance, and maintaining strong social networks. Regional or rural areas require other indicators, such as distance to services or assets versus cash flow. The questionnaire was not particularly clear about scenarios per person or per household. Some attributes such as disability and poverty may have been overrepresented in the questionnaire. Other factors hypothesized to affect individual vulnerability are political climate, local government policy, emergency service capabilities, and welfare services. Factors contributing to validation should include welfare officers, community services, and managers.

2.3.3. Vulnerability Index

The Vulnerability Index (VI) (Adger, Brooks, Bentham, Agnew, & Eriksen, 2004) describe exposure and capacity to use current resources. The control of these resources is linked to vulnerability. While environmental factors may lead to decreased resilience, social factors are more important for livelihoods. Often these factors operate on scales higher than individual households or communities. When considering households, individual members vary in knowledge, skills, and cultural/social rights to resources. Shared belief systems also affect vulnerability. A community is defined as a looser form “of social organization in which either space common interests are the defining characteristics.” (Adger et al., 2004, p.20). The authors provided many examples of processes affecting vulnerability.

The authors defended the qualitative and complex nature of creating a social index by stating that causal laws are multivariate and indeterminate, leading to indirect measurements. This complexity makes conceptualizing a framework difficult but nonetheless important to assess assumptions and weaknesses. The relationships between vulnerability and the factors shaping vulnerability need to be well understood and the assumptions about these relations made explicit. Clear definitions and explaining why

indicators can measure dynamic vulnerability are crucial in making the indicators verifiable and comparable.

The authors used two methods to select indicators: deductive research, which is based on a theoretical understanding of relationships and uses dynamic modeling; and inductive research, which is based on empirical generalizations and uses statistical modeling. In the first method, the main processes and the best possible indicators are selected, and weights are assigned. The authors formulated a hypothesis to test variables empirically. The second method relies on relating a large amount of data to identify statistically significant factors. Many studies are said to use both of these methods but forego explaining how the indicators relate to vulnerability. The final selection concerned generic indicators applicable to all countries, covering wealth, inequality, food availability, health status, education, physical and institutional infrastructure, access to natural resources and technology, and geographical and environmental factors (for current and future vulnerability).

The authors calculated a vulnerability score for all countries, even when only limited indicator data was available. Despite the research calling for clarity on why certain indicators are included, there is no example calculation of the vulnerability scores. The authors stated that disaster data is not accurate enough to be a reliable source in research. The VI has great support for the theoretical framework of vulnerability and the requirements of indicators. While validation is deemed to be crucial, it has not yet been performed, but suggestions as to the exact approach are given.

2.3.4. *Risk Management Index*

Rather than measuring vulnerability, the Risk Management Index (RMI) (Carreño, Cardona, & Barbat, 2005) measures the performance of risk management. This reflects “the organizational, developmental, capacity and institutional actions taken to reduce vulnerability and losses, to prepare for crisis and to recover efficiently from disasters.” (Carreño et al., 2005, p.1) The RMI compares the existing risk management actions with a predetermined set of targets or benchmarks that all risk management actions are thought to require.

The authors selected policies on four different topics: risk identification, risk reduction, disaster management, and financial protection. The authors assigned each of these six indicators, including hazard evaluation and mapping, environmental protection, community preparedness, and training or budget allocation and mobilization. The indicators had five performance levels ranging from low to optimal. The authors applied the same indicators for country and subnational application.

The RMI uses the opinions of experts and fuzzy mathematics to evaluate whether risk

management in a certain area meets a preordained set of necessary risk management steps. While it can serve as a model for the current study, it does not distinguish any particular requirements for vulnerable people, nor does it separate policy from implementation.

2.3.5. Local Vulnerability Index

The Local Vulnerability Index (LVI) (Naudé, McGillivray, & Rossouw, 2007) sees vulnerability as a combination of income of a place along with the sociopolitical regional determinants. The LVI uses the U.N. 1999 definition of vulnerability: the risk of being negatively affected by unforeseen events. The authors stated that vulnerability on the level of a place influences both transient and chronic poverty, and poverty itself may be the cause of vulnerability.

The authors examined earlier economic vulnerability indices for their usefulness. The first method was principal component analysis to extract common factors from domains. Each domain could have multiple indicators, but only the component that accounts for the most variance was chosen; the others were ignored. This method was repeated to obtain the most influential out of 10 domains, which was used as the LVI score. The authors created 21 socioeconomic features. Results suggest that isolation is the most influential in vulnerable economies.

The LVI mentions several potentially relevant indicators. The LVI mentions that the monitoring of vulnerable regions is also necessary to monitor spillover effects on neighboring regions. It may be worthwhile to investigate if vulnerable people have spillover effects in their social groups. This would justify additional measures for their social group as well.

2.3.6. Disaster Resilience Indicators

The goal of the Disaster Resilience Indicators (DRI) (Cutter, Burton, & Emrich, 2010) is to measure the effectiveness of policies designed to improve disaster resilience. The DRI seeks out two types of indicators: those that improve community resilience and those that decrease it. Composite indicators are mathematical combinations of individual variables or thematic sets of variables that represent different dimensions of a concept that cannot fully be captured by any individual indicator alone.

The authors selected indicators in five categories based on the idea that higher resilience is linked to areas with more high-quality education and economic diversity rather than dependence on a single sector or natural resources (but fewer older adults, people with disabilities, and nonnative English speakers). The authors also judged a sense of community, place attachment, and citizen participation as increasing resilience, which could be measured

by proxies such as religious adherents and self-help groups. The authors applied the indicators to FEMA region IV (U.S. Southeast), where many states have racial inequality, health disparities, limited education and job skills, high amounts of older adults, and outmigration. The authors constructed five subindices: social resilience (seven indicators), economic resilience (seven indicators), institutional resilience (eight indicators), infrastructure resilience (seven indicators), and community capital (seven indicators).

The authors described the most important drawback as dependence on often-outdated national databases, which also do not capture the local circumstances in every situation. There is a great need to obtain more data on community capacity—for instance, by measuring community-based organizations and involvement. The research on DRI is one of the few studies measuring factors that might indicate vulnerable people, such as education, income, age, disability, and language ability. The DRI is one of the few studies to attempt to incorporate more intangible indicators, such as sense of community, place attachment, and citizen participation, though it proved difficult to find adequate proxies to measure these.

2.3.7. Risk Index

The World Risk Report (RI) (United Nations University, Institute for Environments and Humane Society, 2011) uses an equation much like the pressure and release (PAR) model, but it is indifferent to representing a distinction between initial vulnerability and resilience: $\text{Risk} = \text{Exposure} * \text{Vulnerability}$ (susceptibility, lack of coping capacities, lack of adaptive capacities).

The authors placed governmental influences under “coping capacities,” looking also at the existence of a national disaster risk management policy, according to report of the United Nations.

The authors judged a local sensitivity analysis to possibly reveal more information regarding policies. The authors assumed homogeneity but mentioned that especially smaller countries are less homogenous. Data for this calculation is subnational and was therefore not available. The Risk Index showed that asking experts to apply weights resulted in no significant difference than when applying equal weight to the main categories from the formula applied.

2.3.8. Flood Emergency Plans Assessment Metric

The goal of the Flood Emergency Plans Assessment Metric (Lumbroso, Stone, & Vinet, 2011) is to evaluate flood emergency plans, and therefore it has no definition of vulnerability. It does borrow a definition of emergency plans from Alexander (2005): a “coordinated set of protocols for managing an adverse event, whether expected or untoward

in the future.” (Lumbroso et al., 2011, p.342). Alexander also noted the lack of homogeneity of emergency plans as well as standards for evaluating them. A metric is defined as “a means of deriving quantitative measurement or approximation for otherwise qualitative phenomena.” (Lumbroso et al., 2011, p.346)

The authors applied the following selection criteria to indicators for the three countries (the Netherlands, France, England/Wales) in the research: applicability to regional as well as local scale, generalness, clarity, ability to focus, measurability, and realism. After reviewing emergency plans, the authors consulted stakeholders for the final list of metrics. The authors developed 6 categories to divide the 21 metrics: objectives, assumptions and target audience; organization and responsibility; communication; flood hazard; flood risk to receptors; and evacuation.

As noted by the emergency managers themselves, the real evaluation of the effectiveness of an emergency plan can take place only once it has been put into action. Many plans had generic data but lacked location-specific information, making them less useful. The Flood Emergency Plans Assessment Metric, like the RMI, uses experts and fuzzy mathematics for evaluation, but in this research the subjects are the emergency plans themselves. Like the RMI, the Flood Emergency Plans Assessment Metric compares the plans to a preordained set of standards to which all plans should ideally comply, with the main difference that it is up to experts to determine what this ideal is. It is a simple and effective method of evaluation, but the division between theoretical plans and implementation remains unaddressed.

2.3.9. Flood Vulnerability Index

The Flood Vulnerability Index (FVI) (Balica et al., 2012) takes individual categories (hydrogeological, social, economic, and politico-administrative) and calculates their respective effects on exposure, susceptibility, and resilience. The FVI also shows the impact of climate change over a longer timescale. Vulnerability is considered as the extent of harm, which can be expected under certain conditions of exposure, susceptibility, and resilience.

The authors made a distinction between the natural river subsystem with physical, chemical, and biological processes; the socioeconomic subsystem with rules and institutions that mediate human use of resource, knowledge, and ethics; and the administrative subsystem with administration, legislation, and regulation. The second incorporates “deficiencies in mobility of human beings associated with gender, age or disabilities.” (Balica et al., 2012, p.5). The third comprises institutions having the ability and authority to develop and implement plans and therefore also covers exposure, susceptibility, and resilience. The authors used a deductive approach to select indicators, based on existing

principles and the theoretical framework. The authors found some indicators to be related to multiple factors, such as “institutional organizations” to “vulnerability” as well as “susceptibility.” In these cases, given the available data, the authors chose only one of the factors. Initially the authors tested 30 indicators. The authors rated awareness/preparedness a scale between 1 and 10 based on previous flood experience. The authors assumed that previous experience leads to flood insurance, trust in mitigation, and preparedness for emergencies.

The authors found that the method captures only a small period of time and cannot represent temporal changes. In addition, the quantification of social and political-administrative indicators is a weakness, as well as the logic behind the assumptions. The FVI has indicators used in the politico-administrative category, including the existence of flood hazard maps, institutional organizations, flood protection, and uncontrolled planning zones. This division enhances the idea that DRM laws affect only a limited part of the causes of vulnerability, and that other laws (e.g., economic, education, or spatial planning) might affect other causes. While the FVI has a politico-administrative component, this merely measures the existence of institutions and not their effectiveness or the degree of implementation.

2.3.10. Governance and Climate Vulnerability Index

In the Governance and Climate Vulnerability Index (GCVI) (Jubeh & Mimi, 2012), climate change as well as governance influence vulnerability. The authors used the definition from Adger et al. (2004) for vulnerability: “a powerful analytical tool for describing states of susceptibility to harm, powerlessness and marginality of both physical and social systems.” (Jubeh & Mimi, 2012, p. 4148). The authors supplemented this with the understanding that “any sudden changes in the political or managerial contexts may also affect communities due to socio-political vulnerability.” The authors defined governance either as “the manner in which power is exercised in the management of a country’s socio-economic resources” or “the traditions and institutions by which authority in a country is exercised.” (Jubeh & Mimi, 2012, p.4149). This explains the need for incorporating governance in a study of social vulnerability. However, it remains problematic that indicators of governance are themselves politically charged. The authors mention that some measure of good governance is found in research by Kaufmann and the World Bank.

The subject of the index is water resources. The Climate Vulnerability Index from Sullivan (2002) and governance data from the World Bank (2001) in the form of a Governance Index are combined into the GCVI. The authors mentioned as a drawback the lack of weights, which would aid representing national policy goals. The GCVI provides an

outstanding theoretical framework of governance, which becomes restrained by the indicators and data availability.

2.4. DRM Policy Indicators

Most vulnerability indices do not take government or law into account (e.g., the Disaster Risk Index by the United Nations Development Programme, 2004), and those that do, do so sparingly. This is due to the need for global indices that rank countries and show where the world population is most at risk, which creates a need for globally accessible data. Much data pertaining to law is available in the local language only. So far no index fully accounts for measures taken by DRM laws, regardless of their implementation.

Indices evaluating DRM laws (e.g., the RMI, Carreño et al., 2005) focus on measuring the effectiveness of the DRM laws compared to a theoretical maximum of potential vulnerability-reducing steps, rather than showing to what extent they reduce the actual vulnerability of the area they are applied to. The Environmental Sustainability Index (ESI) (Yale Center for Environmental Law and Policy and the Center for International Earth Science Information Network, 2005) incorporates legal indicators such as the rule of law (which refers to enforcing regulations), and governmental effectiveness is measured by the quality of public service provision, bureaucracy, and commitment to policies (i.e., implementation). In this case there is no attention on vulnerable people specifically, and only a general countrywide figure for government effectiveness and other indicators is available.

As for the one study using metrics, the authors combined expert advice to generate a list of items an emergency plan must have, regardless of circumstances. For both indices and metrics, there is often no distinction between different areas that might have different hazards or root causes of vulnerability, and none that account for populations that are likely to have different build-ups of vulnerable people, both now and in the future.

Other sources that evaluate DRM policies include the International Federation of Red Cross and Red Crescent Societies (IFRC, n.d.) and the Asian Disaster Preparedness Center (ADPC, 2006), which have both prepared a set of indicators; the IFRC assists national societies in evaluating capacity building and disaster preparedness strategies, and the ADPC evaluates the status of resilience and increases it where necessary, aimed at local governments and NGOs. Examples of those latter indicators include the existence of disaster risk-reduction plans, training, transportation, and communication connections and funds. Although these indicators could be used for their intended purposes, an index in itself is lacking. Not only is there no index available to evaluate DRM laws, but there is no specific

attention to quantify the measures taken for vulnerable people. Comparable government documents include those from Australia (Steering Committee for the Review of Government Service Provision, 2006) and the United Kingdom (OCTO Ltd & Cranfield University, 2001), which have developed indicator models to evaluate their national emergency management policies on a local scale.

The lack of realistic representation of laws and governmental actions in vulnerability indices is partially due to the selection method applied to indicators. The main three factors influencing whether an indicator is included in an index are whether they are indicative of the objective, measurable, and available. Given that many indices are designed to be global, a heavy burden is placed on availability (and accessibility in a uniform or understandable language) of data.

Indices often mention participation in policy formation and execution and creating awareness as important factors of successful DRM. These concepts are difficult to measure quantitatively and are often left undefined and vague. A clearly defined amount of participation and awareness, including to what extent and by whom and how many, can help make these concepts measurable. Some sources do mention indicators that could be said to be a root cause of vulnerability, such as lack of access to information; lack of access to resources; and being limited by economic, political, or social resources. Interestingly, no sources mention lack of mobility or lack of understanding directly.

Dwyer et al. (2004) identified many social factors believed to influence vulnerability, but found them immeasurable and excluded them from research. These social factors comprise qualitative indicators such as sense of community, emotional capacity, psychological capacity, trust in authority figure, understanding of natural hazard, perception of risk, capacity for change, core beliefs and values, preparedness, and capabilities of local government. Some of the additional sources mention similar factors, such as family and social resources or networks of reciprocity (Morrow, 1999); values, attitudes, and practices (McEntire, Fuller, Johnston, & Weber, 2002); social networks (Brooks, 2003); beliefs and customs (National Research Council (NRC), 2006); psychological effects on the populous (Rovins, 2009); coping skills of the community (Laukkonen, Blanco, Lenhart, Keiner, Cavric, & Kinuthia-Njenga, 2009); and community solidarity (Lee, Okazumi, Kwak, & Takueuchi, 2014).

DRM knowledge and experience are linked to belief systems. A belief system can be shared in a community and/or be personal, and parts of a belief system can increase and/or decrease vulnerability, especially when it becomes linked to what is called salutogenesis (Center on Salutogenesis, n.d.). This refers to a belief in one's own power, the predictability of future events and a meaningful life, and the perceived amount of self-reliance. Examples

include the following:

1. The low value placed on lives in Japan after World War II, during which many lives were lost, caused people not to respond to the deaths due to disasters in the subsequent decade with as much alarm as they would now.
2. People who view disasters as an act of god(s) and therefore unavoidable, leading to the perspective that any action taken would be fruitless.
3. Children were taught how to save themselves from disasters and have self-confidence in Kamaishi, resulting in 99.8% of the children saved during the GEJET in 2011 (Katada, 2011).

It remains very difficult to measure types of belief systems, particularly because they change over time, and inquiring about them might trigger people to start changing and developing their perspectives. A lack of self-confidence or value of life will definitely increase vulnerability if it leads to a lack of action.

One source mentioned the number of dependents as an indicator (NRC, 2006). It is conceivable this indicator can have a high impact on people's vulnerability, whether they are vulnerable themselves or not. The key concept in many disaster plans (preparing and saving oneself) does not always result in doing the same for one's dependents.

3. Methodology

“People don’t do mathematics because it’s useful. They do it because it’s interesting. The point of a measurement problem is not what the measurement is; it’s how to figure out what it is.”

Paul Lockhart, *Measurement* (Lockhart, 2012)

3.1. Defining Vulnerable People

This section contains a summary of the main steps taken to define vulnerable people, whereas the succeeding sections describe the methodologies in more detail.

Different understandings of vulnerability, hazard, disaster, and risk have been developed over time. It is important to point out what or who exactly is vulnerable to what, and moreover why. The first objective of this study is to define vulnerable people and also to provide examples of how vulnerable people are more susceptible during different phases of disaster management. To achieve this, recent literature and government documents on vulnerability, vulnerable people, and groups of potentially vulnerable people are evaluated. Next, an overview of different definitions of vulnerability is presented, followed by a discussion of the causes of vulnerability. The subject of what or who is vulnerable can range from individuals to communities and entire ecosystems or economic systems. In this research the focus is on vulnerable people rather than assets or environmental or economic systems. The literature review is used to arrive at an original definition of vulnerable people.

Six groups found repeatedly in the literature were determined to be the basis of further study. These groups are defined as groups of potentially vulnerable people. While certain circumstances may lead to vulnerability, these circumstances are not necessarily the equivalent of vulnerability (Cardona, 2003), so the proxies indicate groups of potentially vulnerable people. For example, “older adults” (those 65 and older) constitute a group with many vulnerable people as members, but not all older adults are vulnerable people; thus, older adults are merely *potentially* vulnerable people. Additionally, not every group of potentially vulnerable people can be accounted for in this research.

The indicators of relevant vulnerability indices and additional sources were evaluated for their applicability in this study, with a focus on social vulnerability. Based on a thorough review of disaster data and literature, the characteristics of vulnerable people are described as (1) less physically or mentally capable; (2) fewer material and/or financial resources; (3) less access to information, and (4) restricted by commitments. It was found that these characteristics affect people differently at every phase in DRM, and these characteristics were used to develop the vulnerability framework and indicators.

Finally, the list of facets of vulnerability studies from Adger et al. (2004) was used to

verify the indicators before and after data collection (Table 3.1). These facets of vulnerability should be verified both before and after a vulnerability study takes place, so they are covered again in the verification section of Chapter 6, Discussion.

Table 3.1. Facets of vulnerability studies (Adger et al., 2004).

Facet	Example
Purpose	Comparison, assessment of threat, enhanced understanding of causes (and identification of measures to reduce vulnerability)
Definition of vulnerability	Yes/no
Scale	Scale at which processes operate, unit of investigation/unit at threat
Dynamism	Multiple pressures, processes affecting factors of vulnerability
Conceptual framework	Yes/no, assumptions transparent?
Research approach	Deductive/inductive, (subjective/objective), statistical/processed based
Data	Reliable and representative, selection of indicators defensible to community/stakeholders?, reproducibility
Verification	Evaluate validity and plausible outcome, compare with findings of relevant studies, analogue [comparable] past event, case study, explaining relationships

3.1.1. Analysis of literature review

In this section the more detailed steps of the literature review are described. The results from the literature review were analyzed to form categories of similar indicators and recurring items related to vulnerability and vulnerable groups. Next, the applicability of the encountered indicators for vulnerability as well as vulnerability-reducing policies for this research are examined. The findings that led to the creation of a framework based on characteristics are presented as well.

The results of the literature review are further organized in Appendix 3. The first table analyzes the 10 indices from Section 2.3 by grouping similar indicators into categories, while the second table contains the analysis of 8 additional indices in the same manner. The third table has an analogous method of analysis for 18 additional literature sources found to describe social vulnerability and groups of potentially vulnerable people, their characteristics, and/or circumstances. Classification of the indicators or items depended on the way these were described by the respective studies, and not on the effectiveness of the indicator or item in measuring or describing their targets.

The appendix provides an overview of the individual indicators and categories per index and further classifies them according to similar characteristics. Blue indicators are health related, and purple indicators are education related, including previous disaster experience and drills. Orange indicators are related to income, vary in scale from individuals to regional areas, and include health insurance. Green indicators represent hazard-related indicators. Yellow indicators are related to government effectiveness and include on the one

hand the recognition of people's rights and on the other organization of the government. Other indicators were left blank. For the analysis of the additional sources, the following additional categories were created: children, older adults, gender, disabilities, minorities, and social factors. On some occasions these items were counted twice. For instance, "age" was counted as relating to both children and older adults. Another example is the item "fragility of the family and the collective economy," which was counted as relating to both income and social factors.

From the findings in Tables 1–2 in the Appendix 3, it becomes clear that the evaluated indices on average pay relatively the same amount of attention to the identified indicator categories of health, education, income, hazard, and governance (a total of 108 indicators), as they do to other indicators (133) not associated with these categories. For the 8 additionally analyzed indices, these figures are comparable (54 indicators matching the identified categories; 41 other indicators). On average, the attention paid to the individual categories is roughly equal in the first 10 evaluated indices, and for the 8 additionally analyzed indices, there is slightly less attention to governance and much less to hazard indicators. However, this distribution is quite different when examining the individual indices, as some indices have no indicators in certain categories altogether.

When considering the results in Table 3, it becomes clear that the most often-mentioned items related to vulnerability or vulnerable groups are those concerning income and various minorities. Other recurring items are children, older adults, women or gender-related items, people with disabilities, items related to education and awareness, governance, and social factors. While these items are identified as related to vulnerability or vulnerable groups, it is often not clarified during which phase of disaster management these items should be addressed.

The main finding from the review of vulnerability indicators is that most studies emphasize the importance of a solid theoretical framework as well as validating both methods and results; however, almost none of them report on these issues. Many of the indicators linked to social issues concern characteristics or vulnerable groups that in themselves do not necessarily indicate vulnerability. Examples include age or children/older adults; disabilities or people with disabilities; ethnicity or tourists, illiteracy or non-English speakers; and poverty or low-income households. These indicators could be said to be end-point indicators or proxies, measuring potential vulnerability rather than actual vulnerability.

3.1.2. Characteristics of vulnerable people

The understanding of vulnerability is adapted from the concepts in the book *At Risk*

(Wisner, Blaikie, Cannon, & Davis, 2004). This is based on the understanding that disaster risk arises from a combination of exposure and vulnerability. If people are exposed but not vulnerable, they are not at risk; likewise, if people are not exposed but still vulnerable, they are not at risk. The question then became what exactly makes someone vulnerable. From the previous literature analysis, certain characteristics recurred and could be arranged together. Therefore, the following characteristics of vulnerable people (with examples of groups of potentially vulnerable people) were developed:

1. less physically or mentally capable (infants, older adults, people with disabilities)
2. fewer material and/or financial resources (low-income households, homeless)
3. less knowledge or experience (children, illiterate, foreigners, tourists)
4. restricted by commitments (people taking care of children, people with pets)

These four characteristics lie at the root causes of how people can be vulnerable and unable to prepare themselves for or save themselves from disaster. When considering the characteristics of who are vulnerable people to disasters, an overlap may exist where people can have multiple characteristics simultaneously or their characteristics may change during their lifetime. People who are helped by others (who are then restricted by commitments) are still vulnerable people, but their resilience is increased by the help.

These characteristics may be used to examine vulnerable people in different phases of DRM (see Table 3.1.2). The remainder of this research focuses on the response phase only. The examples of vulnerability are centered on the six target groups of potentially vulnerable people in this research, although these examples could also be valid for other groups. It should be noted that these examples are not all-inclusive and merely serve to illustrate possible actions that perpetuate or exacerbate vulnerability, per disaster management phase.

Table 3.1.2. Examples perpetuating or exacerbating the vulnerability of vulnerable people per disaster management phase.

Disaster Management Phase	Examples that perpetuate or exacerbate the vulnerability of vulnerable people
Prevention (land-use regulation, evacuation ways, shelters)	<ul style="list-style-type: none"> • Hospitals, prisons, nurseries, retirement homes built in unsafe locations • Construction of evacuation routes for those without disabilities • Placing evacuation signs in one language • Reduced earning capacities for groups of potentially vulnerable people, leading to social isolation • Poor building code reinforcement or land-use regulations in lower economic zones and unsafe areas

Preparation (education, EWS, research, drills, hazard mapping)	<ul style="list-style-type: none"> • Political powerlessness • Not involving groups of potentially vulnerable people in the creation of emergency plans or drills • Research or data collection not related to vulnerable groups
Response (EWS information, traffic regulations, evacuation, lifelines, infrastructure)	<ul style="list-style-type: none"> • Emergency messages not tailored to vulnerable people • Physical weakness or lack of vehicles, unable to escape independently • No special health care related to women (pregnancy, childcare, gynecology) or older adults (medications, Alzheimer’s disease) • Shelters not equipped to withstand temperature extremes • No special measures on how to deal with people unwilling to evacuate
Recovery (lifelines, housing, businesses)	<ul style="list-style-type: none"> • No safe area available for relocation • No protection against trafficking • Temporary housing not equipped for disability or religious or cultural activities • Financial recovery funds or health-care provisions not aimed at vulnerable people • No discussions or involvement of recreating jobs for vulnerable people

Many groups beyond the scope of this research may be particularly vulnerable during certain phases of disaster management. For instance, men can be more vulnerable during the response phase, as was seen after Hurricane Sandy in the Northeast United States in 2012. The number of male victims in their 50s was unusually high compared to victims of the GEJET (Sugimoto, 2013), and experts reported that rescue or recovery activities contributed to these values.

3.1.3. Vulnerability definitions

It is necessary to have a general definition of “vulnerable people” to summarize the findings that is applicable to all countries. It is often not possible to consider the individual characteristics of vulnerable people on a national scale. When considering the statistics of a group of people who are likely to have one or more characteristics, it is unknown, on the individual level, who has a vulnerability characteristic (or multiple characteristics). Therefore, it is necessary to construct a definition of “groups of potentially vulnerable people” as well. For example, “older adults” include many vulnerable people, but not all older adults are vulnerable people. This definition is included to explain the focus of the gathered statistical data. This research used the following working definitions presented below.

Vulnerable people in a community: people who have one or more characteristics that make them more susceptible than others in a community and who therefore require extra DRM measures for them to have the same level of risk as others (see Figure 3.1.3-1).

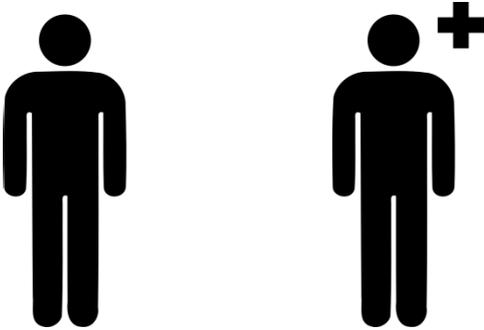


Figure 3.1.3-1. Self-reliant person and person with vulnerability characteristic(s).

Group of potentially vulnerable people: a group of people who share an aspect that distinguishes the group, such as age or ethnicity, and a majority of whom have one or more characteristics of vulnerable people. The word “potential” in this definition indicates that while there are many individuals in the group who have one or more characteristics of vulnerable people, it is unidentifiable which individuals have the characteristics. An individual who is in such a group but does not have a characteristic is considered self-reliant, and an individual who is in such a group while having one or more characteristics of vulnerable people is considered a vulnerable person (see Figure 3.1.3-2).

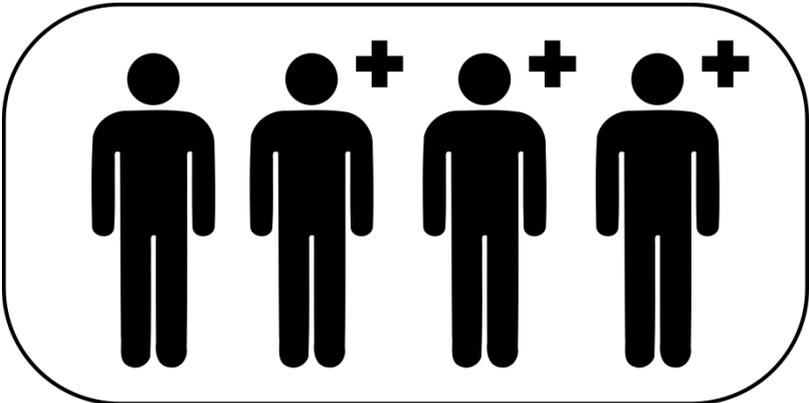


Figure 3.1.3-2. Group of potentially vulnerable people; the majority have one or more characteristics of vulnerable people.

3.2. Developing a Vulnerability Framework

This section contains a summary of the main steps taken to develop a vulnerability framework; the following sections describe the methodologies in more detail. Indicators were proposed for six groups of potentially vulnerable people, attuned to the hazard type of

floods and evacuation phase of flood disaster. The six groups are as follows:

1. children
2. older adults
3. minorities (ethnic)
4. people with disabilities,
5. people living in poverty
6. women

People may belong to multiple groups of potentially vulnerable people simultaneously. Such individuals may be vulnerable in multiple ways and therefore require multiple measures on their behalf.

As risk, vulnerability, and adaptive capacity are hazard-specific, the research focused on only one hazard type (Brooks, 2003). The emphasis on defining indicators specific to different phases of disaster management is crucial to addressing the root causes of vulnerability and identifying which measures could be taken to reduce vulnerability at various stages of a disaster. The focus was on the response phase, as this is the time most associated with disaster mortality.

Indicators were evaluated per characteristic for each of six groups of potentially vulnerable people across the four characteristics of vulnerable people. The indicators were proposed following a thorough literature review covering several requirements. These requirements include the fact that chosen indicators had to be relevant to the theoretical framework, have a narrow scope, and be objectively understandable. The data on the indicators had to be measurable; available from reliable, valid sources; reproducible; and sensitive to dynamic aspects (changing over time). As there was the need to rely on governmental statistics, measurability and validity significantly decreased the number of possible indicators. Data availability was hampered by ambiguous data and power-related issues such as the need to provide data contributing to a positive image. It is particularly difficult to obtain information on disaster victims and those with disabilities in Japan, as these characteristics are considered private and therefore often not publically available (see Hada et al., 2013).

The three case study countries for which the indicators were to be evaluated further influenced the development of the indicators. Vulnerability indicators should differ by area as vulnerability represents both biophysical risks and social responses that differ by area (Rygel, O'Sullivan, & Yarnal, 2006). This implies that comparison of vulnerability in countries is only possible if the biophysical risk and social responses are comparable. Aside from the comparable development and flood management practices in the three countries, evacuation simulations from the Dutch Programma Nationale Veiligheid (2008) assumed that people will evacuate by car and are at home when the evacuation orders are given. Given the dependence of evacuations on car availability, car ownership was viewed as an important indicator of evacuation success for the Netherlands. Despite new discouragement

of car transportation during floods in Japan, the indicator of car ownership is kept for comparative purposes.

3.2.1. Boundary conditions for groups of potentially vulnerable people

If we are to reduce vulnerability, it must be clear who is vulnerable and how vulnerability is caused (Thomalla et al., 2006). Based on the analysis of the literature review, the groups of potentially vulnerable people chosen in this research are children, older adults, people with disabilities, people living in poverty, ethnic minorities, and women. To create indicators on their behalf, these groups require clear boundary conditions in order to make estimations as to their numbers so that it is clear who belongs to the group and who does not. However, setting boundary conditions remains a subjective process, as the interpretations of who belongs to them are subject to culture as well as to time.

Groups that might appear easy to define are those associated with age. Regarding “older adults,” it is worthwhile to note the perspective of English author Virginia Woolf, born in 1882, who wrote in *A Writer’s Diary* (2003) at the age of 37 to her future self, “50 is elderly, though I anticipate her protest and agree that it is not old.” (Woolf, 2003, p.7). As life expectancy has increased in the last 130 years in many developed countries, so has the notion of who is considered an “older adult.” As Figure 3.2.1 shows, the average life expectancy in the Netherlands in 1850 was only half of what it is today. The statistics bureaus of many Western countries use the age of retirement as a boundary condition for “older adults.”

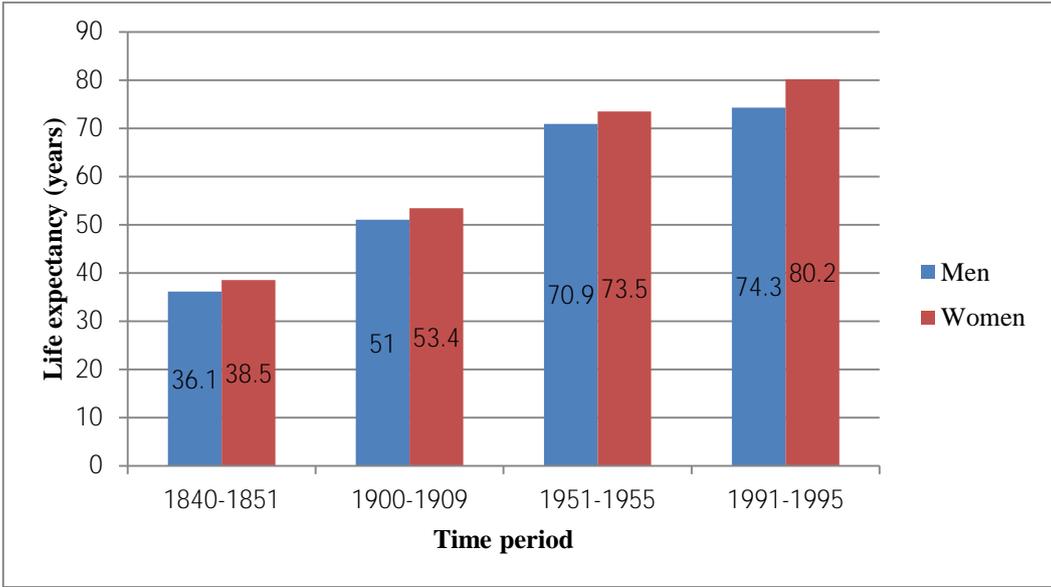


Figure 3.2.1. Life expectancy in the Netherlands in selected time periods (see Beets & Van Nimwegen, 2000).

However, in recent years the retirement age of many of these countries has increased or is about to increase, along with aging populations. What may be the retirement age this year may not be the retirement age next year, thus causing a shift in the number of people who might be included in this group. Furthermore, “older adult” age or even the retirement age differs per country and per culture and may be incomparable, especially between developing and developed countries. As with “older adults,” given that cultural understandings may vary and change throughout time, and boundary conditions may lead to different ages throughout time, “infants” or “children” are also ambiguous groups that require strict boundary conditions in order to gather relevant and comparable statistics. The age boundary of the “children” group often depends on the school system prevalent in the country.

For “people with disabilities,” it is possible that people have multiple disabilities at the same time. According to the Handbook of Hazards and Disaster Risk Reduction, “a person with disabilities is one whose ability to move, think, perceive or express himself or herself is compromised by injury, illness or societal limitations” (Alexander et al., 2012). Given statistics from both developing and developed countries, the figure of people with disabilities worldwide is estimated at 20% of the population. One way to define this group is by looking at health laws or insurance types, which vary greatly from country to country. Additionally, there will always be people with disabilities that do not receive any aid through a registered legal or financial system, even in developed countries. Finally, a disaster itself is likely to lead to more people with disabilities, further influencing the number of people in this group.

For “people living in poverty,” in addition to the economic level of poverty, which may vary from country to country and within countries often from urban to rural areas, “wealth” must also be defined. A person with low income (or a person in a low-income household) may still be sufficiently wealthy if there are other assets, insurance types, investments, and pensions available. The definition of poverty will not merely depend on average income in a country but also on what is considered a decent life. Not only do people living in poverty have fewer resources to recover from disasters, a disaster itself can lead to more people living in poverty if there are not enough available resources to recover. For instance, after a meteorite strike in Russia in February 2013, over 100,000 m² of glass was shattered, and the local glass factories did not have the capacity to meet the demands to repair all houses, schools, and factories (Meteor attack in Russia injures 1,200, causes billion rubles of damage, 2013), leaving many structures exposed to the elements and rendering businesses inoperable. The expected loss of income or wealth due to disaster should also be determined when assessing current and future poverty.

As is the case for people with disabilities, it is possible for people to belong to multiple minority groups at the same time. An example of minorities includes ethnic minorities, which is a difficult term to define. One such definition is “those groups of people whose members identify with each other through a set of shared cultural practices which other groups consider as distinct” (Gaillard, 2012). Examples include certain castes in India, the Burakumin in Japan (those performing occupations historically considered as impure, such as coroners or butchers, who live in separate areas), and the Ainu (the indigenous people) of Japan. It is possible through heritage and migration to be part of multiple ethnic groups at the same time or to experience changes in ethnic groups over time, including belonging to minority groups. People can also belong to multiple religious groups simultaneously, or their affiliation might change over time. For instance, according to the Central Intelligence Agency (CIA) World Factbook (n.d.), in Japan, 83.9% of the people belong to Shintoism, and 71.4% to Buddhism, which is due to people belonging to both religions at the same time. This can be true for religious minorities as well. A final example of minorities is sexual minorities, which still suffer arrest, prosecution, and imprisonment in 76 countries (U.N., 2012). In 2008, 66 countries supported an international human rights statement including sexual orientation and gender identity at the General Assembly of the United Nations (Amnesty International, 2008). For the countries signing the statement, it is legally clear whether sexual minorities are vulnerable, and subsequently whether data gathering is feasible. It is expected that data regarding sexuality in countries opposing the statement is either impossible or skewed. Given the ambiguous nature or potentially life threatening treatment of minorities, two things will have to be investigated for this research regarding minorities: the existing minorities (ethnic, religious, sexual, etc.) in each area and the extent to which they experience any form of discrimination leading to lack of resources or education (which could be nonexistent).

Finally, the group of potentially vulnerable people that is ‘women’ is also not unambiguous. Even though many countries have statistics dividing the population into two sexes, men and women, naturally there are more prevalent options, as well as for gender. For example, a person may be male assigned at birth, yet later on decide to fully transition into a female by means of hormone therapy and surgery (transsexual). Transition away from the sex assigned at birth but not fully to another or “opposite” sex is common. Another example is a person assigned a certain sex at birth but who identifies as gender fluid and experiences various genders without actually changing their sex. The acceptance of more than the two traditional sexes and genders is not fully recognized in the governmental records of many countries. However, the percentage of the population this affects is generally not very high. The report “Becoming Who You Are” (Sociaal en Cultureel Planbureau, 2012) found that

48,000 people live with “an ambivalent or incongruent gender identity,” which translates to 0.6% of men and 0.2% of women in the population between 15 and 70 years old. When defining the group “women,” it is relevant to note who is included in the corresponding statistics and whether the existence of certain sexes or genders is ignored to obtain the most accurate figures. This is most crucial in cases of discrimination.

To provide a concrete example of boundary conditions, Table 3.2.1 shows the identified groups of vulnerable people in Saitama City, Japan. These definitions provide slightly more strict rules as to who belongs to each group of vulnerable people, though they are still not unambiguous.

Table 3.2.1. Identified groups of vulnerable people and the corresponding boundary conditions according to the government of Saitama City, Japan (Saito, 2012).

Group of potentially vulnerable people	Boundary conditions
Elderly persons	People who are 65 years or older and receive certification for long-term care, those who live in households only for elderly people, or those who live alone
Physically handicapped persons	People with disabilities hold a handicapped person notebook
Mentally disabled persons, mental patients	
Persons disabled by disaster	[No further conditions]
Infants	Children until elementary school attendance
Foreigners	Those who need special consideration for language and culture

3.2.2. Indicator requirements

To assess general indicator requirements, previous literature describing indicator requirements as a basis was used (see Table 3.2.2). From these sources, the following indicator requirements were derived:

1. relevance to theoretical framework
2. narrow scope to directly measure phenomena
3. understandability and objectivity
4. measurability
5. sensitivity to dynamic (temporal) aspects
6. availability and cost-effectiveness of data
7. scientific validity (data from reliable sources, data reproducible)

Table 3.2.2. Overview of indicator criteria grouped in similar themes based on separate sources (the first five rows are based on Dwyer et al., 2004).

Criteria	Relevance	Validity	Sensitivity	Measurability	Narrow scope	Availability	Understandability
Davidson		Valid (data quality)			Direct	Based on available data	Understandable, objective, quantitative
Cobb	Clear and created on a conceptual basis				Narrow range		
Krumpe	Indicative, significant	Reliable	Sensitive, responsive		Discriminating		Quantitative
King	Developed along a theoretical model	Based on a fixed set of tested indicators				Based on existing data	
Dwyer et al., 2004	Supportive of the concept, serve the needs of the research question, accurately represent concepts, acknowledged as valid substitutes for concepts	Valid (use credible data and be verifiable, quality, data must be credible and reproducible, available from a reliable source)	Sensitive to temporal aspects, measuring changes in system/process, aligned with time-scale			Based on available data	Quantitative, measurable via a readily understood method, having a limited bias/subjectivity of data collator, providing clarity to decision makers' comprehension, simplicity, easily understood, reflecting the complexity of the concepts, unambiguous, accessible

Abarquez & Murshed, 2004	Specific and reflect things the project intends to control	Verifiable, able to be checked	Sensitive to changes over time, time-bound when a change is expected	Measurable	Adequate, providing enough relevant information, direct, closely tracking results		
Pintér et al., 2008	Describing the underlying issue/ phenomenon accurately	Valid (scientifically)		Measurable		Based on available data; cost effective	Understandable
UNU, 2006	Relevant, representing issues important to the relevant topic, policy-relevant	Valid, accurate, reproducible, comparable(data), analytically and statistically sound	Sensitive and specific to the underlying phenomenon	Measurable	Appropriately scoped and only measuring important key-elements	Based on available data; cost effective	Understandable, easy to interpret
UNOCHA, 2012	Describing the definition or rationale (reason for using this indicator)	Describing the means of data collection and sources (databases used), comments and limitations (anything affecting data quality)	Periodic (how often the data is updated)		Describing the methods of computation (values representing indicators) and disaggregation (whether/how the data should be diversified in smaller categories)		

Several sources state that it is preferable that the indicators are generic and applicable to all countries (Adger et al., 2004). This places constraints on data availability, as different countries have different ways of collecting, among others, socioeconomic or land-use data. In addition, it is crucial that the indicators measure vulnerability existing prior to a disaster, rather than measuring the outcome of the disaster (e.g., human mortality, damage).

As seen in the EVI, to reduce data requirements, it can be advantageous to select SMART or end-point indicators. The example provided by the EVI is as follows: “The presence in a country of a high percentage of original forest cover automatically indicates that all the processes that lead to maintenance of good cover must be operating well for that end-point to be present, without the need to measure the many hundreds of indicators that could individually lead to losses. The conditions present may include good policies for preservation, low widespread degradation, sufficient renewable water recharge, and little problem with acid rain.” (Kaly et al., 2004, p.5).

Aside from the general requirements, there are additional issues that must be taken into account for this specific research:

1. **Dynamic definitions:** Vulnerability and the groups of potentially vulnerable people are dynamic in definition. Moreover, what is seen as a group of potentially vulnerable people, and what is regarded as safe or an acceptable loss, differs per culture. It must be made clear, per case study, who is considered to belong to the groups of potentially vulnerable people at the moment of measurement.
2. **Cross-community traveling:** People do not necessarily stay within the confines of their community as they can move across community boundaries for their daily activities such as work, school, and touristic outings. Even though some groups of potentially vulnerable people are less mobile, it must be clear how both statistics agencies and DRM policies handle cross-community traveling.
3. **Available resources:** It is possible DRM policies take into account the available resources in the area, rather than the required amount of vulnerability reduction. The knowledge to create more measures to support vulnerable people might already be present in such a case, but is merely not incorporated due to lack of resources. This means that the recommendations must be adjusted not merely to include more measures for vulnerable people but also to focus on obtaining the necessary resources by other means.
4. **Sensitivity:** For Japan, research from Zhai and Ikeda (2006) suggested not to inquire about household income directly but to refer to age and house ownership instead. This type of conversion into different proxies for measuring sensitive indicators may have to be applied for multiple factors. Certain disabilities might also be considered sensitive information.

3.3. Estimating the Number of Potentially Vulnerable People

This section contains a summary of the main steps taken to estimate the number of potentially vulnerable people, whereas the following sections describe the methodologies in more detail.

Using the indicators from the vulnerability framework, the number of vulnerable people per indicator in each country was determined using information from governmental statistics and research agencies. Due to limited data availability, the estimation was performed on a countrywide basis and not on a regional scale. Most data were obtained directly from governmental statistics (the central bureaus of statistics and governmental research agencies in the respective countries). Other sources included ministerial research reports, social planning agencies and related research theses, national police agencies, and regional research agencies contracted by the government.

Some data were estimated (see Appendix D), including: ‘restrictive clothing’, ‘cultural travel restrictions’, and ‘no access to early warning systems (EWS) (television in household)’ for women. For one characteristic (less physically or mentally capable) and group (people living in poverty), a proper indicator could not be identified. The data was harmonized according to the 2010 population, and the number of people was converted to a percentage of the total population. Altogether, 26 indicators of vulnerability were evaluated, and the percentage of the population belonging to each indicator, group, and characteristic was estimated.

Religious or sexual/gender identity minorities were not considered, nor were people with service animals and rescue personnel due to lack of data and/or a smaller number of people. People with pets and livestock owners were considered, as various literature and policy sources indicated that the number of people belonging to these groups might be significant for evacuation operations. Pregnancy is not considered as not being in a good physical or mental condition; rather, it requires extra physical care.

3.3.1. Relevance, scope, and understandability of indicators

The considerations from the previous sections led to the proposal of the following vulnerability framework for each of the six groups of potentially vulnerable people and corresponding indicators based on the hazard flood and evacuation (Table 3.3.1).

All indicators were developed from a perspective of developed countries and the capacity of their citizens to respond to the threat of a flood hazard by evacuation. In the Netherlands, the smallest case study country with a size of 41,543 km², the natural hazard with the most severe possible consequences is flooding. As over 60% of the country lies below sea level and much of the land is reclaimed from the sea, evacuation is the preferred action when floods occur. More specifically, 81%–94% of inhabitants expected to use their

own transportation to evacuate in case of a flood (TNS Nipo, 2006). While there are many types of evacuation from floods (such as horizontal evacuation to shelters within the exposed areas or to safe areas outside the floodplain, vertical evacuation to higher levels within the residence/building), there are no shelters prepared for floods in the Netherlands.

Table 3.3.1. Indicators for evacuation per type of characteristics and group of potentially vulnerable people (based on flood evacuation and response phase).

Type of characteristic	Group of potentially vulnerable people	Indicator
Fewer material and/or financial resources	Children Older adults Minorities (ethnic) People with disabilities People living in poverty Women	Living in household without car access No car ownership No car ownership No car ownership No car registered to name in the lowest income category No car ownership
Less physically or mentally capable	Children Older adults Minorities (ethnic) People with disabilities People living in poverty Women	Under certain age Above 65 years old and disabilities Restrictive clothing People with physical and/or mental disabilities, chronic or temporary (None) Cultural travel restrictions, pregnancy
Less knowledge or experience	Children Older adults Minorities (ethnic) People with disabilities People living in poverty Women	No EWS at schools Experiences leading to evacuation reluctance Unfamiliar with local area/language No earlier warning for prolonged evacuation time at nursing homes No access to EWS No access to EWS
Restricted by commitments	Children Older adults Minorities (ethnic) People with disabilities People living in poverty Women People with animal dependents	Caregivers of children Caregivers of older adults People with ties to the local area Caregivers of people with disabilities People unable to leave possessions Caregivers of pregnant people Pet owners, livestock owners

Japan and the United States are both much larger in size (377,944 and 9,826,675 km², respectively) and also feature many high mountains over 3,000 meters, whereas the highest point in the Netherlands is a mere 323 meters. However, comparable floodplains exist in the equally densely populated floodplains and reclaimed land in the Kanto area, Osaka and Nagoya in Japan, as well as New Orleans, New York City, and Miami in the United States.

Hurricane hazards in the United States often cause floods and most commonly lead to evacuations. A flood warning system and regulations for evacuation by car are in place in the United States. While there is a great difference between federal and state or municipal hazard preparedness, there is great attention in policies for potentially vulnerable people. The American National Incident Management System (FEMA, 2008) even describes the “special needs population” as those in need of transportation, and the “individuals in need of additional response assistance” as including people who are transportation disadvantaged.

In Japan, evacuations by car have been strongly discouraged by the government since the Great East Japan Earthquake and Tsunami in March 2011, when many people became stuck in traffic jams while trying to evacuate, only to drown.

The idea situation for the three case study countries was assumed to mean sufficient evacuation time and orders to evacuate given on time, with the majority of people still desiring to evacuate by car if possible. Based on “fewer material and/or financial resources,” car ownership is an important indicator.

Regarding the characteristic “less physically or mentally capable,” it was not automatically assumed that having a certain age automatically makes all people of that age incapable of evacuating themselves (although this can be argued for infants). For ethnic minorities, various literature sources suggested certain cultural practices would render people less able to evacuate. This was also suggested for religious minorities. Therefore, cultural travel restrictions and clothing were added as indicators.

For the characteristic “less knowledge or experience,” the indicators had to acknowledge not the physical existence of EWS but whether certain groups of potentially vulnerable people were less likely to receive and understand the warning in comparison with the average population. In the case of people with disabilities, the indicator was not measuring whether an early warning is received and understood, but whether it is received earlier than the average population, as it might take them more time to evacuate. In the case of older adults, the indicator of previous negative evacuation experience was used.

People are “restricted by commitments” when they have to take care of dependents, either people or animals. It was recognized from literature sources that other commitments might involve ownership issues. This includes irreplaceable property that might be looted once people evacuate, as well as the area itself being occupied.

3.3.2. Measurability and sensitivity of indicators

Regarding sensitivity, all data were collected and recalculated for the population of 2010 of the respective countries. The total data range varied from 2003 to 2013, with one notable exception. In Japan, for the indicator of illiteracy, there was no other governmental

survey other than one from 1955. This data was used as it was comparable to that of the other two case study countries.

It was not possible to take psychological aspects related to vulnerability into account as there are still no objective methods to measure these factors. Examples include the previously explained belief in one's own power, the predictability of future events and a meaningful life, and the perceived amount of self-reliance. It remains debatable how to measure beliefs and customs regarding disaster situations, as each hazard is different, people's reactions are based on their beliefs, and customs might also depend on the time of day that the hazard occurs. Indicators that might be considered to be psychological or social are place attachment and people worrying for possessions. As beliefs and customs are potentially highly influential in determining an individual's course of action, they should be included in future research and measured throughout different life phases.

3.3.3. Availability and validity of indicators

Appendix D provides an overview of the sources of the indicators. Equal effort was made to find the data from reliable sources for all indicators and in all countries. As indicated, in some cases the data was not available from reliable sources and the numbers were estimated. For dependents, these estimations were based on already determined numbers of groups of vulnerable people. For instance, while it was not possible to find information on people who have to take care of someone unable to leave in both the Netherlands and Japan, these numbers were estimated to be the same as the number of people with disabilities. This assumes that people who have to take care of a dependent will also try to evacuate their dependents when an evacuation order is given.

For some indicators the estimations were low (0, below 1% or 5%). Examples include ethnic minorities wearing restrictive clothing or women experiencing travel restrictions. The assumption was that people having these characteristics have the option of, for instance, removing restrictive clothing or ignoring cultural travel restrictions if they find themselves at risk. It is possible these indicators have higher numbers in other cultures.

For one indicator, the estimation was 100%: "people with disabilities no EWS," which had as proxy, "people with disabilities living at nursing homes where there is no earlier warning for prolonged evacuation time." There were no policies found related to this practice—one that might lead to the death or injury of all of people facing this particular situation.

Occasionally it was not possible to find data on the exact same indicator, as definitions and data gathering differed per country. Examples include the definition of people with disabilities or illiteracy. This is described differently in each country and is

reflected in Appendix 4. In Japan and the United States, car ownership data was not available, so driver’s license data was used instead. The data on literacy was not available for ethnic minorities, but only for the entire population. The assumption is that a significant amount of ethnic minorities might face literacy issues.

3.3.4. Future number of vulnerable people

The future number of vulnerable people was obtained by assessing the information from the governmental census bureaus in the respective countries for projections of vulnerable people. The main sources are the Central Bureau of Statistics (the Netherlands), the Statistics Bureau (Japan), and the United States Census Bureau (United States). Where possible, the expected trends for the number of vulnerable people for the year 2050 is shown, as is for which groups the DRM policies should increase their effort to create appropriate measures. The results of aging societies are linked to expected climatological events and further urbanization of flood plains.

3.4. DRM Policy Evaluation

This section contains a summary of the main steps taken to evaluate the DRM policies, whereas the succeeding sections describe the methodologies in more detail.

A new DRM policy evaluation method is proposed to determine the extent to which laws or policies include measures supporting specific groups of vulnerable people. A five-point evaluation method is proposed (Lumbroso et al., 2011) and applied to the following scoring system (Table 3.4):

Table 3.4. Metric evaluation criteria and corresponding scores.

Criterion	Score
No mention of groups of potentially vulnerable people	1
Recognition of a group of potentially vulnerable people	2
Specific measures taken to reduce the vulnerability of potentially vulnerable people	3
Anticipation of future trends in numbers of potentially vulnerable people	4
Involvement of potentially vulnerable people in policy formulation	5

The evaluated laws and policies and their score (1–5), depending on the scope of their measures, are listed in Chapter 5. Scoring is cumulative; meaning that to obtain a score of 5, policies also must satisfy previous conditions (with the exception of the score of 1). The scoring method is illustrated by three examples in Section 5.2.5. The aim was to make universal evaluation criteria available for all countries, as the expected level of detail of the measures can vary per scale level per country. Given the mandatory nature of national laws, it is more important to get a higher score on the national scale.

The scope of the DRM laws and policies focused on floods and evacuation in relation to the six main identified groups of potentially vulnerable people and the indicators for evacuation.

While the goal is to evaluate DRM laws, factors contributing to people's vulnerability during disasters are not addressed solely in DRM laws. They are also found in laws concerning e.g. human rights, spatial planning, building codes, financial equity, health care, and education. Creating a system that measures the performance of only DRM laws may allow for superficial measurement of those laws only, possibly including an evaluation of links to other relevant laws and other factors listed in the HFA. However, in most current cases, this will result in poor scores for DRM laws as many laws do not incorporate such links and do not focus on vulnerable people. It will also fail to provide an adequate description of measures taken for vulnerable people in all available laws or an accurate comparison with actual measures taken outside of the law. To improve upon this, each law or policy is examined in greater detail following the general policy evaluation scores.

3.4.1. Regional scale and area selection

The scale of policy evaluation encompassed the national laws as well as policies on a subnational policy scale and regional scale. There are many reasons to focus on a regional scale even though many of the factors influencing vulnerability on a household or community level operate on far larger scales. One reason is that many countries have national disaster risk management laws that fail to take effect on the regional level (IFRC, 2011). This is due to communities not being informed, engaged, or resourced to be an active part of risk reduction. Additionally, laws concerning building codes or land use are often not enforced. This suggests a gap between national laws and regional policies. Looking at the regional level would make it easier to identify the origin of the gap between law and implementation.

Another reason to look at the regional scale is that general indicators used on a global or national scale might not be appropriate to the regional geophysical condition, socioeconomy, and governance (Adikari, Osti, & Hiroki, 2013). A final reason for committing to a regional approach includes coverage and reliability of data interpretation. By choosing to examine the regional policies, it is possible to examine the measures for groups that are actually in that area, rather than arbitrarily chosen groups, and the limited scope allows for a more scrutinizing policy evaluation than merely counting groups (Van Houwelingen, 2012).

Two regions in each country were selected for the evaluation of policies: Rotterdam-Rijnmond (1.2 million inhabitants), western Netherlands; Twente (0.6 million inhabitants), eastern Netherlands; Sanjo city (over 100,000 inhabitants), Niigata Prefecture, western Japan; Chikusei city (over 100,000 inhabitants), Ibaraki Prefecture, eastern Japan; New Orleans (over 1 million inhabitants), Louisiana, southeastern United States; and

Hillsborough County (over 1 million inhabitants), Florida, southeastern United States. The selected communities are primarily urban and located in areas of moderate to high flood risk, having comparable sizes regionally. These areas were chosen deliberately as they were likely to have policies focusing on vulnerable people. This served two purposes: to guarantee the availability of policies with suitable measures for evaluation and to find policy measures that may serve as examples for other areas where policies for vulnerable people are less well established. Additional selection criteria involved areas with a known presence of groups of potentially vulnerable people, expected damage/loss of life (highest risk area), and frequent hazards.

3.4.2. Comparative law methodology

The theoretical background involving the comparative law analysis involves the following: a wide range of policy fields is involved with the creation, perpetuation, and reduction of vulnerability. The PAR model by Wisner, Blaikie, Cannon, and Davis (2004) explains how vulnerability is created via root causes, dynamic pressures, and unsafe conditions, and how vulnerability can be reduced. It seems logical that DRM laws, which aim to reduce vulnerability, would target all of the causes that ultimately lead to vulnerability to create a lasting reduction of vulnerability, from the root causes to the unsafe conditions. The U.N. World Water Assessment Programme (WWAP) (2012) described such dynamic processes as population growth, land-use change, and greater use of hazard-prone areas. During the last 10 years, many countries such as Japan, the Netherlands, and the United States have revised their disaster laws given the increased losses from disasters worldwide, and several countries are beginning to adopt climate change in their legislation (UNISDR, 2011). It remains to be seen to what extent dynamic trends influencing the amount of vulnerable people, such as poverty, aging, and urbanization of coastal areas, are considered in vulnerability reducing laws.

There are many laws covering aspects of vulnerability, as can be seen in Handmer and Monson (2004)'s selected examples of laws related to components of vulnerability. Most include antidiscrimination, labor, health-care, and education laws and the right to a safe environment. These aspects can also be applied to enforce changes in social norms that perpetuate unequal distribution of resources, which in turn inhibits resilience. A well-functioning DRM law therefore incorporates or makes reference to such laws. The Global Assessment Report on Disaster Risk Reduction (DRR) (UNISDR, 2011) mentioned that explicitly linking to other laws is the first key element of effective DRR and adaptation laws, as well as adaptation in development plans.

To evaluate the DRM policies from different countries, comparative law methodology was applied. Comparative law is the comparison of different legal systems in the world (Zweigert & Kötz, 1998). Macro comparisons consist of comparing the spirit and style, the methods of thought, and procedures. An example study could look at the different roles and

responsibilities people involved with law have in different countries. On the contrary, micro comparisons start from specific problems and see how they are treated in different countries. An example study could look at how flood damage compensation works. There is also sociology of law, which “aims to discover the causal relationships between law and society.” Sociology of law mainly seeks to find patterns between sociological and legal changes, such as political, economic, psychological, or demographic. In all methods of comparative law, it is crucial not only to note the differences and similarities, which is the theoretical-descriptive form, but also to explain the causes of these, to arrive at recommendations in the applied form. But it is not possible to explain the lack of measures for vulnerable people when the possible basis for the existence of certain measures is mentioned.

3.4.3. Validation of methodology

The policy evaluation method was based mainly on a study by Lumbroso et al. (2011). In this study, the authors evaluated flood emergency plans from different regions according to 3 scores and 21 metrics (as described in Section 2.3.8. of the literature review). In that study, the lowest scores corresponded to considerable room for improvement, and the highest scores with little room for improvement. Along these lines it was projected how vulnerable people might be considered in DRM policies and developed five scores to evaluate DRM policies by, regardless of the scale level, country or number of vulnerable people.

Regarding data collection, the national laws were obtained from governmental law databases (Ministry of Justice, n.d.; Overheid.nl, n.d.; USA.gov, n.d.); the national policies from ministerial websites; and the regional policies from governmental research or consultancy agencies. In the case of Japan, a team of translators was consulted to obtain translations of the relevant laws. Confirmation of the correct and complete set of laws was achieved by related research performing law analyses and discussions with experts in the field. To determine which groups of potentially vulnerable people were supported, an initial analysis was performed of measures supporting the six identified groups (women, children, older adults, people with disabilities, minorities, and people living in poverty). If the laws mentioned specific (support for) groups, these were taken into account.

Keywords were selected to search databases, including “disaster,” “flood,” “vulnerable people,” and words relating to the characteristics and the six groups of potentially vulnerable people. The Japanese and Dutch equivalents were applied in the respective countries. The keywords can be found in Appendix E. I made equal effort to find all the relevant disaster policies in each country.

4. Results: Estimating the Number of Potentially Vulnerable People

“All models are wrong, but some are useful.”

George E. P. Box

4.1. Current Numbers of Vulnerable People

This section displays the current numbers of groups of potentially vulnerable people per indicator. The combined statistics show that people with the characteristic fewer material and/or financial resources and people restricted by commitments are the most populous. There are fewer people with the characteristic less access to information or who are less physically or mentally capable—with the exception of the United States, which scores second highest for less physically or mentally capable and third highest for people restricted by commitments. Several indicators in all countries show numbers higher than 10% of the total population. These high numbers of people warrant attention in DRM laws.

4.1.1. *The Netherlands*

The indicator with the highest number of people is women without car access, and is estimated that this indicator comprises 33% of the total population. A further 3 indicators show numbers higher than 10% of the total population (see Figure 4.1.1).

When ranking the indicators by characteristic, the most populous indicators are as follows:

1. people with fewer material and/or financial resources: women without car access
2. people who are less physically or mentally capable: people with disabilities
3. people with less knowledge or experience: low or no literacy skills
4. people restricted by commitments: people with pet dependents

When ranking the indicators by groups of potentially vulnerable people, the most populous indicators are as follows:

1. children under 14, caregivers of children
2. older adults with no access to transportation
3. minorities (ethnic) with no car registered to their name
4. people with disabilities
5. people living in poverty with no car registered to their name
6. women with no car registered to their name

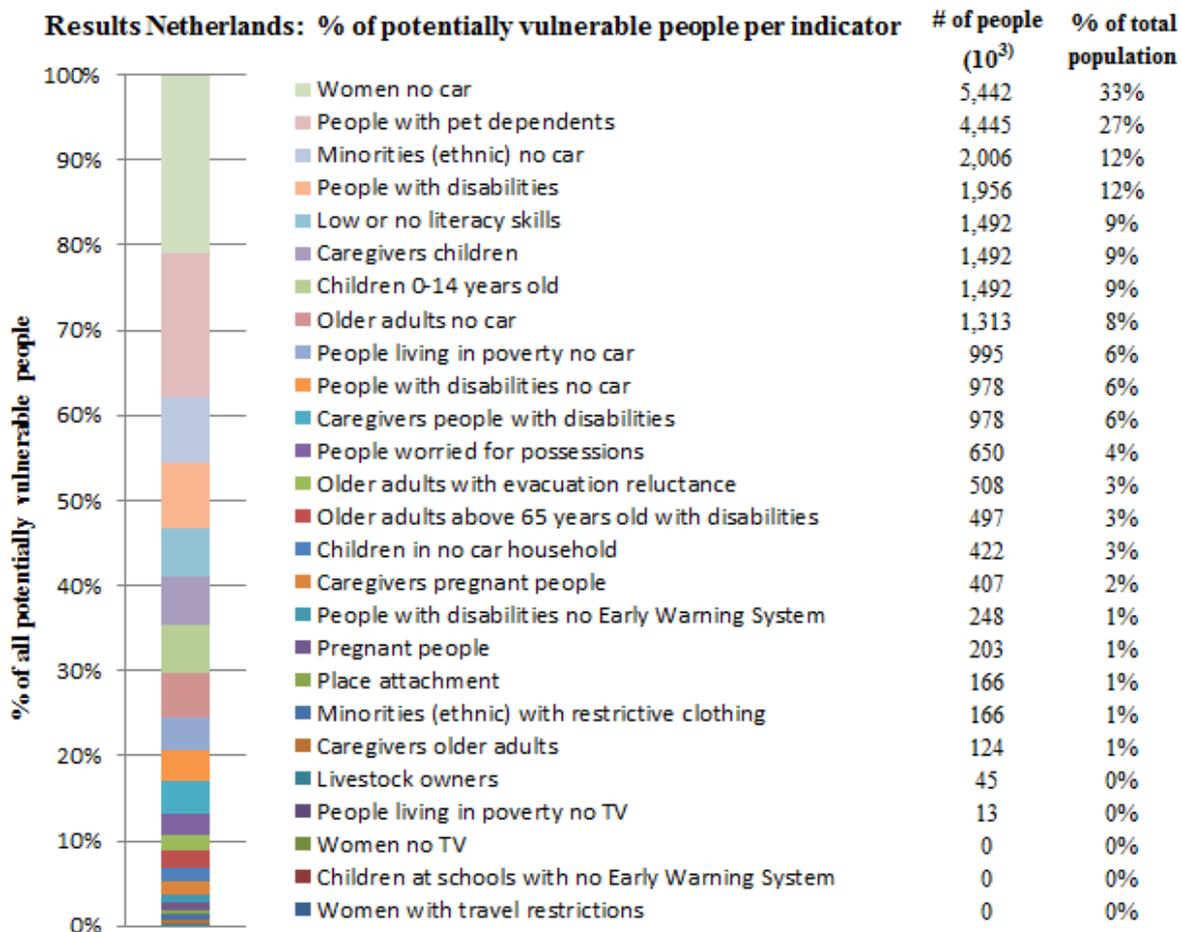


Figure 4.1.1. Percent of potentially vulnerable people per indicator, the Netherlands. The left hand side of the figure shows the percentage relative to the total hypothetical number of potentially vulnerable people gained by adding all found numbers of the indicators together; the right hand shows the percentage of the total population with each respective indicator.

Notable additions that did not fit the original groups of vulnerable people but nevertheless consisted of a significant number of people include the previously mentioned people with pet dependents and people with low or no literacy skills. The number of people with pet dependents is estimated at about three times higher than the number of people with low or no literacy skills.

4.1.2. Japan

The indicator with the highest number of people—women without car access—is estimated at 28% of the total population. A further five indicators show numbers higher than 10% of the total population (see Figure 4.1.2).

When ranking the indicators by characteristic, the most populous indicators are as follows:

1. people with fewer material and/or financial resources: women without car

access

2. people who are less physically or mentally capable: children aged 0–14
3. people with less knowledge or experience: low or no literacy skills
4. people restricted by commitments: people with pet dependents.

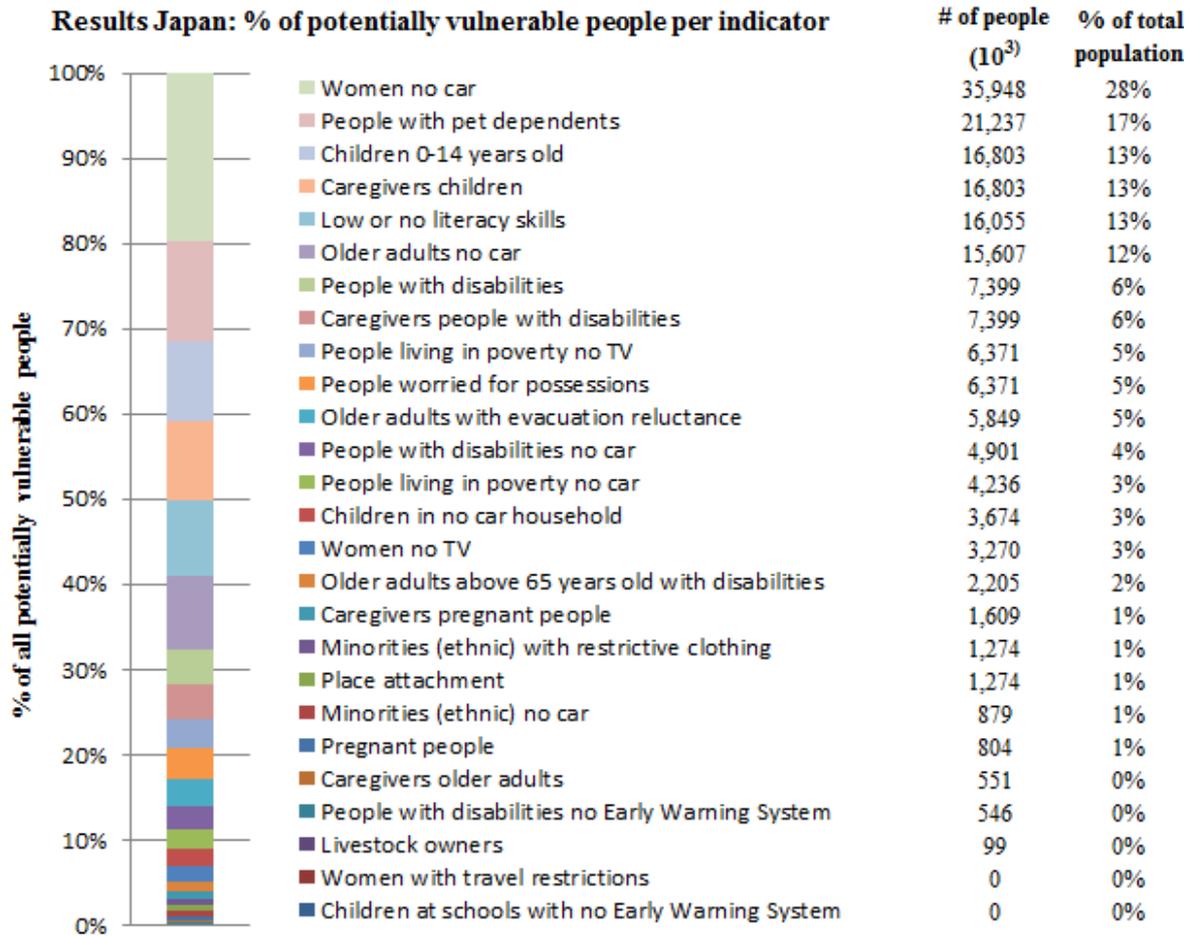


Figure 4.1.2. Percent of potentially vulnerable people per indicator, Japan. The left hand side of the figure shows the percentage relative to the total hypothetical number of potentially vulnerable people gained by adding all found numbers of the indicators together; the right hand shows the percentage of the total population with each respective indicator.

When ranking the indicators by groups of potentially vulnerable people, the most populous are as follows:

1. children aged 0–14
2. older adults without car access
3. minorities (ethnic) with restrictive clothing
4. people with disabilities
5. people living in poverty without a TV
6. women without car access

As with the Netherlands, notable additions that did not fit the original groups of

vulnerable people but nevertheless consisted of a significant number of people include people with pet dependents and people with low or no literacy skills.

4.1.3. United States

The indicator with the highest number of people—people living in poverty without car access—is estimated at 27% of the total population. A further six indicators show numbers higher than 10% of the total population (see Figure 4.1.3).

When ranking the indicators by characteristic, the most populous indicators are as follows:

1. people with fewer material and/or financial resources: people living in poverty without car access
2. people who are less physically or mentally capable: children aged 0–14
3. people with less knowledge or experience: low or no literacy skills
4. people restricted by commitments: caregivers of children

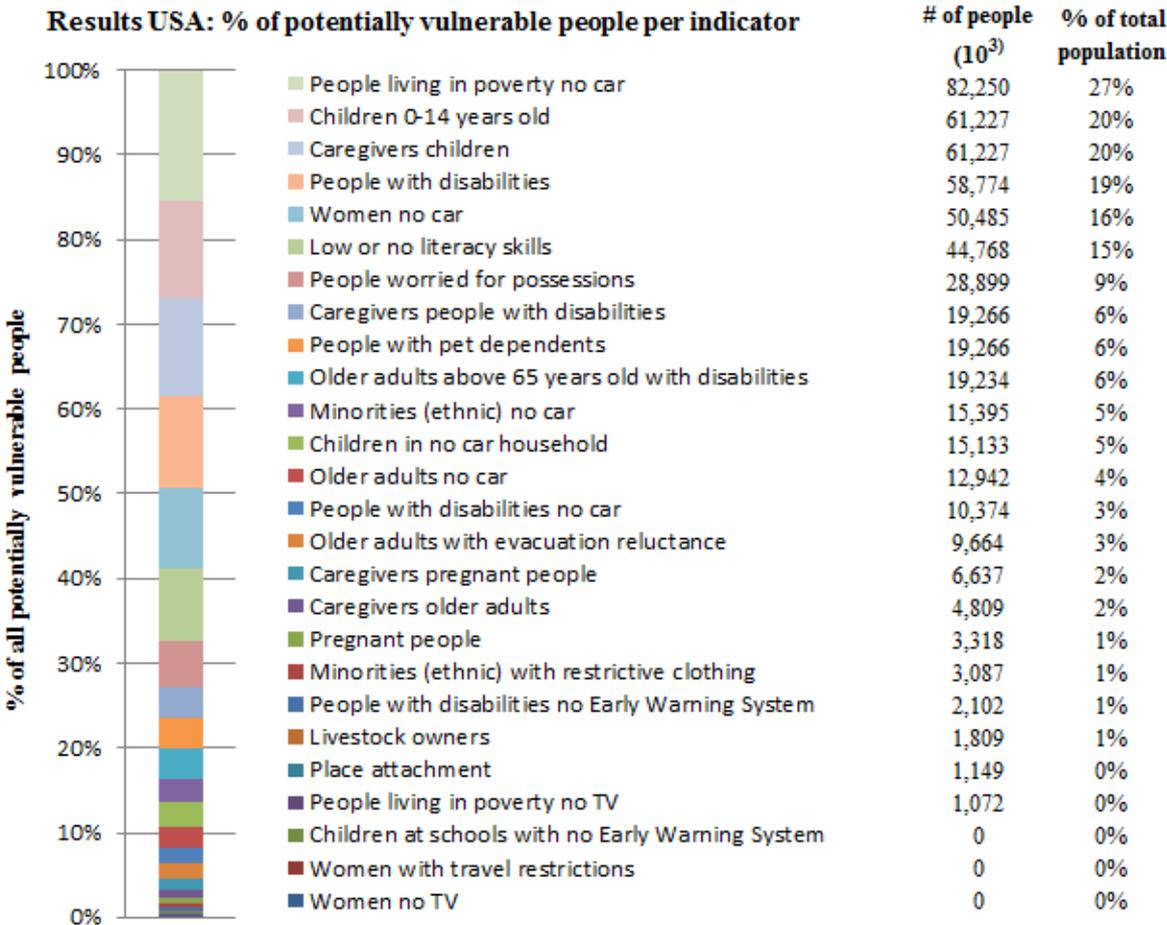


Figure 4.1.3. Percent of potentially vulnerable people per indicator, United States. The left hand side of the figure shows the percentage relative to the total hypothetical number of potentially vulnerable people gained by adding all found numbers of the indicators together; the right hand shows the percentage of the total population with each respective indicator.

When ranking the indicators by groups of potentially vulnerable people, the most populous indicators are as follows:

1. children aged 0–14
2. older adults with disabilities
3. minorities (ethnic) without car access
4. people with disabilities
5. people living in poverty without car access
6. women without car access

As with the Netherlands and Japan, notable additions that did not fit the original groups of vulnerable people but nevertheless consisted of a significant number of people include people with pet dependents and people with low or no literacy skills, though in this country, the number of people with pet dependents is estimated to be about half of that of people with low or no literacy skills.

4.2. Future Numbers of Vulnerable People

Where available, projections are provided of people with disabilities, people living in poverty, and ethnic minorities. While the information in this section is by no means a full and unambiguous representation of the number of vulnerable people in any of the countries investigated, the figures serve as a starting point to estimate future numbers, thus legitimizing policy development for those future numbers.

4.2.1. The Netherlands

Like many western countries, the Netherlands experienced a baby boom after the end of World War II (Figure 4.2.1). This generation of children is currently beginning to retire, placing a heavy burden on retirement funds and health-care facilities. Population projections of 2050 show that nearly every age category will make up 2%–3% of the population. There will be slightly more females aged 75 and older. This creates the shape of a population column rather than a traditional population pyramid. Even though the legal age of retirement is 65, according to director of the Social and Cultural Planning Agency Paul Schnabel, in 2003, the actual age of retirement was 61 years on average; in 2013, the figure had become 64 years (Omlo & Ham, 2013).

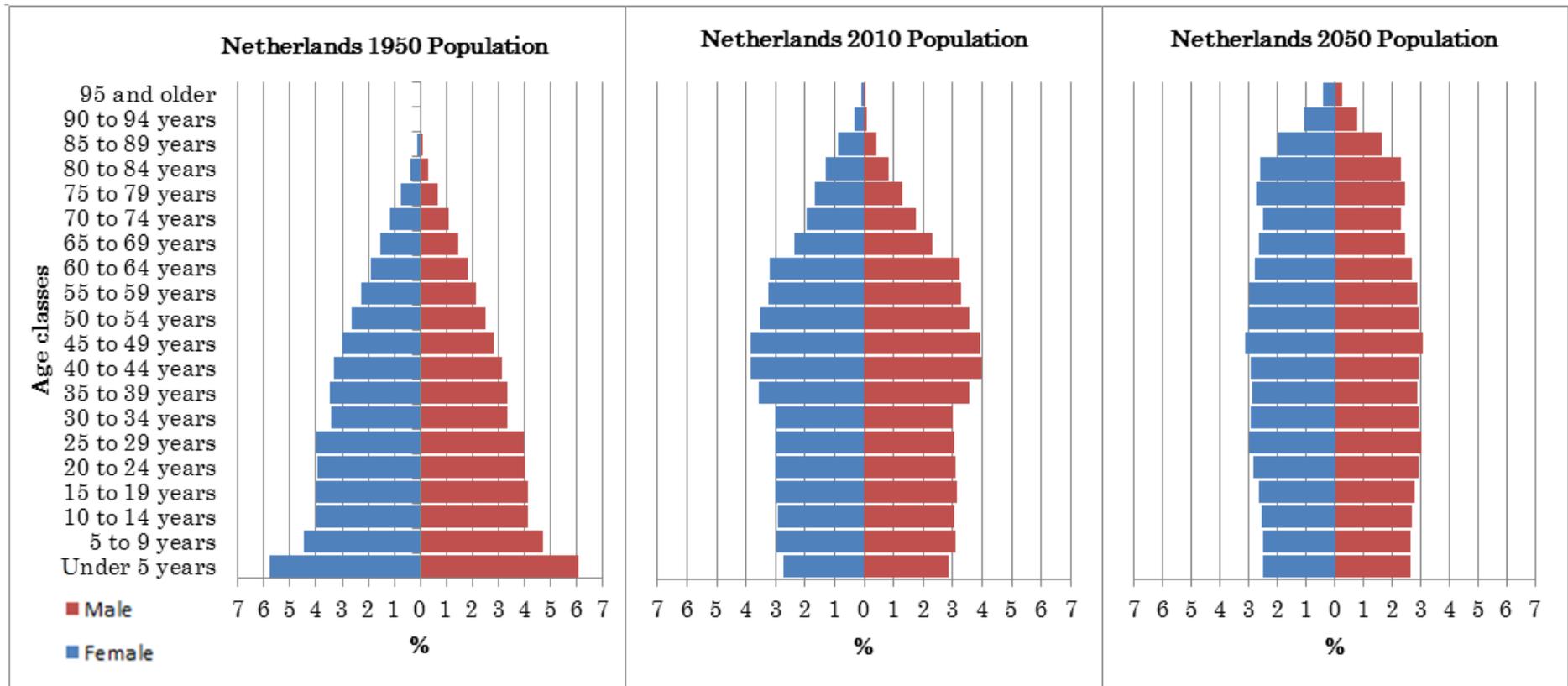


Figure 4.2.1. Dutch population statistics from 1950, 2010, and 2050 (Based on data from Centraal Bureau voor de Statistiek, n.d.).

There were prognoses available of the number of ethnic minorities for the year 2050, but none for people with disabilities and people living in poverty. Regarding ethnic minorities, it is expected there will be close to 5 million immigrants in 2050, which translates to an increase from 19.6% to 28.7% of the total population (Garssen & Van Duin, 2009).

4.2.2. *Japan*

The current population (Figure 4.2.2) shows the baby boom after World War II as well as a second boom one generation later, which are both more pronounced in a single age class. Without a third boom, birth rates have declined in the past 35 years. The projected age distribution in 2050 is starting to show the shape of a reversed pyramid, with there being a far greater number of older adults than children. Governmental prognoses on the number of people with disabilities and people living in poverty for the year 2050 or any other year are not reported. The Japanese National Institute of Population and Social Security Research (2002) projects the amount of foreigners, accounting for some of the ethnic minorities in Japan, expecting a net increase of almost 100,000 people per year by the year 2025.

Ethnic minorities such as the Burakumin (those performing occupations historically considered as impure, such as coroners or butchers, living in separate areas) or Ainu (indigenous people of Japan) are not registered separately as they are regarded as Japanese, and it is seen as a form of discrimination to count them as a separate ethnic group.

One-third of single women who have a job are considered poor (Kuchikomi, 2011). Additionally, 52% of women over 65 are living in poverty, and 57% of single mothers with children are living in poverty. It is expected that single women will continue to live in poverty, and as the population and age distributions show, the number of females is expected to grow.

4.2.3. *United States*

The shape of the American age distribution of the population (Figure 4.2.3-2) has developed into a bell shape. For the 2050 population, nearly every age category will make up 2%–3% of the population up to age 75. As in the Netherlands and Japan, there will be more women 75 and older. In 2011, the average age of retirement was reported to be 64 for men and 62 for women (Munnell, 2011). In 2009, the age of retirement was 66 (Social Security Administration, n.d.).

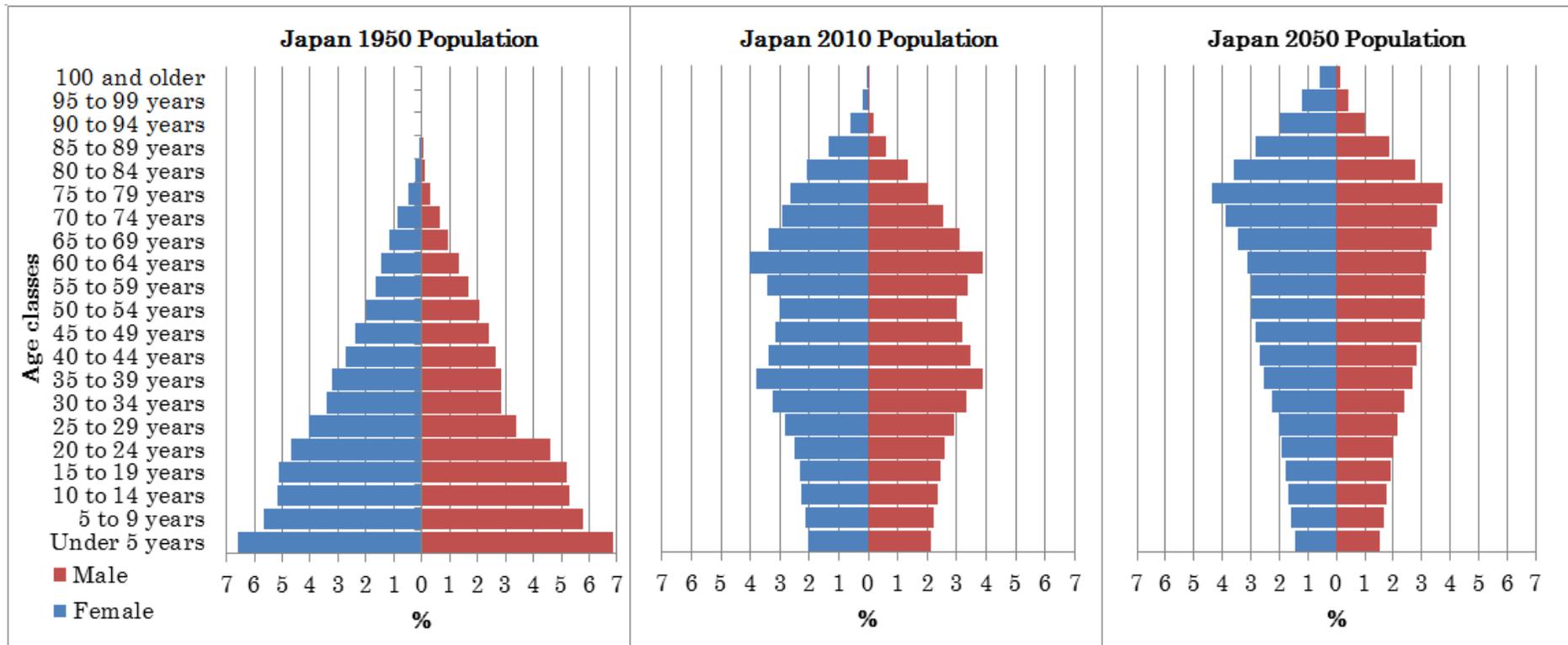


Figure 4.2.2. Japanese population statistics from 1950, 2010, and 2050 (Based on data from the Statistics Bureau, 2011; National Institute of Population and Social Security Research, 2012).

There were several prognoses available on the number of people living in poverty and ethnic minorities for the year 2050, but none for people with disabilities. Regarding ethnic minorities, the race and ethnicity projections from the Census Bureau (Ortman & Guameri, 2009) show a decrease in the percentage of white people and the largest increases in the percentages of Asians and people of two or more races (see Table 4.2.3). Within the group of white people are Hispanic populations, which also dramatically increase. Along with Asians, this increase will be mainly due to immigration. The Hispanic population is projected to more than double between 2000 and 2050 due to the high fertility rate.

In combination with older adults, projections are that 42% of the older adults will be ethnic minorities in 2050 (United States Census Bureau, 2010).

Table 4.2.3. Projections regarding ethnic groups in the United States for 2050, based on data from the Census Bureau (Ortman & Guameri, 2009).

Race	2050 projections	Change compared to 2012
White and Hispanic	74.0%	-5.96%
Black	13.0%	0.15%
Asian	7.8%	3.37%
Native American/Alaska Native	1.2%	0.23%
Pacific Islander	0.3%	0.12%
Two or more races	3.7%	2.09%

While there were no exclusive prognoses for poverty, several figures on poverty were available that could be combined with the previous data on changes in ethnic minorities. In 2012 the Census Bureau (DeNavas-Walt, Proctor, & Smith, 2012) reported that poverty under non-Hispanic Whites was 9.8%, while for Blacks it was 27.6%. Given that the percentage of Whites in the total population will decline and that of Blacks will increase, the percentage of people living in poverty could increase as well.

The same method can be applied to women living in poverty. Current figures from the Census Bureau (see Figure 4.2.3-1) show more women living in poverty than men for every age class. Given that there will be significantly more women over 75 in 2050, it is likely that more of them will be living in poverty.

Poverty Rates by Age by Gender: 2012

(In percent)

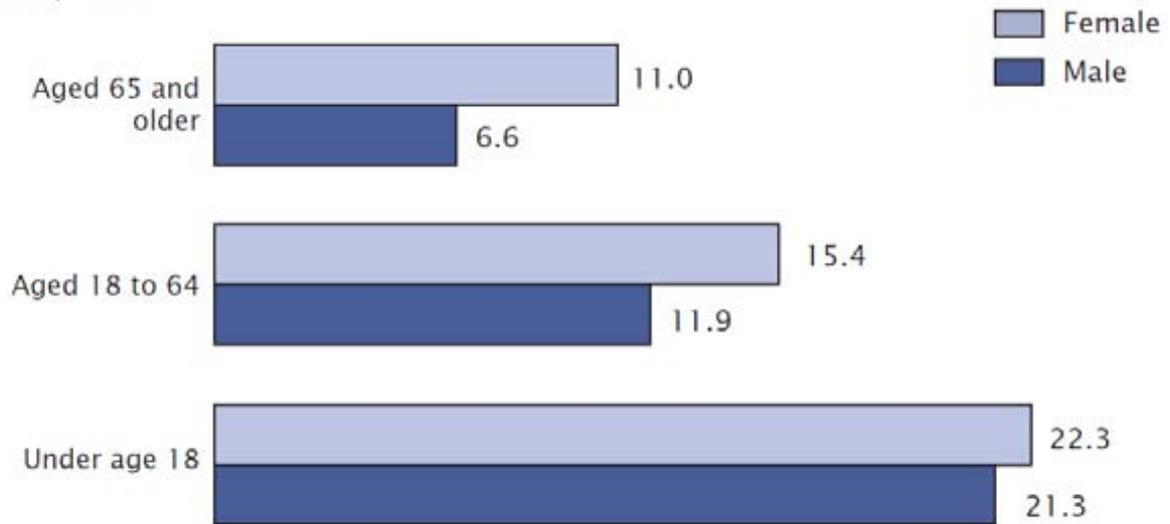


Figure 4.2.3-1. Poverty rates by age and gender in 2012 (Based on data from the United States Census Bureau, 2013c).

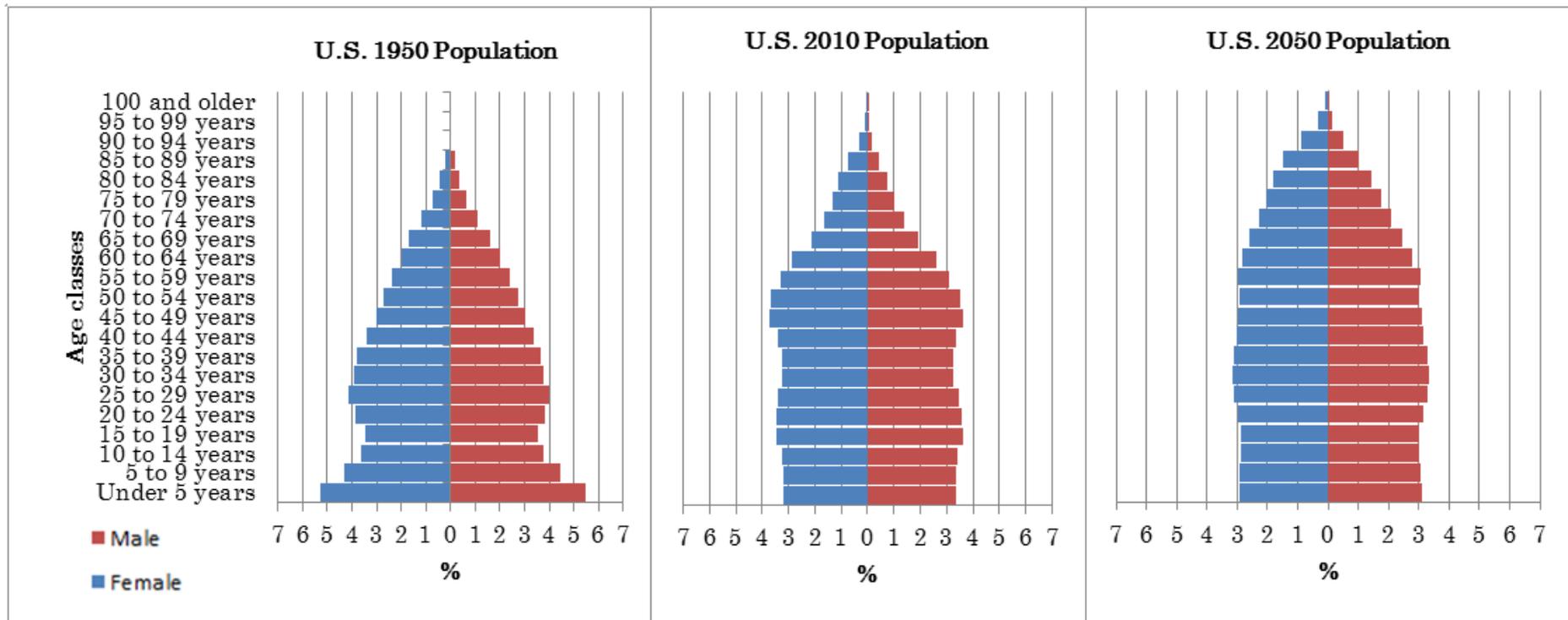


Figure 4.2.3-2. American population statistics from 1950, 2010, and 2050 (United States Census Bureau, 2012).

5. Results: DRM Policy Evaluation

“Fortune cannot aid those who do nothing.”

Sophocles

5.1. Basic Human Rights and DRM

The goals of DRM laws and policies, as well as safety norms and acceptable losses, differ greatly from country to country. There is a common theme, however, to increase support for vulnerable people. For instance, the three case study countries – Japan, the Netherlands, and the United States – all have governments that assert to be democratic. The Universal Declaration of Human Rights (U.N., 1948) was signed by the Netherlands and U.S. in 1948 and is strongly supported by Japan (Ministry of Foreign Affairs of Japan, 2012), which joined the U.N. in 1956. It consists of articles that declare all human beings are equal in dignity and rights (article 1), without distinctions such as race, sex, and religion (article 2); and have the right to life and security of person (article 3); have a standard of living adequate for the health and well-being of themselves and of their family, and the right to security in the event of circumstances beyond their control (article 25). (U.N., 1948, articles 1-3, 25). There is no ranking of articles in terms of valuing one article as more important than another, and there are no restrictions or priorities with regard to implementation. The articles in the Universal Declaration of Human Rights translate to equal protection from natural hazards.

The Handbook of Hazards and Disaster Risk Reduction (Carnalt & Dale, 2012) does make a distinction in rights with regard to implementation. According to the handbook, “the absolute rights are: prohibition of genocide and slavery; right to life; prohibition of torture; freedom of thought, conscience, and religion; due process guarantees; non-discrimination; and the right to be recognized before the law. Other rights, such as freedom of movement, right to housing, right to education, or right to health, can be restricted provided that there is: (1) an imperious reason, such a national emergency or a threat to public health; (2) a legal basis for taking the decision; (3) the measure restricting or suspending the right is proportional to the potential danger; (4) the decision is limited in time and periodically reviewed.” (Carnalt & Dale, 2012, p.63). This distinction greatly aids the implementation of disaster management policies as it can justify the need for temporary relocation or evacuation of the population.

The national laws of Japan, the Netherlands, and the United States all include references to equality and guarantees of safe living environments, even though they belong to very different families of law. These three countries are modern states with sufficient resources, knowledge, a stable infrastructure, and highly functioning distribution networks and education systems that support vulnerable people. This means Japan, the Netherlands, and the United States have both the need and the methods to support vulnerable people. Therefore, it is assumed their individual DRM policies would, at least on one of the scale levels (regional, subnational or national), guarantee the right to safety, in some form, for all people against hazards.

It is important to realize that measures in national laws are a form of mandatory goals, whereas national/regional policies cover a more directional nature of the measures covered, and guidelines and local plans have concrete actions or examples thereof. In general, a policy is a principle that guides decisions to reach practical outcomes, or a statement of intent. Laws, however, can either compel or prohibit certain actions, and often come with punitive actions if these actions are not compelled or prohibited. This means that policies are closer to objectives or ideals, showing intent, whereas laws can, legally, better guarantee human rights. With this in mind it was found that the Dutch laws are mandatory; other documents are policies or operational guidelines. The regional safety plans contain certain information as decreed by the Law Safety Regions, but details vary. The Japanese Ibaraki Prefecture Environment Department – Disaster Prevention and Risk Management Division (茨城県生活環境部防災・危機管理局 防災・危機管理課) confirmed that the prefectural documents are only guidelines, and there is no punishment if they are not followed. The local documents are the same. As for the U.S., all acts are mandatory, and other evaluated documents are either policies or operational guidelines. For all three countries, the national laws are therefore most likely to be implemented in practice and of the highest importance to guaranteeing the human right to security of vulnerable people.

5.2. Evaluation Results

This detailed evaluation focuses on the groups of potentially vulnerable people recognized by the aforementioned laws and available measures to support them. Special attention is paid to the recognition of regional policies of the rights of vulnerable people, involvement of vulnerable people in regional decision making, cooperation between regional government and civil society/private sector, knowledge sharing vs. privacy, and the anticipation of future increases of vulnerable people. As described by Alexander (2005), at least for emergency plans, there is a large amount of variance and a lack of standards for

creating and evaluating emergency plans. The metric proposed in this study allows for evaluation of multiple types of policy documents, on various scales, from the perspective of vulnerable people. As stated, the following scores are applied (Table 5.2-1):

Table 5.2-1. Metric evaluation criteria and corresponding scores

Criterion	Score
No mention of groups of potentially vulnerable people	1
Recognition of a group of potentially vulnerable people	2
Specific measures taken to reduce the vulnerability of potentially vulnerable people	3
Anticipation of future trends in numbers of potentially vulnerable people	4
Involvement of potentially vulnerable people in policy formulation	5

The scores are cumulative, which means that, to obtain a score of 5, policies also have to satisfy previous conditions (with the exception of 1). The laws and policies are ordered by scale (from national to regional) for each country. Due to the lack of concrete measures or concrete definitions of groups of potentially vulnerable people in the laws and policies, it was not possible to differentiate the scoring by specific groups of potentially vulnerable people. However, close attention was paid to whether or not there were any measures related to the top ten indicators in each country.

Overall, the evaluation of laws and policies (Table 5.2-2) indicates that measures for vulnerable people are more elaborate in the USA as compared to Netherlands or Japan. DRM laws in all three countries at all administrative levels rarely anticipated future numbers of potentially vulnerable people (score of 4), and none were created by the involvement of potentially vulnerable people (score of 5). The policies frequently show partial support to some groups of vulnerable people. No policy foresees different measures for all identified or possible groups of vulnerable people throughout the different phases of DRM, and the time limits or the means to guarantee measures can be established are often not described, leaving much room for improvement.

Additional information regarding how the basic DRM laws and main flood DRM laws in Japan, the Netherlands, and the United States support vulnerable people is explained in the publication by Vink and Takeuchi (2013). The subsequent sections contain detailed evaluations of measures or lack thereof in the national, sub-national, and regional laws and policies. The sources of the DRM policies can be found in Appendix F, and a more detailed overview of selected measures for vulnerable people in each policy can be found in Appendix G.

Table 5.2-2. Evaluation results of the DRM laws and policies in the three case study countries.

Country	Scale	Law/policy title	Year	1	2	3	4	5
Netherlands	(Inter) National Laws	European Flood Directive	2007	o				
		Water Law	2009	o				
		Law Safety Regions	2010	o				
		Delta Law	2012	o				
		Law of Population Displacement (inactive)	1952			o		
	National Policies	National Response Plan High Water and Floods	2007	o				
		Guidance Information for Evacuations in Flood Events and Flooding	2008				o	
		National Crisis Plan High Water and Floods	2008			o		
		National Guidance Manual for High Water and Floods	2010	o				
	Regional Policies	Policy Plan Rotterdam Rijnmond	2012	o				
		Regional Crisis Plan Rotterdam Rijnmond	2009	o				
		Regional Risk Profile Rotterdam Rijnmond	2012	o				
Policy Plan Twente		2012	o					
Regional Crisis Plan Twente		2011	o					
Regional Risk Profile Twente		2011	o					
Japan	National Laws	Disaster Countermeasures Basic Act	2013	o				
		River Law	1999	o				
		Flood Fighting Law	2005	o				
	National Policies	Basic Disaster Management Plan	2014				o	
		Committee for Policy Planning on Disaster Management Final Report	2012			o		
		Action Policies for Supporting Evacuation Activities of Persons Needing Assistance During Forced Evacuations	2013			o		
		Niigata Prefecture Regional Disaster Management Plan (Wind & Flood)	2013				o	
		Ibaraki Prefecture Regional Disaster Management Plan (Wind & Flood)	2010			o		
Regional	Sanjo City Flood Disaster Manual	2005				o		

	Policies	Sanjo City Area Disaster Prevention Plan	2012		o
		Chikusei City Local Disaster Management Plan [summary version]	2013	o	
		Disaster Prevention Measures at Chikusei City	2012	o	
United States	National/ State Laws	Robert T. Stafford Disaster Relief and Emergency Assistance Act	2013	o	
		Louisiana Homeland Security and Emergency Assistance and Disaster Act	2009	o	
	National/ State Policies	National Response Framework	2013	o	
		National Incident Management System	2008	o	
		Governor's Office of Homeland Security and Emergency Preparedness Strategic Plan	2013	o	
		State of Louisiana Emergency Operations Plan	2009	o	
		Florida State CEMP Basic Plan	2012	o	
	Regional Policies	Orleans Parish 2010 Hazard Mitigation Plan Update	2010	o	
Current Local Mitigation Strategy Document Hillsborough County		2009		o	

5.3. Dutch DRM Laws

Floods are the most prominent hazard threatening the Netherlands. Drought also plays a part in water management, especially during the summer season. The most relevant laws in the Netherlands are the Water Law, the Law Safety Regions, and the Delta Law.

During the formation of the Dutch constitution in 1814, in consultation with other European countries, the eight Articles of London were created, the last of which concerned flood management. One article mentioned that local areas were responsible for paying for flood defenses, with the exception of disasters, for which the entire country would be required to pay (Colenbrander, 1909).

Table 5.3 shows that, in keeping with people's need to evacuate during floods, policies were amended according to a decreasing scale of effect. Already, before the 1953 disaster, it was clear that the country's levees were not high enough in multiple locations (Deltawerken Online, 2004a). After the Second World War, most available money in the province Zeeland was being spent on desalination of agricultural soil rather than reinforcing dykes, as it had been a while since the last flood and food was scarce. The flood in 1953, which originated from the ocean, led to the creation of the Delta works (a series of mostly movable dams and weirs).

The impending river floods in 1993 and 1995 and the consequent mass evacuations led to the creation and implementation of the Room for River program.

The aftermath of Hurricane Katrina in New Orleans in 2005 in the U.S. alarmed the Dutch government and led to the formation of the Delta Committee (Mohnen, 2008). Realizing that the current safety norms were based on the situation after 1953, the expected effects of future climate change had to be incorporated in new safety norms. In 2008, the committee made 12 recommendations, one being the formation of the Delta Law that implemented a Delta Program, Delta Fund, and Delta Director. The law became active on January 1, 2012. Other laws and policies, such as spatial planning and construction policies, can affect the prevention phase of disaster management. As of yet, it remains unclear which policy changes will be initiated by the events of January 2012, given the continuous developments in the Delta Law (2011).

The results from Table 5.2-2 show that none of the active national laws in the Netherlands recognize groups of potentially vulnerable people. This is partially due to the heavy focus on prevention rather than preparedness in most of the laws. The newly formed Law Safety Regions places the responsibility for identification of groups of vulnerable people upon the regions themselves. National policies (scores 1–4) vary greatly in identification of and supportive measures for groups of potentially vulnerable people. The

newly formed regional policies also have some improvements to make. While they do recognize certain groups of potentially vulnerable people, there are as of yet no specific measures on their behalf.

Table 5-3. Overview of the major disasters leading to policy changes in the Netherlands.

Period	Location	Cause	Effects	Policy effects
Feb. 1953	Province Zeeland	Heavy storm and high water	Levee breaches lead to the death of 1,836 people and 200,000 cattle (Deltawerken Online, 2004b)	Delta law leading to Delta works
Dec. 1993 Jan. 1995	Rhine and Meuse floodplains	Heavy rainfall, low levees	1995: Evacuation of 250,000 people and 1,000,000 cattle (Room for the River, n.d.)	Room for River program
Aug. 2003	Wilnis (Van Engelen, 2004)	Drought of levees (Van Baars, 2004)	Levee breach leading to evacuation of 2,000 people, 600 houses under 50 cm water	Checklists to review levee safety (Stichting Toegepast Onderzoek Waterbeheer, 2008), Compensation for damages (Dutch National Government, 2003)
Jan. 2012	Coastal and lower-lying areas	Heavy storm and high water	Imminent levee breach, evacuation of 800 people, around 2,500 cattle	Unknown

5.3.1. The Dutch Constitution

Around 1815, the former Dutch republic was transforming into a kingdom with a constitution. As a prelude, the Eight Articles of London were conceived in 1814, including an article on flood management: “The cost of the making and upkeep of the dykes shall be at the charges of the districts more directly interested, except in the case of an extraordinary disaster.”

The Dutch Constitution was created in 1815 and revised to include a more democratic system in 1848, which did not affect the basic rights listed in chapter 1. These include equality and non-discrimination (Article 1), along with protecting and improving a habitable

environment (Article 21). The text concerning payment of flood defenses from the original Eight Articles of London from 1814 did not become part of the constitution.

5.3.2. *(Inter-)national laws*

European Flood Directive (2007)

The European Flood Directive (EFD) has no mention of vulnerable people.

The EFD covers floods as ‘natural hazard type,’ as well as chemical pollution as ‘other hazard type.’

As part of the European Union, the Netherlands also has to follow European law concerning disaster management. Apart from aiding other member countries with support or finances after a disaster, since 2007 a Flood Directive, which is coordinated with the 2000 Water Framework Directive (WFD), has been in effect. The WFD dictates the establishment of river basin plans, cross-country where needed, by 2015 (Dutch National Government, 2009). The EFD is a highly preventative directive that designates responsibilities and cooperation with member countries and regions. In concordance with the WFD, all member countries must execute preliminary flood risk assessment, create flood risk and hazard maps, and set up flood management plans, all with revision cycles of around six years. According to the timetable of the directive (European Commission, 2012), in 2012 the public participation process started. In 2013, the flood hazard and risk maps were scheduled to be completed.

The purpose of the EFD is to reduce the risk of adverse consequences, especially for human health and life, the environment, cultural heritage, economic activity, and infrastructure associated with floods. However, measures to reduce these risks should, as far as possible, be coordinated throughout a river basin if they are to be effective.

Risks are evaluated by the individual Member States (national governments).

Law Safety Regions (2010)

There is no explicit mention of vulnerable people in this law.

No types of natural and other hazards are described by this national law, because it relies on the individual regions to describe possible disasters or crises in their risk profiles. These must consist of an analysis of the consequences of possible disasters (Article 15, 2c).

A disaster is defined as “a major accident or other event seriously harming or threatening the lives of many people, the environment or large material investments and involving the coordinated use of services or organizations from different disciplines to eliminate the threat or reduce the harmful effects”. A crisis is defined as “a situation during which the vital interests of society are affected or likely to be affected.” (Law Safety

Regions, 2010, p.1).

The purpose of this law is to integrate firefighting, emergency response, crisis management, and medical services administratively and operationally on a regional level, while maintaining local administration, to ensure efficient and effective assistance that is partly based on coordinated preparation and established safety regions.

Risks are evaluated by the regional governments (which equates to the safety regions board including a water board representative); and, more importantly, any person who notices a disaster should inform the mayor.

Water Law (2009)

There is no explicit mention of vulnerable people in this law.

The types of natural hazards covered by this law are floods, droughts (water scarcity), high tides, and storms. The only other hazard described is chemical pollution.

The purpose of this law is translated as follows: “The government, while caring for the habitability of the land as well as the preservation and improvement of the environment, where that care takes the form of water management, is facing great tasks, and an effective and efficient approach to water management is desirable in order to streamline and modernize the legal tools while focusing on the integral management of water systems.” (Water Law, 2009, p.1).

Risks are evaluated by the national government, more specifically by the Ministry of Infrastructure and the Environment. Appendix II of the Water Law contains the safety norms for the primary flood defenses (see Figure 5.3.2).

Delta Law (2011)

As with the Water Law, this is a law aimed at the prevention of disasters; as such, it does not mention any vulnerable people, but focuses on infrastructure measures.

The types of natural hazards implicitly covered by this law are floods and droughts. There are no other types of hazard mentioned.

The purpose of this law addresses the significant challenges entailed by expected climate change to both flood protection and fresh water supply. It states that it is, therefore, desirable to establish additional rules for the implementation of measures to protect against flooding and to ensure the care of the freshwater supply in both the short and long term.

Risks are evaluated by an independent research institute (Deltares), which is not mentioned in this law itself, but rather in the implementation policy of the Delta Law, which is called the Delta Program.

Safety norms primary weirs according to Water law

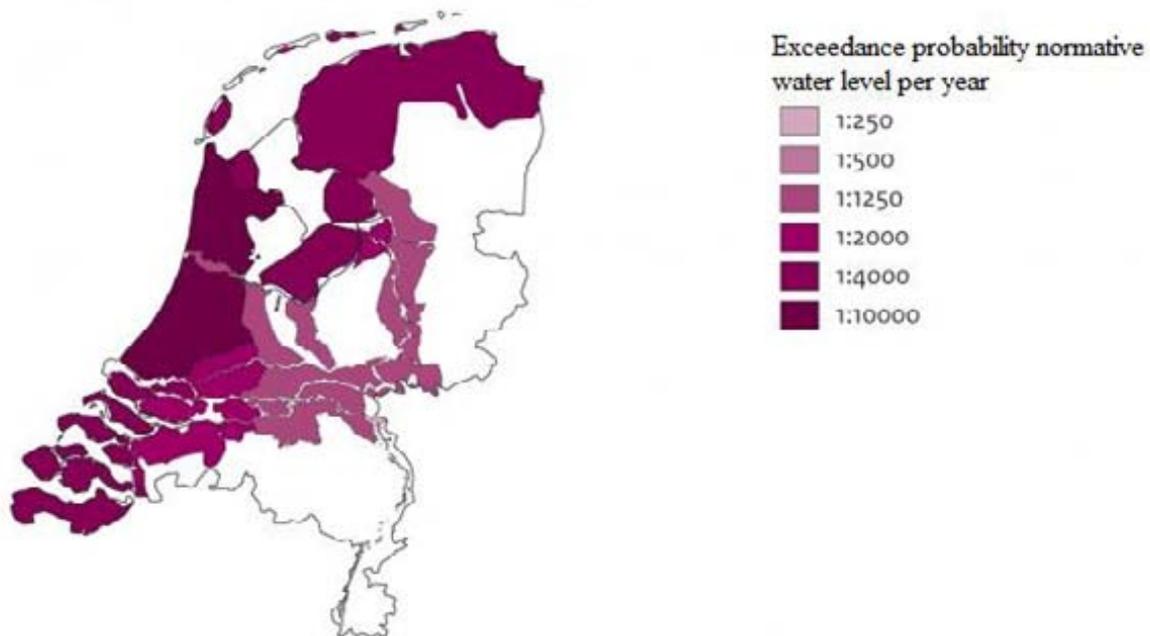


Figure 5.3.2. Safety Norms of Primary Flood Defenses according to the Water Law 2009 (Planbureau voor de Leefomgeving, n.d.).

Law of Population Displacement (1952)

This law is inactive and is created to be activated during extraordinary circumstances as per royal decree. Upon activation, the law would allow the designation of residences to people, including their co-residents, depending on the health, age, or behavior of the people involved. This would allow for the mandatory evacuation of people at risk to certain shelter areas, possibly adapted to health- or age-related circumstances.

5.3.3. National policies

National Response Plan High Water and Floods (2007)

There is no explicit mention of vulnerable people in this policy. The National Response Plan consists of three parts; namely, the policy script, national operation strategy, and guide. The first and third parts make no mention of vulnerable people. Part two mentions increasing the self-reliance of people who remain behind in the area (p. 13) and vulnerable buildings (p. 23). Part one contains simulations of different flood scenarios (varying population amount and structures). Only two types of population are modeled however, namely evacuees per hour and people who stay behind (p.9–10). There is no consideration of people who require special transportation, earlier evacuation warnings, or special measures once at a shelter location.

Guidance Information for Evacuations in Flood Events and Flooding (2008)

This report mentions that the number of non-self-reliant people in the Netherlands is lower than 10%, while the government often takes measures for many more people. Neither of these statements has any scientific argumentation or source. It also states that the amount of non-self-reliant people is usually calculated to be 10–15% and will increase as the population ages.

The groups of vulnerable people identified in this policy are (former) psychiatric patients, older adults, entrepreneurs, detainees, people in hospitals, people in nursing homes, non-self-reliant people living alone, immigrants who do not speak/do not have fluent command of the Dutch language, strictly religious people who do not own a radio and television, families with children, animals, and farmers.

Other than the need to streamline communication and evacuation for certain people, little is said in the legislation on how these measures should take place. The one exception is how non-self-reliant people staying at organized centers (e.g., nursing homes) should obtain communication. This should be done by the vulnerable people themselves, through such media as the national media, regional (day) magazines, and municipal and regional websites, as well as the national website crisis.nl. This measure cannot be successful because some non-self-reliant people lack an understanding of such early warning messages.

National Crisis Plan High Water and Floods (2008)

There are no specific groups of vulnerable people identified in this policy, but less self-reliant people are mentioned along with agricultural businesses and animal keepers as being stricken worse during high waters and floods.

Concrete measures after floods include medication and cash money for all affected people, the latter due to the expected unavailability of ATMs and banks. Providing cash would partially enable people to take care of their own pressing needs, including those of vulnerable people.

National Guidance Manual for High Water and Floods (2010)

There are no groups of vulnerable people identified in this policy. It is, however, one of the few DRM policy documents that mention earlier warnings for vulnerable people. It would be an improvement to see this included in future versions of this document, as well as the other national policies.

5.3.4. Regional policies

Following the guidelines from the Law Safety Regions, the Netherlands is divided into

25 regions in which all safety issues are coordinated among water boards, hospitals, firefighters, and police. The two regional areas under consideration are #17 (Rotterdam-Rijnmond) in the west and #5 (Twente) in the east (see Figure 5.3.4).

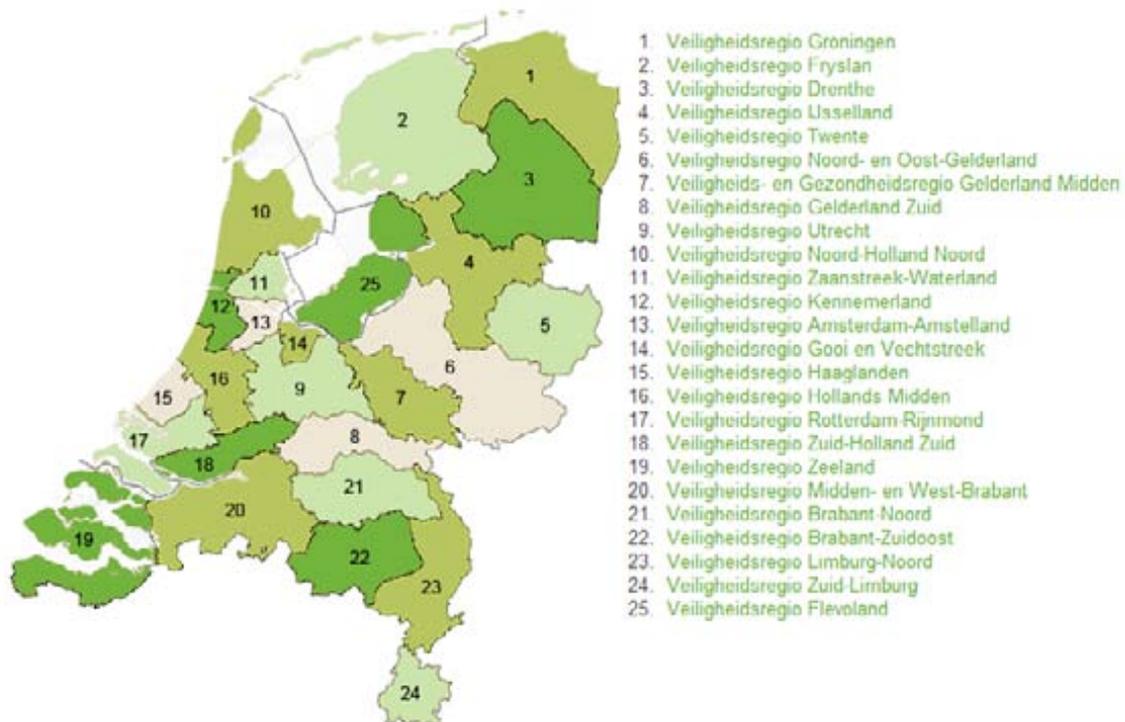


Figure 5.3.4. Safety regions in the Netherlands (Veiligheidsberaad, n.d.).

Policy Plan Rotterdam-Rijnmond (2012)

The groups of vulnerable people identified in this policy are less self-reliant people, pregnant women, and children. There are no accompanying measures.

Two of the 29 scenarios from the risk profile concern levee breaches, either primary or regional. Scenario number four concerns storms and gales and mentions people who are not self-reliant. The scenarios are all part of the theme of ‘natural environment.’ Given the variety of functions present in the Rotterdam-Rijnmond area, we also expect to find many other themes, such as built environment, technological environment, vital infrastructure and services, traffic and transportation, health, and social-societal environment. According to the policy, the first scenario – primary levee breach – will lead to other complications, such as failure of electricity, which is part of Scenario 14. In this sense, compounding consequences are anticipated.

Regional Crisis Plan Rotterdam-Rijnmond (2009)

The groups of vulnerable people identified in this policy are ethnic groups. The decontamination scenario mentions problems that might arise between different ethnic groups,

but it proposes no solutions. Vulnerable buildings are recognized that might house vulnerable people, including hospitals and nursing homes. No measures are mentioned.

Regional Risk Profile Rotterdam-Rijnmond (2012)

The groups of vulnerable people identified in this policy are non-self-reliant people who will need help in flood scenarios. Other scenarios, including heat waves, mention elderly, the chronically ill, socially isolated people, overweight people, children, tourists, heart patients, pregnant women, and older adults (aged >60 years). Additional vulnerable buildings are identified as healthcare facilities, correctional facilities, involuntary commitment clinics, retirement homes, and children's daycare center.

With regard to the two flood scenarios, Scenario 1 estimates 10% or 40,000 people to be non-self-reliant. It is not clear what the basis for this number is. On pages 9 and 13, floods are described as "traditional disasters," which seems to indicate local knowledge on who is vulnerable to floods and how many people could be considered vulnerable people. However, the two flood scenarios do not specify this beyond the general description of non-self-reliant people.

Policy Plan Twente (2012)

One group of vulnerable people mentioned in this policy is people with physical or mental impairments. There are no other specific groups of vulnerable people identified in this policy, but the terms "vulnerable people" and "less self-reliant people" are mentioned. While there are no specific measures mentioned, the plan calls for an increase communication, knowledge, and opportunities for self-reliance.

Regional Crisis Plan Twente (2011)

No groups of vulnerable people are identified in this policy. While the homeless are mentioned, the term, in this context, refers to evacuated people who have no alternative residence to turn to. In other words, the plan describes people who have become homeless as a consequence of the disaster; it is not limited to people who were homeless before the disaster. Animals are also seen as deserving of shelter. The policy also recommends increasing civilians' self-reliance, but only for fires. Other hazard types are not mentioned; nor are measures for vulnerable people.

Regional Risk Profile Twente (2011)

The groups of vulnerable people identified in this policy are less self-reliant people, among which are older adults, chronically ill, or people depending on medical aid.

Vulnerable buildings are recognized that might be said to house vulnerable people, including nursing homes, monasteries, abbeys, prisons, elderly resorts, asylum-seeking centers, elementary schools, high schools, nurseries, clinics, hospitals, and retirement homes. No measures are mentioned.

The text on page 35 reveals priorities that are disturbing, as the main focus of aid is on self-reliant people; non-self-reliant people share secondary priority with animals and art treasures.

5.4. Japanese DRM Laws

Japan is exposed to several hazards, including earthquakes, typhoons, tsunamis, and floods. In 1949, the Flood Fighting Law was enacted as one of the first DRM laws after the Second World War. In 1961 the main disaster law, the Disaster Countermeasures Basic Act, was enacted. Since that time, major disasters have led to revisions that ameliorate the perceived shortcomings per disaster. The most important changes occurred after the Kobe Earthquake in 1995 and the GEJET in 2011.

After the 1995 earthquake, the potential and importance of local volunteers was recognized and given a more important role (UNISDR, 2005). Before the 2011 earthquake, national, prefectural, and municipal DRM policies contained suggestions for measures, including for vulnerable people. A prominent example is the “Evacuation/Sheltering Assistance Guideline for People with Special Needs in Times of Disasters” from 2005 (Tatsuki, 2011). Since then, the policies have been updated on all scale levels and now have mandatory measures, in much greater detail than before.

The results from Table 5.2-2 show that the basic disaster laws involving floods all recognize various groups of potentially vulnerable people, but are lacking in describing specific measures on their behalf. These are elaborated upon in the national and regional policies, some of which mention the likely increase in vulnerable people in the future. As with the Dutch policies, no policies describe themselves as having been created through the involvement of vulnerable people themselves. Very promising in this respect is the most recent Basic Disaster Management Plan (2014), which mentions future regional policies should be created with the involvement of women, older adults, and people with disabilities.

5.4.1. The Constitution of Japan

The Constitution of Japan was created after the Second World War under the United States’ influence and was enacted in 1947. The American influence is most visible in Article 13, which reflects the right to life, liberty and the pursuit of happiness mentioned in the

American Declaration of Independence. Equality and non-discrimination are stated in Article 14, while Article 25 mentions the right to the minimum standards of wholesome and cultured living without defining it, along with the state's responsibility to at least partially contribute to wholesome and cultured living.

5.4.2. National laws

Disaster Countermeasures Basic Act (1961 – last translated revision 2013)

This law mentions older adults, people with disabilities, children, disaster victims, and other people requiring care, but does not prescribe specific measures on their behalf. The 2013 revisions require municipalities to construct and manage lists of all people in need of evacuation assistance, including provisions on consent and confidentiality, but make no mention of what such evacuation assistance might entail. Additions to Article 42 allow for residents to develop their own Area Disaster Prevention Plan, which can come into effect if it does not conflict with existing standards.

Types of natural hazards: Storm, heavy rain, heavy snow, flood, high tide, earthquake, tsunami, other unusual natural event.

Other hazards: Conflagration, explosion, damage to a similar extent from a cause prescribed by ordinance.

The purpose of the Act is described as follows: “For the purpose of protecting the national territory, the life and limb of the citizens and their property, this Act shall have for its aims the establishment of a machinery working through the State and local governments and public corporations and the clarification of where responsibilities lie, and provide for the formulation of disaster prevention plans and basic policies relating to preventive and emergency measures and rehabilitation programs to deal with disaster, and other necessary measures as well as financial action, thus ensuring an effective and organized administration of comprehensive and systematic disaster prevention with a view towards the preservation of social order and the security of the public welfare.” (Disaster Countermeasures Basic Act, 2013, p.2).

Risks are evaluated by all layers of government, including national, prefectural, local governments (designated administrative organs, the Central Disaster Prevention Council [chaired by the Prime Minister], Prefectural Disaster Prevention Councils, Local Disaster Prevention Councils), and Designated Public Corporations/Designated Local Public Corporations. Similar to the Dutch basic disaster law, any person detecting an unusual event must report the same to their mayor.

Flood Fighting Law (1949 – last translated revision 2005)

This law mentions older adults, people with disabilities, children, and other people requiring care, but does not prescribe specific measures on their behalf.

The types of natural hazards covered by this law are flood, heavy rain, and landslide. No other types of hazard are covered.

The purpose of the Flood Fighting Law is to “guard against, defend against, and mitigate any damage due to, any flood disaster upon the occurrence of a cataract or tidal wave, and thus to maintain the public safety.” (Flood Fighting Law, 2005, p.1).

Risks are evaluated by the national government (Ministry of Land, Infrastructure, Transport and Tourism) and prefectural governments.

River Law (1997 – last translated revision 1999)

There is no explicit mention of vulnerable people in this law itself, but the official translation is supplied with commentary by Toshikatsu Omachi from the Infrastructure Development Institute. He mentions the aging of society on two occasions in the preface (see Appendix G).

The types of natural hazards covered by this law are flood, drought (unusual drought), heavy rain, high tide, and earthquake. No other types of hazard are covered.

The purpose of the River Law is to “contribute to land conservation and the development of the country, and thereby maintain public security and promote public welfare, by administering rivers comprehensively to prevent occurrence of damage due to floods, high tides, etc., utilize rivers properly, maintain the normal functions of the river water by maintaining and conserving the river environment.” (River Law, 1999, p.E1).

Risks are evaluated by the national or prefectural government in the form of the river administrator (Ministry of Construction/Ministry of Land, Infrastructure, Transport and Tourism, or the prefectural governor).

5.4.3. National and prefecture policies

Basic Disaster Management Plan (2014)

Vulnerable people mentioned in this plan are infants, older adults, people with disabilities, people who need assistance, foreigners, women, and pregnant women. The increase in people requiring assistance, such as older adults, people with disabilities, and foreigners, has been noticed. The measures covered by this plan include more consideration for women’s needs in evacuation centers, listing and supporting people who need assistance during evacuations, and – most importantly – to involve women, older adults, and people

with a disability in future decisions on regional policy plans.

Committee for Policy Planning on Disaster Management Final Report (2012)

The groups of vulnerable people identified in this policy are people of a certain age (elderly, children), gender, or nationality; people with disabilities; foreigners; expectant/nursing mothers; and others with special needs.

Concrete measures include health care for children, older adults, and others; school systems and foster care for children; cooperative evacuation schemes between municipalities and child care organizations; involvement of women in the management of evacuation centers so as to better understand the needs of other groups of potentially vulnerable people; surveys of vulnerable people to guarantee their needs are known; the stockpiling of specific foods; and acquiring housing based on both the finances and needs of vulnerable people.

While various groups of potentially vulnerable people are recognized and several measures are made on their behalf, not all recognized groups have measures that serve their needs. This includes foreigners and expectant/nursing mothers. The broad term “others with special needs,”(p.26), as well as the surveys, might leave room to incorporate additional needs beyond those specified in this policy, but there is no guarantee to what level of detail these surveys are executed.

Of particular interest is the text on page 15, which suggests that “appropriate information” should be supplied to the media of other countries in order to “ensure economic stability.”

Action Policies for Supporting Evacuation Activities of Persons Needing Assistance During Forced Evacuations (2013)

The groups of vulnerable people identified in this policy are older adults requiring nursing care, people with disabilities, and in general people needing assistance. The foreword describes several groups of vulnerable people who are traditionally overrepresented in the mortality figures, consisting of people aged 65 or older (60%), people with disabilities (twice as many as others), and volunteers (firefighters and welfare).

The policy focuses on how information regarding people needing assistance during evacuations should be gathered, kept, and used during evacuations. To anticipate blackouts, the policy states that this information should also be stored on paper.

There are several examples of how to list people who need assistance during evacuations. Proposed necessary information includes reason for needing evacuation assistance (type of disability, classification of nursing care) or marking which actions cannot be performed (I am incapable of standing and walking, I am visually impaired, I

cannot make judgments about danger), etc.. Other suggestions include a mark people can leave on their homes that indicates that they have already evacuated. Communication measures for people with disabilities include fax information for the hearing impaired; mobile phones that read out received emails for the visually impaired; mobile phones with hands-free devices for people with physical disabilities; and others through mailing lists, subtitled broadcasts, dual language broadcasts, sign-language broadcasts, and SNS (Social Networking Services) through the Internet. Additional information includes pamphlets in Braille, enlarged characters, and audio pamphlets.

Relationships between residents should be enhanced during normal circumstances so that people will know each other by sight.

Niigata Prefecture Regional Disaster Management Plan (Wind & Flood) (2013)

The groups of vulnerable people identified in this policy are specifically described as “people who have trouble getting necessary information and are limited in taking action by themselves,” (Chapter 1, Section 1, 7 (1)), with examples including older adults, people who are injured or sick, pregnant people, infants, and foreigners.

This document lists many concrete measures. Evacuation shelters should have specific facilities for vulnerable people, who include older adults, people with disabilities, infants and pregnant women. These include air conditioners, western-style toilets, communication facilities, water storage tanks, etc. Other necessary items are wheelchairs, powdered milk, and special dietary foods. The buildings should also be barrier free. For people needing assistance, toilets should be arranged within 24 hours. Other measures include transportation to bathing facilities and proper housing. Low-income families may receive financial aid for daily living.

Foreigners should receive education and information from their communities; e.g., company, school, or local community group, in a language they understand. Other communication measures are provided for people with visual or hearing impairments, including communications in Braille, large letters, audio devices, and sign language.

This is one of the few documents to mention that the number of vulnerable people might increase in the future, and it stresses the need for infrastructure measures and knowledge of their whereabouts in order to conduct evacuations accordingly. Information concerning how to help vulnerable people should be shared with the general public, who are primary respondents, under the guidance of community groups.

While the importance of gender equality is mentioned, it is not entirely clear how this is to be executed. It is not clear if women were involved in designing the disaster plan.

Ibaraki Prefecture Regional Disaster Management Plan (Wind & Flood) (2010)

The groups of vulnerable people identified in this policy are older adults, children, people with disabilities, single mothers, widows, and foreigners.

Several measures are mentioned for different groups. Infrastructure recommendations feature evacuation routes (smooth surface; sufficient width of paths and doorways; bright, large letters on signs). One of the recommendations of this plan is to take preventive methods for various situations; for instance, landslide risk when selecting sites to build new schools in.

As in the Niigata plan, information concerning how to help vulnerable people should be shared with the general public, who are primary respondents, under the guidance of community groups. However, people in charge of organizing the evacuation should also know the number and whereabouts of vulnerable people.

For foreigners, there should be pamphlets written in foreign languages; information distribution via television, radio, the Internet, and other means; and signs to shelters in foreign languages. Finally, single mothers and widows can apply for disaster loans.

Also similar to the Niigata plan, the importance of gender equality is mentioned, in that the involvement of women in disaster prevention should be increased, and disaster prevention systems should be constructed around the perspective of gender equality. It is not clear if women were involved in designing the disaster plan itself.

5.4.4. Regional policies

Sanjo City Flood Disaster Manual (2005)

The groups of vulnerable people identified in this policy are people with disabilities, children, and older adults.

Measures focus on listing people with specific disabilities and assigning volunteer aids for evacuation where necessary. The manual stresses that the government list is a last-resort measure and notes that it is preferable to make arrangements with the local disaster organization and neighbors for evacuation. Furthermore, it suggests giving flotation devices to children and seniors and carrying people with physical disabilities. Vulnerable people who are able to evacuate by themselves will receive an earlier warning through welfare officers, home nursing centers, or nursing insurance services in order to start early evacuation.

While the rapidly aging population is mentioned, there are no specific measures on how to deal with this.

Sanjo City Area Disaster Prevention Plan (2012)

The groups of vulnerable people identified in this policy are people with disabilities, older adults, pregnant people, infants, children, orphans, foreigners, unemployed people, single mothers, workers, small business owners, and financially vulnerable people,

Communication measures regarding disasters for people with disabilities include the use of Braille, enlarged characters, audio messages, teletext broadcasting, and sign language. Foreigners should receive information through foreign language information and interpreters, from either the municipality or the corporations they work at.

Concrete measures in shelters for people requiring assistance include wheelchairs, milk powder, food, and helpers; for people with disabilities, there should be stockpiles of medication; and Western-style toilets should be provided for older adults and people with disabilities.

Temporary houses are provided to the unemployed, older adults, people with disabilities, and single mothers, as well as financially vulnerable people, workers, and small business owners. Orphans are to be taken to the child consultation office in order to seek placement with relatives, children's homes, or foster parents.

While the policy mentions the number of people needing assistance during disaster is increasing, there are no specific measures on how to deal with this.

Self-reliance and cooperation between neighbors is promoted as "it is very important for all residents to have a strong will that they unite and protect their communities by themselves." (Sanjo City Area Disaster Prevention Plan, 2012, Chapter 3, Section 7: Plan for organizing local voluntary disaster management organizations, Item 1).

Chikusei City Local Disaster Management Plan [summary version] (2013)

The groups of vulnerable people identified in this policy are older adults, people with disabilities, infants, women, foreigners, and children.

A list of vulnerable people will be shared with supportive agencies, while neighbors are encouraged to assist during evacuation. Children are to receive replacement school materials and reduced tuition fees after a disaster. This plan also notes injured animals and pets, which will be protected, sheltered, and possibly reunited with their owners.

While not directly involving women in policymaking or shelter management, measures directly aimed at women include separate spaces (dressing rooms, nursing rooms, places for hanging laundry, etc.), separate lavatories and bathing facilities, distribution of women's supplies by women, and securing of women's safety at evacuation centers.

Disaster Prevention Measures at Chikusei City (2012)

The groups of vulnerable people identified in this policy are older adults, people with disabilities, infants, pregnant women, and women with infants.

The measures are not altogether unambiguous, mentioning the need for a prolonged evacuation time, greater community support, and searches for missing people (especially older adults).

5.5. American DRM Laws (Based on information from Rubin, 2010b)

The U.S. is prone to a multitude of hazards, many affecting large parts of the country. Prevalent natural hazards include earthquakes, volcanoes, hurricanes, tornadoes, floods, mudslides, forest fires, and permafrost.

The many disasters in the United States led to the foundation of the American Red Cross in 1881, which aided in three different floods in the ten years after its establishment. It has become the only nonprofit organization recognized by federal law.

Many flood disasters have led to changes in or the creation of legislation. The Flood Control Act of 1928 was enacted due to the flooding of the Mississippi River in 1927, which affected seven states and caused at least 246 deaths and 700,000 people to become homeless. Subsequent floods led to subsequent flood acts in 1936, 1938, and 1941, mainly for dam and reservoir construction. Until the 1930s, disaster assistance was seen as an individual or local responsibility that was carried out by local governments, charities, and churches.

In 1950, the Federal Disaster Relief Act was enacted. This transformed emergency management from volunteers to a more organized movement and led to overarching legislation. Three major changes were made. The first was that Congress no longer decided on disaster relief funds; rather, the decision could be made by a single person. The second was shifting authority to the president to decide whether the federal government and agencies would become involved in relief. The final change was the necessity of the federal government to take specific measures both before and after a disaster, such as creating local disaster plans. However, the federal government was still not responsible for disaster relief funds.

In 1965, Hurricane Betsy affected southern Florida and New Orleans in Louisiana. The corresponding Disaster Relief Act made the following year enabled many financial options for disaster-struck people, such as low interest loans, the option to buy housing originally intended to be temporary, loan cancellations, and special funds for educational facilities. This Act underwent several amendments in the following years, most notably the changes in 1970; which, for the first time, stated that disaster aid should be provided in a

nondiscriminatory manner and that legal assistance should be provided to lower-income families.

In 1968 the National Flood Insurance Act was enacted after studies regarding the viability of a federal insurance program were completed. Flood insurance would be possible only if local land use regulations were applied. In 1972, Hurricane Agnes caused great damages along the entire east coast of the U.S. 50 people died and damages exceeded \$2 billion. Aside from financial legislation on loans, in 1974 the Disaster Relief Act was changed yet again. Now communities receiving federal aid would need to create disaster mitigation plans, and flood insurance was removed.

Given the still disorganized mixture of regional, state, and federal involvement in emergency management, in 1979 the FEMA was created. Several agencies were merged into FEMA, including the National Fire Prevention and Control Administration, the National Weather Service Community Preparedness Program, and the Federal Disaster Assistance Administration. This first marked the phases of disaster management into mitigation, preparedness, response, and recovery.

The 1988 Robert T. Stafford Disaster Relief and Emergency Assistance Act enabled funds to be spent not just on pure recovery, but also on measures that would avoid future damage. After Hurricane Andrew in 1992, states developed a mutual aid agreement. In 1996, the agreement, called the Emergency Management Assistance Compact, was nationalized.

The 1993 Great Midwest flood led to 48 deaths and disaster was declared in nine states. FEMA responded proactively, and more than 14,000 homeowners moved out of the floodplains afterwards with governmental compensation.

The most notable changes in the 21st century include the enactment of the Disaster Mitigation Act in 2000, the start of the National Response Plan and National Incident Management System in 2001, FEMA becoming part of the U.S. Department of Homeland Security in 2003, and the Post-Katrina Emergency Management Reform Act from 2006.

The current basic disaster law, the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), was most recently amended in 2007 after Hurricane Katrina (with many measures focusing on pets), and in 2013 after Hurricane Sandy that hit the New York area.

The results from Table 5.2-2 show that, on average, the U.S. policies are the most detailed when it comes to measures for vulnerable people. Many detailed measures for vulnerable people exist on the national/state law level. The national/state policies vary in their level of detail, but the regional policies contain excellent measures and considerations for future numbers of vulnerable people. Ideally, these considerations should be stated in all policies. As with the Dutch and Japanese policies, no policies describe that they have been

created with the involvement of vulnerable people themselves.

5.5.1. The Constitution of the United States of America

The original (1787) Constitution of the United States of America focuses only on governing structures (legislature, presidency, judiciary, and states). It does mention equality in the legal system (Article 3, Section 2 (1)), and the preamble states the purpose of the Constitution, which is to provide common defense and the general promote welfare. This could encompass natural disasters. The 1776 Declaration of Independence has a further statement concerning equality.

5.5.2. National/state laws

Robert T. Stafford Disaster Relief and Emergency Assistance Act (2013 Amendments)

There are many groups of vulnerable people identified in this law, as well as detailed measures to be taken on their behalf. Examples include people with disabilities; displaced people; people with pet dependents and service animals; small, impoverished communities; and people who are in need of financial assistance due to a disaster. Furthermore, there is a special section on non-discrimination on grounds of sex, disability, English proficiency, or economic status.

Appendix G provides an overview of several examples of the various measures prescribed by the Stafford Act.

The types of natural hazards covered by this law are hurricanes, tornados, storms, high waters, wind driven waters, tidal waves, tsunamis, earthquakes, volcanic eruptions, landslides, mudslides, snowstorms, and droughts. Other types of hazard covered by this law, regardless of their cause, are fires, floods, and explosions.

The purpose of the Stafford Act is to “provide an orderly and continuing means of assistance by the Federal Government to State and local governments in carrying out their responsibilities to alleviate the suffering and damage which result from such disasters.” (Robert T. Stafford Disaster Relief and Emergency Assistance Act, 2013, p.1).

Risk evaluation is not covered by this law, as it is a law that mostly concerns emergency response rather than prevention or preparation. Disasters are evaluated by the president, who can receive requests for a declaration of the state of emergency by the governor of the affected states or by the chief executive of an affected Indian tribal government. The severity, magnitude, and impact of a disaster are reviewed by the administrator of FEMA and representatives of state, tribal, and regional emergency management agencies.

Louisiana Homeland Security and Emergency Assistance and Disaster Act (2003)

Unlike the other 49 states of the United States, which have a legal system based on English common law, the State of Louisiana has a different system that is founded in French and Spanish law and, therefore, is based on civil law and common law influences. For this reason, the Louisiana Homeland Security and Emergency Assistance and Disaster Act is also taken into account in the scale level of national/state laws.

The groups of vulnerable people identified in this law include people with special needs, the elderly, the infirm, tourists, people who refuse to leave during evacuation, those without personal transportation, and people with disabilities who have service animals. Appendix G gives an overview of several examples of the various measures prescribed by the Louisiana Homeland Security and Emergency Assistance and Disaster Act.

The types of natural hazards covered by this law are fires, floods, and earthquakes. Other types of hazard covered by this law are described as “other natural or manmade causes.”

The purpose of the Louisiana Homeland Security and Emergency Assistance and Disaster Act is to “ensure that preparations of this state will be adequate to deal with such emergencies or disasters, and in order to detect, prevent, prepare for, investigate, respond to, or recover from these events, and generally to preserve the lives and property of the people of the state of Louisiana.” (Louisiana Homeland Security and Emergency Assistance and Disaster Act, 2003, §722).

Risks are evaluated by the president, the governor, and other government officials.

5.5.3. National/state policies

National Response Framework (2013)

The groups of vulnerable people identified in this policy are children, people with disabilities, minorities (religious, racial, and ethnic), people with limited English proficiency, and people with livestock or pet dependents/who are dependent on pets.

Measures include incorporating the contributions of vulnerable people in plans, as well as providing interpreters, alternate format documents, and improved access to shelters and temporary housing for people with disabilities. It also features specific NGO contributions in the form of identifying vulnerable people and their needs, language assistance, and animal sheltering.

While the groups of vulnerable people identified by this policy are mentioned repeatedly, specific measures on their behalf remain limited.

National Incident Management System (2008)

The groups of vulnerable people identified in this policy are people with disabilities, people with special needs, children, older adults, ethnic minorities, people with limited or no English proficiency, and people without transportation. Most measures are limited to advisors and outreach programs for people with special needs. Given the practical nature of this publication, a more practical level of detail would be more fitting.

Governor's Office of Homeland Security and Emergency Preparedness Strategic Plan (2013)

The group of vulnerable people identified in this policy is children. Only one very detailed measure is named in the policy, which mentions no other measures on behalf of vulnerable people. This level of detail would be a welcome find in regional policies.

State of Louisiana Emergency Operations Plan (2009)

The groups of vulnerable people identified in this policy are people with disabilities, people with special needs, pet and service animal owners, and home health patients. Indian tribes and tribal people are discussed separately as they are independent authorities.

Tribal people can obtain the same disaster information, evacuation guidance, sheltering, and lifesaving support measures as other state citizens if their authorities previously agree on this.

Pets are to be sheltered and reunited with their owners by the Louisiana Department of Agriculture & Forestry. According to the Americans with Disabilities Act, however, service animals are to be sheltered with their owners. People requiring the assistance of family members, personal assistants, or service animals will remain together with the assistance providers as long as possible during evacuation and sheltering. The parishes are responsible for arranging for people with special needs to arrive at evacuation pick-up points. Notably, this plan calls for separate shelters for sex offenders.

Florida State CEMP Basic Plan (2012)

The groups of vulnerable people identified in the Comprehensive Emergency Management Plan (CEMP) are people with disabilities, children, older adults, pregnant women, people with pets and service animals, and low-income households.

Measures for people with disabilities include food and medical care at shelters, which have to be accessible. Anyone requiring functional needs assistance might receive personal assistance services (PAS), durable medical equipment (DME), and consumable medical supplies (CMS) when staying in a general shelter. People with service animals should have

those animals sheltered with them.

This plan mentions people should be self-sufficient for the 72 hours following a disaster, but also includes the need for registering people with special needs.

5.5.4. Regional policies

Orleans Parish 2010 Hazard Mitigation Plan Update (2010)

The groups of vulnerable people identified in this policy are homeless, people living in poverty, older adults, people with disabilities, and special needs residents.

Measures include specific locations for gathering people in need of assistance during evacuations, grants and loans for temporary housing for low-income persons, and a GIS database for tracking special needs residents.

This is one of the few policies to differentiate explicitly between vulnerability and exposure, as it is understood in this study: “Vulnerability is related to, but not analogous to, exposure, which is simply the numbers or value of assets and operations that can potentially be impacted by hazards” (p. 186).

Current Local Mitigation Strategy Document Hillsborough County (2009)

The groups of vulnerable people identified in this policy are older adults, people with disabilities, ethnic minorities, people living in poverty, single parents, people who are language isolated, and children.

Measures include prohibition of development in exposed areas in case of special needs facilities (e.g., hospitals and nursing homes), and shelter and feeding for various groups of vulnerable people.

The strategy document is one of the few policies to incorporate an overview, in estimated numbers, of the number of people vulnerable to different types of natural hazards, as well as additional information concerning race, age groups, income, and female-headed households. While it warns for the future increase in population and limits the building of certain special needs facilities in exposed areas, it does not anticipate a future increase of vulnerable people. The strategy document does demand that public and education programs take preventive action to reduce people’s own vulnerability in the 72 hours following a disaster (p. 12).

6. Discussion

“Rain doesn’t fall on one roof alone.”

Cameroon proverb

6.1. Results: Number of Vulnerable People

6.1.1. Number of vulnerable people by characteristic

The vulnerability characteristic “fewer material and/or financial resources” encompasses the greatest number of vulnerable people identified in this study. In all three countries, it was found that women with no driver’s license or no car registered to their name make up a sizable portion of people with the characteristic “fewer material and/or financial resources.” As the assumed mode of transportation people will use during an evacuation in the case study countries, car access may influence evacuation success. In practice, the amount of time available for evacuation and the time of day at which a sudden flood disaster occurs will affect the number of people who can reach a car. For instance, during the build-up to the 1995 flood in the Netherlands, most inhabitants decided to leave one or two days in advance of the mandatory evacuation orders and used their own transportation (cars) to reach family or friends elsewhere in the country (Van Duin, Bezuyen, & Rosenthal, 1995). In this case, there was enough time to coordinate among family members, arrange places to stay, and pack valuables in the car. If the worst-case scenario is considered, in which immediate evacuation is necessary, car availability becomes more crucial. The time of day at which a disaster occurs will determine where the car is, especially if only one car is available to a household. For these reasons, car availability is viewed as an important vulnerability indicator during flood evacuation.

The second most populated characteristic is comprised of people who are “restricted by commitments,” be those dependents or pets. In all three case study countries, the same four indicators make up most of all potentially vulnerable people with this characteristic, albeit in different proportions. These are: caregivers of children, people caring for someone physically unable to leave, people with pet dependents, and people worried their possessions might be stolen.

The third most populated characteristic, by population, is “less physically or mentally capable.” The high result for the U.S. can be explained by two indicators: children, and people with disabilities. Both these indicators are more populous in the U.S. than in the other two countries. The number of children in the U.S. is about twice the number of children in Japan or the Netherlands respectively. This same difference can be found for

people with disabilities: in the U.S., the proportion of population is 19.0%, whereas in the Netherlands it is 11.8%; and in Japan it is 5.8%. The ADA (Americans with Disabilities Act) enables easier registration to health care, and may subsequently lead to a high number of registered people with disabilities in the U.S. Regarding people with disabilities, a consultancy agency based in the Netherlands estimates that only 1% of non-self-reliant people are staying at a location with organized care (Don & De Jong, 2008). This means that most people with disabilities or their caretakers live at home and, therefore, are on their own in terms of taking evacuation measures.

In all three countries, it was found that potentially vulnerable people comprise a considerable proportion of the population. Overall, people with the characteristics “fewer material and/or financial resources” and “restricted by commitments” are the most populated, while fewer vulnerable people are associated with the characteristics “less access to information” and “less physically or mentally capable.”

6.1.2. Number of vulnerable people by indicator

In all three countries, the top ten indicators, based on the number of potentially vulnerable people described thereby, account for 80% of potentially vulnerable people. The percentage of the total population attributed to single indicators in these top ten ranges from 5% to 33%. Moreover, seven of the top ten indicators are identical across the three case study countries, namely: women with no car access, people with pets, people with disabilities, people with low (or no) literacy skills, children 0–14 years old, caregivers of children, and caregivers of people with disabilities.

While many indicators in the top ten are the same across the three countries, there is variability in the rankings of “people living in poverty with no car.” In the USA, this is the top indicator, comprising 27% of the total population, while it is ranked as number 9 and 13 in the Netherlands and Japan (representing 6% and 3% of the population, respectively). Another indicator that varies between nations is “minorities (ethnic) no car,” which is 12% in the Netherlands, 5% in the USA, and only 1% in Japan.

When comparing the top indicators of potentially vulnerable people, in both Japan and the Netherlands the top two results are women with no car and people with pets. By contrast, these indicators rank at number 5 (women with no car) and 9 (people with pets) in the USA. Furthermore, in both Japan and the USA “children aged 0–14” appear in the top three most populated indicators, whereas children are ranked number 7 in Netherlands.

In all three countries, two indicators were found to have 0 potentially vulnerable people: children at schools without EWS and women experiencing travel restrictions. These indicators are associated with the characteristic “less access to information.” It may be

necessary to verify these figures on a local scale by investigating which schools have implemented the EWS and test it yearly, as well as what the number of women from certain cultural backgrounds (e.g. Islam) who might experience travel restrictions is. The indicators related to access to EWS that are thought to influence vulnerability during this phase resulted in few or no vulnerable people. Many people in the three case study countries are likely to use the Internet to try to obtain information during unfolding disasters. For instance, in the Netherlands, 94% of households have Internet access and more than 86% use the Internet daily or almost daily (Sleijpen, 2012). In practice, the Dutch legal system requires provincial websites to function as communication sources; however, their capacity is limited to 10,000 simultaneous visitors, rendering them useless during disasters (Algemeen Nederlands Persbureau, 2012). If people use alternative sources to find governmental information on unfolding disasters such as television or radio, or if provincial servers' capacities could be legally required to provide for a more realistic number of 1–10 million simultaneous visitors, then the number of vulnerable people with less access to information can indeed be one of the least populated indicators. The most populated indicator for this characteristic, in every country, is “people with low or no literacy skills.” Even by increasing Internet alerts or other modern media, illiterate people run the risk of not fully understanding the warnings and might require extra communication measures.

6.1.3. Future number of vulnerable people

The amount of immigrants in the three case study countries is expected to slightly increase and the biggest ethnic group in all three countries is expected to decrease, indicating there will be more people unfamiliar with the countries' culture, potential natural hazards, safety procedures, and language. The trend is that migration is increasing worldwide due to globalization.

In the Netherlands, the increase in ethnic minorities, by year 2050, from 19.6% to 28.7% of the total population indicates that the present DRM measures that are aimed at the general population will need to address different cultural and language needs for 50% more people than they currently do. There were no prognoses for people with disabilities and people living in poverty.

In Japan, the aging of society does not merely result in a larger vulnerable group of people. Japan also faces a depopulated rural countryside that is primarily inhabited by the aging population, while younger people, who mostly live in cities, have less time available to perform Flood Defense Team volunteer duties. Consequently, there are less people available to help this larger group of vulnerable people. There are no prognoses on the number of people with disabilities or people living in poverty in 2050 or any other year.

There is a prognosis on the increase of foreigners, but not on certain ethnic minorities regarded as native to Japan. The government records no separate information on the numbers of, e.g., Burakumin or Ainu, and thus there is no information on whether these groups suffer circumstances that make them vulnerable, such as less access to resources or education.

In the U.S., the increase in ethnic minorities among older adults indicates that DRM measures aimed at older adults will need to address different cultural and language needs. There were no prognoses for people with disabilities, or for poverty exclusive of other social factors (gender, race).

Recently, governments have begun to increase the retirement age in order to address their aging societies and consequently keep older adults within a network of resources, information, and dependents. The retirement age as set forth in policies is often not reflective of the actual retirement age, as shown for the case study countries in Figure 6.1.3.

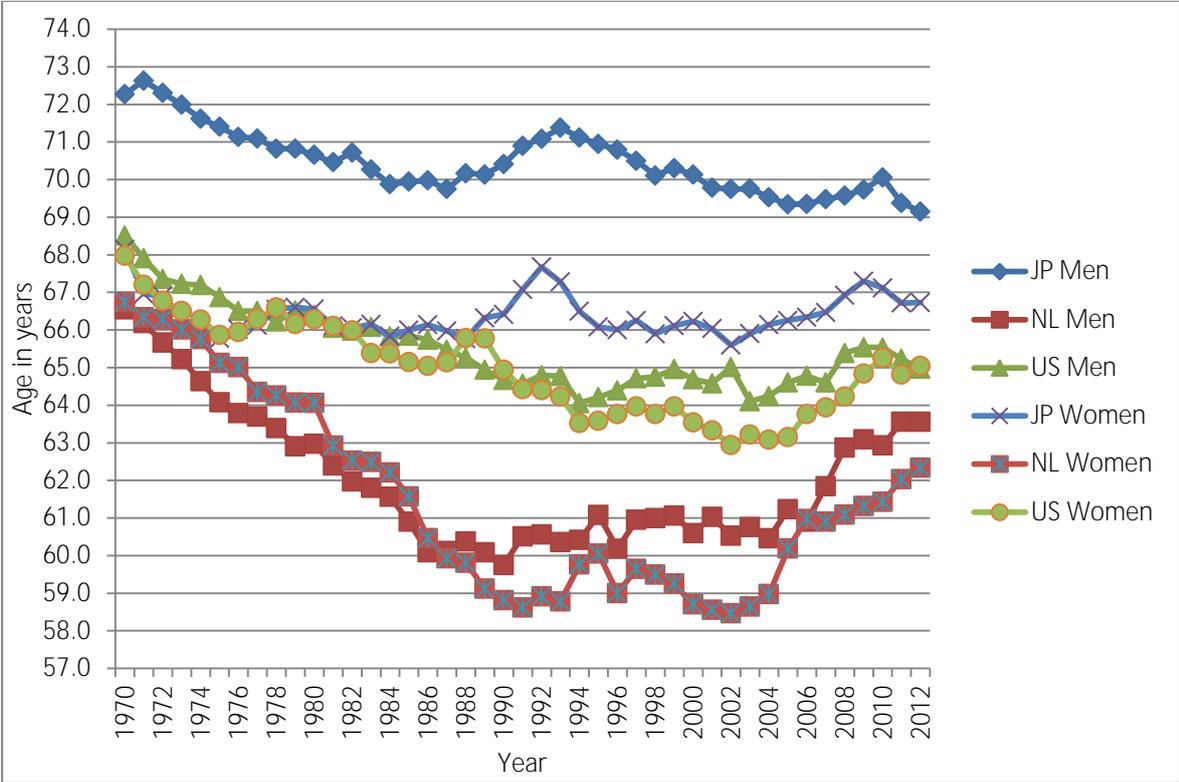


Figure 6.1.3. Retirement ages for men and women in the case study countries (Based on data from the Organisation for Economic Co-operation and Development (OECD), 2012).

Since 1975, the retirement age in Japan has been 55; however, in 1998, it increased to 60 and, beginning in 2013, it is 61. In the Netherlands and the United States, the retirement age has traditionally been 65, but this is also increasing slowly. In the Netherlands it will be 66 by 2018; and, in the United States, it has been 66 since 2009. Since 1970, both men and women in Japan have retired later than the governmental retirement age. The Netherlands

shows the actual age of retirement was higher in 1970 at 67 years of age rather than 65; this declined to around 60 in from 1988 to 2005, after which it increased again. The United States had a similar retirement age in 1970, but shows less variation, and the actual retirement age of about 65 in 2012 was close to the retirement age of 66 set out by the government. Increasing the retirement age is only one aspect of a possible method to address the issue of an aging society. The governments must insure there are jobs available for people in these age categories as well, as many companies prefer to hire less costly, younger, people.

The lack of prognoses on the number of vulnerable people in combination with other social factors than age, ethnicity, or gender shows that the governments of all three case study countries need to increase data collection to be able to anticipate the needs of their future populations.

6.1.4. Global expectations of future numbers of vulnerable people

As shown by data from EM-DAT (n.d.), the frequency of disasters has been increasing in the past decades, as well as the amount of damages they are causing. The draft version of the Sendai Report by the World Bank (2012) shows that, in the last 30 years, natural disasters have cost over 3.3 million lives and 2.3 trillion USD. Both the frequency of and damage caused by disasters are expected to continue to increase in the coming decades, due to – among others – climate change and population increase in developing countries, mostly in areas prone to disaster. In the past 30 years, the population living in flood-prone river areas has increased by 114%; that in cyclone-exposed coastlines, by 192%. As can be seen in the IPCC SREX Summary for Policymakers (Intergovernmental Panel on Climate Change [IPCC], 2012), the future will bring more climatic extremes. The U.N. WWAP (2009, 2012) shows that the world is facing population growth projections of 2 to 3 billion people in the coming 40 years; and that 18 of the world's 27 megacities with populations of 10 million or greater are located in coastal areas, where the largest migration pressures will take place. By 2050, the population potentially exposed to flood disasters will be 2 billion, due to rising populations in flood-prone lands, climate change, deforestation, loss of wetlands, and rising sea levels, according to research by the UNU (2004).

The U.N. WWAP (2009) has estimated that the amount of people aged 60 or older will rise from 10% in 2005 to 22% in 2050, and the amount of people aged up to 25 will be close to 50%. This signifies a great increase in the amount of potentially vulnerable people in the form of children and older adults. All case study countries showed an increase in older adults. Older adults are more likely to have higher morbidity and mortality rates during disasters (as seen in Figure 1.1.2), and their global number is estimated to nearly double

from 550 million to 973 million between 2000 and 2030 (Tuohy & Stephens, 2012). While there might continue to be enough people available to aid children in times of disaster, and their resilience can be increased through education, there might not be enough people available to help all older adults requiring assistance.

6.2. Results: DRM Policy Evaluation

6.2.1. Evaluation per scale level

As stated before, the following scores are applied (Table 6.2.1):

Table 6.2.1. Metric evaluation criteria and corresponding scores

Criterion	Score
No mention of groups of potentially vulnerable people	1
Recognition of a group of potentially vulnerable people	2
Specific measures taken to reduce the vulnerability of potentially vulnerable people	3
Anticipation of future trends in numbers of potentially vulnerable people	4
Involvement of potentially vulnerable people in policy formulation	5

The scores are cumulative, which means that, to obtain a score of 5, policies also have to satisfy previous conditions (with the exception of 1).

On a national level, it was found that no active national law mentions vulnerable people in the Netherlands. This is due to the laws focusing on prevention rather than preparedness or response, as well as the explicit mention in the Law Safety Regions that each region should define its own risks. In terms of scoring, this led to a score of 1 for these laws. One law mentioned in the evacuation procedures is the Law of Population Displacement (1952), which could be used to order evacuations in case of floods. According to this law, people can receive a special designated shelter depending on their age, health, and behavior. However, basic disaster law, the Law Safety Regions, does not explicitly mention that local plans should include measures for vulnerable people.

The Japanese Flood Fighting Law (last translated revision 2005) recognizes some groups of potentially vulnerable people, but does not go into detail. It requires evacuation plans from the owners of underground shopping complexes and facilities used by “elderly people, people with disabilities, infant and toddlers, and other people who especially require care from the perspective of disaster prevention.” (Flood Fighting Law, 2005, p.10). The Disaster Countermeasures Basic Act (last translated revision 2013) is equally unspecific as it mentions in Art. 8 (14) “the State shall endeavor to carry out measures for the elderly, the handicapped, infants and others requiring special care.” (Disaster Countermeasures Basic Act, 2013, p.6).

The American Stafford Act contains extremely detailed measures for vulnerable people during evacuations. As example of scoring, this led to the score of 3 for this law, the highest of all policies on this scale.

For national/prefectural/state policies, only one Dutch policy mentions a possible future increase in the number of vulnerable people (increased aging). There is no policy that involves vulnerable people in the creation of the actual policy.

The Japanese Final Report (2012) from the Central Disaster Management Council is more detailed as it includes measures for older adults, people with disabilities, children, foreign nationals, expectant/nursing mothers, and others requiring special assistance to reach evacuation centers; and, once there, measures to ensure people's needs are equally met.

The American policies vary in detail from recognizing vulnerable people (score of 2) to measures (score of 3), despite national laws that indicate specific measures. This shows that national policy is not always transcribed into lower policy scale levels. One reason for this is due to the independence of U.S. states from the federal government. For DRM, the federal government does not have full control over which measures every state and municipality carries out.

On the regional level, the evaluated Dutch safety region policies show great diversity in what groups are considered vulnerable people, although they are lacking in specific measures taken for these groups. The regional policies also recognize certain groups of potentially vulnerable people in the form of vulnerable buildings (e.g., prisons, abbeys, asylum centers, schools, hospitals, nursing homes). A disheartening shortcoming is the vision expressed in the regional risk profile of Twente, which serves as a shelter region in case of a flood in the Netherlands' western region. In this policy the initial focus is on helping self-reliant people. Those who are not self-reliant are of secondary importance, alongside animals and valuable goods, such as art treasures and national heritage.

The Japanese regional policies provide an accurate description of expected measures, as the Japanese local governments rely heavily on response organized by citizens. The Sanjo City Flood Disaster Manual (2005) describes how local disaster prevention organizations should provide volunteers to assist physically and mentally challenged people in evacuations. According to the manual, the main reason for this dependence on citizens is experiences from the Hanshin Kobe earthquake in 1995, where 60% of people were saved by neighbors and 20% by family members. Without mentioning specific measures, the manual mention the city should be made safe for the rapidly aging population, thus leading to a score of 4.

The regional Orleans Parish 2010 Hazard Mitigation Plan Update contains an extensive vulnerability assessment; however, it focuses on the vulnerability of the city itself and buildings within it, and not its inhabitants. This is in stark contrast to the Current Local Mitigation Strategy Document Hillsborough County (2009). Not only does it limit the construction of new facilities for people with special needs in hazardous zones, it also includes the demographics from the population census, including a breakdown by ethnicity, income, age, and female-headed households per jurisdiction. Most importantly, the assessment of the countywide population at risk is divided into minorities, aged older than 65, with disabilities, poverty, language isolated, and single parent. It also includes a section on future land use and anticipated population growth, and the accompanying increased need for evacuation shelters, but does not recognize increased numbers of specific groups of potentially vulnerable people. Of all the examined documents, this countywide DRM policy document is the most promising in quantifying local potentially vulnerable people and arranging supporting measures on their behalf in all phases of disaster management.

6.2.2. Country Comparison

In comparison with Japan and the U.S., policies in the Netherlands provide the least support to groups of potentially vulnerable people. On the one hand, this is due to new national laws that intentionally retain general descriptions in order for policies to be tailored to the regional situation. On the other, as the policies are also relatively new, they rarely go beyond describing the existence of several groups. Subsequent revisions might prove a more accurate description of the number of potentially vulnerable people as well as specific measures. An examination of Japan's DRM policies found that the national-level laws are more descriptive but lacking concrete measures, which – instead – exist in the regional and local policies. By contrast, this clear separation is not the case in the U.S., where the basic national-level disaster law (the Stafford Act) states very specific measures for vulnerable people. National policies might help shape what happens on a more regional level, making the Stafford Act most promising in guaranteeing support for vulnerable people.

When considering the results from the analysis of the number of potentially vulnerable people and the assessment of the DRM policies, it was observed that the DRM policies rarely take into account how many potentially vulnerable people there are in a given jurisdiction and that the measures taken for identified groups are not proportional to the number of people in each group. This indicates that much room for improvement remains.

National policies are, still, often created and decided upon by a majority that does not have the characteristics of vulnerable people. The majority of lawmakers rarely consists of people living in poverty, people with disabilities, ethnic minorities, children, older adults, or

women; nor are these people represented well or consulted during the drafting of national or state-level DRM laws, which must be adhered to on the regional levels. It would benefit regional policies if national laws already concerned themselves with vulnerable people, a point that can be emphasized by pointing out just how many people this affects. It would be a great improvement if policies are formulated at the national level in consultation with vulnerable people. This is currently indirectly exercised in several policies, but neither directly nor for all groups of vulnerable people.

To evaluate the role of regional policies, two areas per country were investigated. This is a rather low amount, but the choice of these areas was also based on data availability; more specifically, the expectation to encounter support measures for vulnerable people. While support measures were not always found, these regional examples should not be seen as representative of the entire country. Rather, the national measures can be seen as supporting the regional areas. Further research is necessary to conclude whether or not these regions can be considered as representative for the entire country. It was acknowledged that measures supporting vulnerable people may or may not be implemented, as well as complemented by measures not written down in any policy document. Furthermore, it was hypothesized that larger or more populated areas might have more detailed policies or advanced laws compared to smaller areas. As the selected areas were all of a relatively similar size within the respective countries, this hypothesis should be tested in future research with a larger sample size of case study areas.

6.2.3. Examples of good practice

The best examples from each country include the Dutch Guidance Information for Evacuations in Flood Events and Flooding (national policy), the Japanese Sanjo City Area Disaster Prevention Plan (regional policy), and the U.S. Stafford Act (national law) and regional plan from Hillsborough County. These examples may be applied to all countries, as these examples were only found in the individual countries.

The Dutch policy, while not containing any specific measures, does call attention to the fact that some people require more attention in both crisis and communication. It mentions groups of potentially vulnerable people who are often invisible in general policies, including prisoners, (former) psychiatric patients, and strictly religious people who do not own a radio or television. It is assumed this latter group would also not have access to mobile devices or the Internet and would require special attention to become informed of impending disasters.

The Japanese regional plan, which recognizes both governmental limits and the potential power in its citizens, encourages citizens to be mentally prepared for a disaster,

unite with fellow citizens in community groups, and be self-resilient. It is the only documented part of this evaluation to mention such an encouragement, which goes beyond simply informing citizens of possible hazards and measures.

The Stafford Act, as a national law, already legally guarantees that people can depend on many support measures, including: unemployment assistance (Sec. 410); food coupons (Sec. 412); legal services (Sec. 415); assistance in the rescue and care of pets, service animals, and animals without owners (Sec. 403); housing assistance, as well as financial assistance for medical and dental expenses, child care, funeral expenses, property, and transportation (Sec. 408); and the accessibility of all public places (first aid stations, feeding areas, portable payphone stations, toilets, housing) for people with disabilities. Section 6.2.1 discusses the merits of the regional Hillsborough County document.

6.3. Implications

Laws do not guarantee implementation or superior effects over non-governmental assistance, but there are several ways laws can contribute to support vulnerable people. While local actions have proved to have the most effect on increasing resilience, laws can help distribute resources more equally. Aside from establishing a more equal distribution of resources, legislation promotes accountability and coordination (UNISDR, 2011), and can enable speedy recovery after disasters by distributing resources and funds. Legislation can also manage land-use planning and restoring ecosystems to reduce potential damages from storms and floods (U.N. WWAP, 2012). Laws may form a backbone for citizens to claim a right to be protected by the government.

How can knowledge of the theoretical framework of characteristics of vulnerable people contribute to policy planning? We cannot view measures to reduce losses from floods as separate from measures to reduce losses from other disasters. Measures taken to reduce vulnerability for one hazard can often be similar for other types of hazard. This also calls for related budgets.

There are many laws connected to and influencing the reduction of vulnerability. For this reason, scientists such as Wisner (2012) recommend an integration of DRM with sustainable development and climate change policies. Many studies call for the combination of DRM laws with sustainability and climate change (e.g., Kelman, 2010). However, a wider view on integration is necessary beyond the scope of sustainable development and climate change. The distinct links with other policy fields – namely human rights, education, spatial policy, and those relating to income and livelihoods – should be stressed. From the viewpoint of floods, water is more and more becoming a public property in the legal sense

(Burchi, 2012). Floods, however, are still very much a governmental issue, as damages are often increased by land use and spatial planning. As Burchi points out, even in the European WFD there is no explicit link between river basin management plans and spatial planning policies, and most water laws fail to integrate different governmental divisions and regulations that directly influence vulnerability. Burchi does not recommend incorporating one type of legislation into the other; rather, more coordination between water laws and spatial planning is advised. Other policy fields related to flood management and vulnerability are not mentioned.

Future policy integration has to move beyond the traditional patriarchal viewpoints of the origin of vulnerability and transform beyond spatial planning alone into the aforementioned education, human rights, and income-related policies, if all characteristics of vulnerability are to be addressed at the root causes. Extrinsic factors of vulnerability can be addressed by examining the root causes of vulnerability and truly integrating human rights into related policy fields, whereas intrinsic vulnerability will always need specific measures to increase people's resilience.

When applying the indicators to different areas, future populations, or other phases of DRM, the following changes may be considered:

- In developing countries, the indicators relating to EWS at school or travel restrictions for women might be more relevant (Indian Ocean tsunami). Indicators such as pet or car ownership might be far less relevant, whereas livestock and other modes of transportation are more important. For example, car ownership might be less appropriate and could be adapted to the prevalent circumstances.
- On a regional scale, the most prevalent groups of vulnerable people might be more diverse. In aging municipalities, there might be no significant amount of children; and, in certain areas, it may be necessary to distinguish in different ethnic groups as well as religious groups.
- For the preparation phase, indicators should focus on being prepared in ways of knowledge and resources, such as the ability to purchase a survival package and advance knowledge of the evacuation routes.

6.4. Limitations

Three main issues arise in assessing numbers of potentially vulnerable people. The first derives from the lack of independence associated with vulnerability characteristics. As people may have multiple characteristics of vulnerability or characteristics that change over time, considerable overlap may exist. As the indicators are not independent, people may

belong to multiple groups of potentially vulnerable people at the same time; thus, it is not possible to combine these numbers to a total number of potentially vulnerable people. However, given that some of our individual indicators flag large proportions of the population as potentially vulnerable, it may still be concluded that DRM policies should pay close attention to establishing measures aimed at vulnerable people.

The second issue is that individual vulnerability exists along a continuum with respect to severity, which we do not account for in this study. Implicitly, vulnerability is assumed as a binary rather than a continuous variable. The only distinction being made is that between vulnerable people and people who are not vulnerable. By this analysis, once a person is vulnerable by any characteristic, they are as vulnerable as any other person with another characteristic; e.g., people without access to cars are equally vulnerable to people who are restricted to wheelchairs. While it may be possible to apply a gradient or weight to each of the characteristics, it was difficult to remain objective and is likely to vary depending on culture. Therefore, it would be more informative to show the absolute numbers per characteristic without attributing a higher importance to any characteristics over others. However, the number of vulnerable people in terms of the proportion of population and relative severity of vulnerability are both crucial considerations from the perspective of DRM policy design.

The final issue relates to the characteristic “restricted by commitments.” While people restricted by commitments may or may not have any or a multitude of other characteristics that make them vulnerable, it could be argued that being restricted by commitments does not necessarily make a person vulnerable. What is implied here is that, while people with a commitment may or may not be self-reliant, they may choose not to evacuate themselves immediately in order to assist another. This could be due to a sense of duty, or the nature of the relationship to a dependent or asset they wish to protect. An arguable flaw is that, once a person who is not self-reliant is taken care of by someone else, this system would count both people as vulnerable. There are different scenarios imaginable in which this either could or could not, in reality, be the case. For instance, a self-reliant person could save his or her neighbors who don’t have access to a car by sharing his/her vehicle. In this case, the people who were offered a ride may evacuate with the same speed as self-reliant people without dependents; but, in many cases, both or all people involved would become endangered. To err on the conservative side, the characteristic “restricted by commitments” is retained as a vulnerable characteristic within the framework.

A main conceptual problem with developing indicators is that, as the causes of vulnerability are highly dynamic, any change (such as disasters affecting biophysical or socioeconomic conditions) can render the proposed indicators useless (Rygel et al., 2006).

Even if support is generated for the most populated indicators of potentially vulnerable people, other groups with different needs will subsequently form the most populated indicators over time. The question remains as to how indicators can reliably be measured over time, if the subject of measurement changes. One solution might be future population projections. These are already prepared by various governments to cover different age categories and ethnic minorities; occasionally, factors such as religion or political preference are also taken into account. If the same projections were made for other indicators found in this research, such as car ownership, language proficiency, dependents, and disabilities, the future size of the groups of potentially vulnerable people can be estimated. This can then be combined with trends of support measures in policies, which also change over time.

One major shortcoming was the unavailability of national data on people living in poverty, who also have the characteristic “less physically or mentally capable.” These numbers were unavailable on the national basis in all three case study countries, and it led to no indicator being available for this group. Although recording data on both income and health status may lead to privacy issues, this group of potentially vulnerable people can be both extremely vulnerable and large in number. It is vital the governments have measures in place for this group.

Other shortcomings on data availability include social vulnerability indicators. While these are closely intertwined with resilience, issues such as social networks are not yet measured and therefore unavailable. Data gathering on disaster mortality also needs to be expanded beyond age, sex, and race to include other factors such as education, income, and social networks, in order to break down any prevailing conditions leading to disproportionate deaths for certain groups of vulnerable people.

6.5. Verification of the Required Facets of Vulnerability Studies

The validity of this study is supported by adhering to the required facets of vulnerability studies, as described in Adger et al. (2004) (Table 3.1). These facets should be verified both before and after a vulnerability study takes place; therefore, the details are covered again in this section.

1. Purpose: The purpose of the study is well described in the objective (Chapter 1), namely to gauge the amount of support in flood DRM policies aimed at reducing the vulnerability of vulnerable people. For this study, three countries are compared.
2. Definition of vulnerability: Chapter 3.1 contains an original definition of

- vulnerability as well as for groups of potentially vulnerable people.
3. Scale: The scale of the threatened unit is defined as groups of people, of which the numbers are estimated in this study. The number of potentially vulnerable people was estimated at the national level, both for comparative purposes and for data availability. The policies were evaluated on three scale levels: national law, (sub-) national policies, and regional policies.
 4. Dynamism: The basis of characteristics of vulnerability does not address why these characteristics arose in the first place. Whereas some of these root causes of vulnerable characteristics lie in social factors such as discrimination and unequal access to education and resources (extrinsic causes) some root causes are intrinsic, such as certain chronic illnesses or age. This study adequately explains how these characteristics can lead to problems during hazards and notes that a combination of characteristics exacerbates vulnerability.
 5. Conceptual framework: Chapter 3.2 concerns the conceptual framework and discusses the assumptions of all indicators as well as other indicator requirements.
 6. Research approach: Chapter 3 covers the applied methodologies and research approach.
 7. Data: The sources of the statistics can be found in Appendix D: Sources of Size of Potentially Vulnerable Populations. The selection of indicators is discussed in sections 3.2 and 3.3. Appendix F provides an overview of the sources of the DRM policies in the three case study countries. All legal documents are accessible online.
 8. Verification: The evaluation of the validity and plausible outcome is described in the preceding sections.

6.6. Focus of the Study

This section discusses additional issues that relate to this research, but were beyond the study scope. Firstly, people's vulnerability can be affected by many laws (human rights, housing, anti-discrimination, labor, health care, education etc.) (Handmer & Monson, 2004). However, taking all possible laws and policies affecting people's vulnerability into account is beyond the scope of this particular study.

While this research has focused on disasters that result from natural hazards in conjunction with vulnerable people, it is entirely imaginable that human beings could intentionally instigate hazards by themselves, such as deliberate floods or cloud seeding that leads to excessive precipitation. The Netherlands has historically used intentional levee breaches to ward off invading soldiers as a military tactic; for instance, at Leiden in 1574

(Rijksmuseum, n.d.). Another example would be to intentionally flood lands to provide the soil with nutrients from river water to benefit agriculture. The laws and policies analyzed in this research were not evaluated for such deliberate intentions.

There exists a certain governmental responsibility to protect citizens against disaster; however, citizens themselves can equally be expected to take certain steps. The ideal division of responsibility between government and individuals is not the topic of the current study, although the current study does investigate how these responsibilities are viewed by the governments of the respective case study countries.

Often, we find that people living in poverty inhabit areas that are more exposed to natural hazards, or their habitation or working environment do not meet or lack safe building codes. Unequal exposure due to poverty is beyond the scope of this study, which focuses on how vulnerable people are treated in a community in which all people are equally exposed to a flood hazard.

Lack of resources can also affect the government, as resources used to solve one problem cannot be used to solve other problems. In equity development, it is difficult to prioritize problems. How can we justify budgeting for protection against natural hazards that may or may not occur, when there are many clear problems facing society today? Likewise, how can we justify budgeting for measures that only apply to vulnerable people, rather than on measures that would benefit the entire population? This might lead to the necessity of combining budgets from healthcare and education in order to achieve the necessary increased DRM measures for vulnerable people. Furthermore, regarding costs, the government cannot merely concern itself with the current society, but must also consider future generations. How the government should spend its available budget is beyond the scope of this study.

Individual responsibility is also important to consider. Especially in Japan, there is the “tendenko” concept regarding tsunamis (Kodama, 2013), which refers to saving yourself in case of a tsunami, without considering helping other people. This is so because, after a tsunami alert, there is so little time to evacuate that, once you decide to save someone else, it is likely you will both die. It is beyond the scope of this study to determine the ethics of aid; therefore, who exactly should be ultimately responsible for vulnerable people is not examined. Rather, the suggestions in this study are to prepare certain measures that might aid vulnerable people in order to increase their resilience. This could include infrastructure measures such as constructing buildings that will house large amounts of vulnerable people (e.g., hospitals, children’s daycare centers, prisons, etc.) in unexposed areas or providing them with earlier warnings and ample evacuation methods. Another option is to provide education and physical aids to those who are physically able to evacuate themselves and to

make arrangements with capable family members or neighbors for those who are not. It is beyond the scope of this study to make a moral judgment as to who has the ultimate responsibility in aiding vulnerable people. It suffices to state the governments in the countries studies adhere to the international treaties on human rights and, therefore, have the responsibility to take measures for all their citizens, as well as to help prepare those who require additional measures.

In this study, only the DRM policies are evaluated. Policies from community organizations or NGOs are not taken into account, unless they are covered in the governmental policies themselves. The scope of this study is restricted to fact finding and proposing an evaluation method for DRM policies.

Other related questions, while important, are not the focus of this particular research, including:

1. How data used in DRM laws/policies is gathered or estimated
2. To what extent it is feasible to manage disasters
3. Equity among poor and rich nations, within nations, and among vulnerable people
4. Intergenerational equity and interspecies equity: why save only the current population and not also future generations, animals, or ecosystems?
5. How the increase or decrease in vulnerable people could be reversed or slowed down by addressing root causes
6. The possible relationship between the DRM laws of different countries and their cultural aspects
7. The responsibility of risk preparedness beyond that prescribed by international legislation
8. The implementation and impact of measures taken by either the government or community organizations

These are all questions worthy of their own thesis and are not covered by this particular research. Rather, this study is an entrance to studying ways to improve DRM policy implementation.

7. Conclusions

“The best time to plant a tree is 20 years ago. The second best time is today.”

Chinese proverb

7.1. Main Conclusions

This is the first study to use social vulnerability indicators to estimate the numbers of potentially vulnerable people. Recognizing that vulnerability differs per hazard type and DRM phase, a framework based on four characteristics of vulnerability and focused on six groups of potentially vulnerable people was proposed. Corresponding statistics were found per indicator for the hazard type flood and response phase of disaster management for Japan, the Netherlands, and the United States.

The indicators were compiled by characteristic; it was found that people with fewer material and/or financial resources and people restricted by commitments are the most populated in all three countries, and less numerous are people with less access to information, and people who are less physically or mentally capable – with the exception of the U.S., where people who are less physically or mentally capable were second most populated. The top three most populated indicators were comprised of women with no car access and people with pet dependents in the Netherlands and Japan, and children aged 0–14 in Japan and the United States. The top ten indicators account for 80% of all potentially vulnerable people. When addressing the needs of vulnerable people, these top ten indicators may serve as a starting point to formulate resilience-building measures. Seven of these ten are identical across the three case study countries, meaning the countries can learn from each other’s measures and possibly apply them in their own area.

A scoring system was proposed to determine whether DRM laws and policies from national to regional level in the three countries supported the identified groups of potentially vulnerable people. The results from the law evaluation (Table 5.2-2) show that Japan and the U.S. have the most elaborate measures of the three investigated countries.

However, DRM laws rarely anticipated future numbers of potentially vulnerable people, and none was created by involvement of potentially vulnerable people. These results indicate the governments of these countries still have a long way to go in creating equitable DRM policies. On a practical evaluation level, the metric and rating scales showed that, unfortunately, a wide gap remains in DRM policies between identifying groups of vulnerable people and specific measures to support them. A comparison of the scores per scale level shows that identification or lack of identification of groups of potentially vulnerable people

at the national level does not necessary lead to more or less detailed support measures on their behalf.

7.2. Policy Recommendations

It is clear that, in these developed countries, policymakers are not yet paying sufficient attention to the diversity of their population. Additional support measures for vulnerable people must be formulated, depending on circumstances, in order to guarantee the measures are equitable. We count on our governments to make equitable policies, but this has clearly not yet been established in these countries. Given that the investigated measures were related to the flood hazard type, and that floods are a prominent hazard in many areas, developing additional measures deserves immediate attention. The existence of measures for vulnerable people related to other hazard types should also be investigated and compared to flood DRM to uncover gaps and complement existing measures.

To create effective DRM laws, it is necessary to identify the causes of vulnerability. This is very complex as there are many different, subsequent, and simultaneous causes of vulnerability. An example could lie in a hurricane striking a city with slums. The wind may knock down and blow away poor housing, whereas the rainfall may flood the lower-lying parts. The causes of vulnerability could be lack of resources for safe infrastructure, unenforced or lack of building codes, lack of knowledge about possible hazards in the area, etc. Given finite resources, reducing vulnerability to one hazard might increase vulnerability to another hazard. Rather than solely predicting these devastating events in the future, it is vital to increase resilience to these events, as the assumption is they might occur again. Policies from multiple fields should focus on addressing the root causes by reducing social inequalities leading to vulnerability.

7.3. Future Research

This research has taken into account the factors that might lead to vulnerability, focusing on four characteristics. This same procedure, using a division in characteristics and disaster phases, can be applied for other hazard types as well as other groups of potentially vulnerable people, if it is clear which indicators should be used and corresponding statistics are available. Given the application to three developed countries, indicators for potentially vulnerable people in developed countries were constructed, but these can be adapted to less developed countries depending on available statistics. The scoring system may be applied universally to all DRM-related laws and policies and can be refined to focus on measures per group of potentially vulnerable people to identify where policies might be improved.

A further analysis of regional disaster policies, as well as economic and spatial planning laws, is necessary to gain an in-depth understanding of whether vulnerability reduction is addressed in other policy documents or not. Furthermore, it should become clear how individual laws and policies work together across domains and ministries to ensure safety on a regional level and how they relate to implementation. Non-governmental measures (such as volunteer organizations providing education or joint car pickup applications for mobile devices) might play a significant role and should not be overlooked.

For the implementation rate, it is important to investigate what enables or hinders implementation, such as available resources or the amount of cooperation between the regional government and civil society/private sector. Regarding floods and evacuation, questions might be asked in greater detail, especially: are policies including reluctance, hesitance, or inability to evacuate? Even if the evacuation information reaches people, how should people who are unwilling to evacuate or people who are unable to evacuate (due to translation issues for foreigners, pets, children, sick neighbors, gas needed for travel, etc.) be dealt with? For concrete manuals, it would be more relevant to compare the actions described in the manual with the actually implemented actions immediately after a disaster occurs. Also, whether or not the size/population of the regional areas affects the level of detail of policy measures should be researched.

Future research should pay attention to factors that might lead to increased resilience or capacity. One factor that could be useful in such an approach comes from Zautra, Arewasikporn, & Davis (2010), who propose social connections as a main influence on resilience. Furthermore, the exact mechanisms spurring people into greater preparedness for disasters needs to be researched. It may be worthwhile to investigate if vulnerable people have spillover effects to other members of their social groups who are not directly involved. An example could include someone visiting the home of an acquaintance with a disability, who has additional measures for disasters, which then motivates the person to also make a family escape plan for their own home.

Future research should also investigate to which extent measures are a result of laws and policies. Laws involved in the different aspects of vulnerability, in combination with the systems in place for organizing the actually implemented measures, can provide recommendations for best practices on a local scale per group of potentially vulnerable people.

Appendix A: Author's Résumé

Education

2011–2014	PhD Disaster Management – National Graduate Institute for Policy Studies, Tokyo (Japan)
2013–2014	International Development Professional Training Program – Graduate Research Institute for Policy Studies, Tokyo (Japan)
2004–2006	Master of Science, Environmental Sciences – Radboud University, Nijmegen (NL)
2004–2005	Honors Program – Radboud University, Nijmegen (NL)
2001–2004	Bachelor of Science – University College, Utrecht (NL)

Articles and reports

- K. Vink, K. Takeuchi, *Quantifying the effectiveness of measures taken for vulnerable people in Disaster Risk Management (DRM) in the Netherlands*, conference proceedings for the 6th Asia Pacific Association of Hydrology and Water Resources (APHW) conference, presented on 19 August 2013
- K. Vink, K. Takeuchi, *International comparison of measures taken for vulnerable people in disaster risk management laws*, International Journal of Disaster Risk Reduction, 2013, <http://dx.doi.org/10.1016/j.ijdr.2013.02.002>
- K. Vink, *Origin of the Sun. Where do the Japanese and the Japanese language come from?* Honors Review June 2006 (Dutch)
- K. Vink, *Functions in river systems*. Radboud University, 2006
- K. Vink, *The role of nitrate, sulphate and oxygen in peat decomposition*. Radboud University, 2006 (Dutch)

Work Experience

10/2011–10/2014	International Centre for Water Hazard and Risk Management (ICHARM) – Research Assistant - Contributing to ICHARM projects with original research - Guiding bachelor and master students with their theses
09/2009–09/2011	Rosen – Data Analyst - Determined the location of pipelines with Rosen GIS software - Created English work instructions and instructing new trainees
07/2009–09/2009	Royal Haskoning (HDSR) – Law enforcer “Law pollution of surface waters” - Judged and managed research results and report of visits to clients - Wrote clients about consequences of results, visited clients and generated reports
03/2009–06/2009	Ecoselect (Province Zuid-Holland, Municipality Lochem) – Soil information employee - Input soil data into Strabis system and drew locations in GIS - Instructed municipality employees in how to use Strabis

02/2008–12/2008	<p>Centre for Sustainable Management of Resources, Radboud University Nijmegen – Junior researcher</p> <ul style="list-style-type: none"> - Researched the effects on the water level of different management strategies in floodplains - Gathered and analyzed information; coordinated research in France - Co-organized the final conference and discussion panels - Designed and maintained a website; developed a pamphlet for the department - Organized discussions with local area managers and water board - Reviewed papers for final conference
05/2007–02/2008	<p>MH Poly (formerly MH Nederland) – Junior advisor soil (3 days/week)</p> <ul style="list-style-type: none"> - Set up exploratory soil investigations and drilling plans - Requested and managed KLIC and laboratory data - Determined norms for target values and testing result scores - Advised further investigations and made reports - Set up reviews of current conditions of dredging depots <p>MH Poly (formerly MH Nederland) at RWS Zuid-Holland, District Nieuwe Waterweg – Granting of permits (2 days/week)</p> <ul style="list-style-type: none"> - Managed requests for permits with regards to the law “Law maintenance of public works” by using the program Havik, with GIS subprogram - Wrote permits in discussion with seniors, safeguarded objection terms and managed letters to clients
09/2005–02/2006	<p>Internship Radboud University Nijmegen</p> <p>“Functions in River Systems” – Department of Environmental Sciences</p> <ul style="list-style-type: none"> - Designed a theoretical model about different functions of the river area - Conducted literature research; collected and analyzed data - Tested the model with information from a field case and consulted with experts

Appendix B: List of Potential Population Groups

Community-Wide Vulnerability and Capacity Assessment (CVCA): The following is a list of potential population groups, which *may be* considered “vulnerable” given a specific context. In making your assessment, remember that:

- Not all “seniors, youth, women, and people with disabilities” are automatically and exclusively vulnerable;
- Most likely, those who are considered vulnerable fit into more than one of the categories below;

- Aboriginal or indigenous people
- Alcohol/Drug dependent individuals
- Children (especially those of pre-school age)
 - When isolated from parents during impact
 - When gathered in large groups (i.e., schools)
 - When the ratio of children to adults is significantly high (e.g., daycares, day homes)
- Ethnic minorities
- Families of emergency service personnel
- Homeless or “street people”
- Immigrants (especially those from “visible” cultures, or cultures that are diverse from the local “mainstream”)
- Incarcerated individuals
- Language-limited (i.e., those who do not speak the mainstay language)
- Large and high-density households
- Livestock owners
- Marginalized groups (i.e., by society or the community)
- Medication dependent individuals (e.g., diabetics, schizophrenics)
- Migrant workers
- People depending on public transport (versus car owners)
- People living below the poverty line
- People on social assistance
- People with disabilities
 - Mobility-specific
 - Hearing-related
 - Visual
 - Communication
 - Physical
 - Mental or cognitive
 - Multiple chemical sensitivities
 - Dependency on electricity for life-support systems
- Pet owners
- Renters (especially in low-rental areas)
- Seniors
 - Limited mobility
 - Isolated or confined
 - Medically fragile
 - Heavily dependent on medication
 - Heavily dependent on life-support systems
- Single-parent families, especially those who are:
 - On public “assistance”
 - Unable to take time off (e.g., during the response or recovery period)
- Socially isolated people
- Tourists
- Transients
- Unemployed
- Women, especially those who are:
 - Single, Single parents
 - Unemployed

Appendix C: Analysis of Indices

Appendix C 1: Analysis of the Ten Evaluated Indices by Major Indicator Types

Index	Total	EVI	SVI	VI	RMI	LVI	DRI	RI	Metric	FVI	GCVI
Object of measurement		Environment	Individual household	Country	Risk plans	Local area	Local area	Country	Emergency plans	Coastal cities	Country
# of Indicators		50	15	11	24	21	36	16	22	19	27
Health	22	0	4	4	0	1	4	3	1	1	4
Education	19	1	1	3	3	0	4	2	3	1	1
Income	23	0	6	0	1	7	6	2	0	0	1
Hazard	21	10	0	0	0	1	0	5	0	5	0
Governance	23	1	0	4	4	0	5	1	1	1	6
Other	133	38	4	0	16	12	17	3	17	11	15

Appendix C 2: Analysis of Eight Additional Indices by Major Indicator Types

Index	Total	RVM (Leichenko et al., 2004)	SVI Africa (Vincent, 2004)	VNL (Brooks, Adger, & Kelly, 2005)	FRI (Kannami, 2008)	GFRI (Okazawa et al., 2012)	HVI (Kahn & Salman, 2012)	CRED's VI (Stockholm Environment Institute, 2012)	Nexus (Aker & Mallick (2013)
Object of measurement		Regions	Country	Country	Country	World regions	Districts	World regions	Poor households
# of Indicators		5	9	32	15	11	5	3	15
Health	15	0	3	8	1	0	1	0	2
Education	11	2	0	4	3	0	1	0	1
Income	16	1	3	4	1	2	0	1	4
Hazard	3	0	0	0	2	0	0	0	1
Governance	9	0	1	7	1	0	0	0	0
Other	41	2	2	9	7	9	3	2	7

Appendix C 3: Analysis of 18 Additional Sources by Identified Vulnerable Groups, Characteristics and/or Circumstances

Author	Total	Comfort et al., 1999	Morrow, 1999	McEntire et al., 2002	Cardona, 2003	Brooks, 2003	Rygel et al., 2006	Thomalla et al., 2006	NRC, 2006	Yarnal, 2007	Rovins, 2009	Laukkonen et al., 2009	Dinh et al., 2012	Rubin, 2010a	Adikari et al., 2013	GP DRR, 2013	MacDonald, 2013	GNCSDR, 2013	Lee et al., 2014
# of items		5	20	8	10	10	5	8	15	13	3	9	7	7	5	7	4	9	6
Children	15	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	0	1	1
Older Adults	15	1	1	1	1	0	1	1	1	1	0	1	1	1	1	1	0	1	1
Gender	14	1	2	1	1	0	1	1	1	2	0	1	0	1	0	1	0	1	0
Disabilities	11	1	1	1	0	0	1	0	0	3	0	0	1	1	0	1	0	1	0
Health	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Minorities	28	1	7	2	1	1	1	3	2	1	0	0	0	2	0	1	3	3	0
Education	13	0	1	0	2	2	0	0	1	2	0	0	1	1	2	0	0	0	1
Income	24	0	4	1	2	4	1	2	3	2	0	2	0	0	0	1	1	1	0
Hazard	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Governance	14	0	1	0	0	1	0	0	4	0	0	3	0	0	1	0	1	0	3
Social Factors	13	0	1	1	2	1	0	0	2	1	2	1	0	0	0	0	1	0	1
Other	8	0	1	0	0	0	0	0	1	0	1	0	3	0	0	1	0	1	0

Appendix D: Sources of Number of Potentially Vulnerable People

Appendix D 1: Sources of Number of Potentially Vulnerable People: Netherlands

Characteristic	Indicator	Netherlands	Source Organization
Fewer material and/or financial resources	Children in no car household	Children living in a household with no car	Central Bureau of Statistics
	Older adults no car	Older adults with no access to transportation	Central Bureau of Statistics
	People with disabilities no car	People with disabilities with no access to special transportation	n/a; assumed to be 50% of all with disabilities
	Minorities (ethnic) no car	Minorities (ethnic) with no car registered to their name	Central Bureau of Statistics
	People living in poverty no car	People living in poverty with no car registered to their name (lowest income category)	Central Bureau of Statistics
	Women no car	Women with no car registered to their name	Central Bureau of Statistics
Less physically or mentally capable	Children 0-14 years old	Children 0–14 years old	Primo NH
	Older adults above 65 years old with disabilities	Older adults above 65 years old and having multiple smaller disabilities	Primo NH
	People with disabilities	People with physical, psychological, visual, auditory, speech, or mental disabilities or chronic illnesses; temporary impairments	Primo NH
	Minorities (ethnic) with restrictive clothing	Minorities (ethnic) with restrictive clothing	n/a; assumed to be <1%
	Women with travel restrictions	Women experiencing cultural travel restrictions	n/a; assumed to be 0%
	Pregnant people	Pregnant people	Regional patient consumer platform
Less access to information	Children at schools with no EWS	Children at schools with no EWS	assumed to be 0% based on report
	Older adults with evacuation reluctance	Older adults with experiences that lead to evacuation reluctance	assumed to be 20% based on report
	People with disabilities no EWS	People with disabilities who live in nursing homes where there is no earlier warning for prolonged evacuation time	n/a; assumed to be 100%
	Low or no literacy skills	Low or no literacy skills (entire Dutch population)	Primo NH

	People living in poverty no TV	People who live in poverty and do not own a television	Central Bureau of Statistics
	Women no TV	Women with no access to EWS (television in household)	n/a; assumed 0%
Restricted by commitments	Caregivers children	Caregivers of children	n/a; assumed same as number of children
	Caregivers older adults	Caregivers of older adults	n/a; assumed 25% of number of older adults with a disability
	Caregivers people with disabilities	Have to take care of someone who is physically unable to leave	n/a; assumed same as number of people with impairments
	Place attachment	Place attachment/unwilling to leave	n/a; assumed to be <1%
	People worried for possessions	People who are worried their possessions would be stolen or damaged	Ministry of the Interior and Kingdom Relations
	Caregivers pregnant people	Caregivers of pregnant people	n/a; assumed double the number of pregnant people
	People with pet dependents	People with pet dependents	Wageningen University
Livestock owners	Livestock owners (grazing livestock business and animal husbandry)	Wageningen University	

Appendix D 2: Sources of Number of Potentially Vulnerable People in Japan

Characteristic	Indicator	Japan	Source Organization
Fewer material and/or financial resources	Children in no car household	Children living in a household with no car	n/a; assumed to be same percentage as total amount of children living in poverty
	Older adults no car	Older adults without a driver's license	National Policy Agency
	People with disabilities no car	People with disabilities and no driver's license	National Policy Agency
	Minorities (ethnic) no car	Foreigners without access to a car	n/a; assumed to be 40.1%
	People living in poverty no car	No car available in household (income below the federal poverty line)	n/a; assumed to be 13.2%
	Women no car	Women without a driver's license	National Policy Agency
Less physically or mentally capable	Children 0-14 years old	Children 0–14 years old	Statistics Bureau of Japan
	Older adults above 65 years old with disabilities	People aged 65 or older with a disability (visual, hearing/language, physical, internal)	Ministry of Health, Labour and Welfare
	People with disabilities	People with physical disabilities, mental disability, mental disorders	Ministry of Health, Labour and Welfare
	Minorities (ethnic) with restrictive clothing	Minorities (ethnic) with restrictive clothing	n/a; assumed to be <1%
	Women with travel restrictions	Women experiencing cultural travel restrictions	n/a; assumed to be 0%
	Pregnant people	Pregnant people	CIA World Factbook
Less access to information	Children at schools with no EWS	Children at schools with no EWS	assumed to be 0%
	Older adults with evacuation reluctance	Older adults with experiences that lead to evacuation reluctance	n/a; assumed to be 20%
	People with disabilities no EWS	People with disabilities who live in nursing homes where there is no earlier warning for prolonged evacuation time	n/a; assumed to be 100%
	Low or no literacy skills	Illiterate and having difficulties in daily life	assumed to be 12.6%
	People living in poverty no TV	People who live in poverty and do not own a television	assumed to be <5%

	Women no TV	Women with no access to EWS (television in household)	assumed to be <5%
Restricted by commitments	Caregivers children	Caregivers of children	n/a; assumed same as number of children
	Caregivers older adults	Caregivers of older adults	n/a; assumed 25% of number of older adults with a disability
	Caregivers people with disabilities	Caregivers of people with disabilities	n/a; assumed to be same as number of people with physical disabilities, mental retardation, mental disorders
	Place attachment	Place attachment/unwilling to leave	n/a; assumed to be <1%
	People worried for possessions	People who are worried their possessions would be stolen or damaged	n/a; assumed to be <5%
	Caregivers pregnant people	Caregivers of pregnant people	n/a; assumed double of pregnant people
	People with pet dependents	Number of dogs and cats owned	Interpets Asia Pacific
	Livestock owners	Livestock owners (dairy cattle, beef cattle, hogs and pigs, layers)	Ministry of Agriculture, Forestry and Fisheries

Appendix D 3: Sources of Number of Potentially Vulnerable People in the United States

Characteristic	Indicator	U.S.	Source Organization
Fewer material and/or financial resources	Children in no car household	Children living in a household with no car	n/a; assumed same percentage as total amount of children living in poverty
	Older adults no car	Older adults without a driver's license	U.S. Department of Transportation
	People with disabilities no car	People who have medical/physical problems that make it difficult to leave	National Center for Biotechnology Information
	Minorities (ethnic) no car	Ethnic minorities without household access to a car	University of California
	People living in poverty no car	No car available in the household (income below the federal poverty line) or cannot afford to leave	University of California and National Center for Biotechnology Information
	Women no car	Women without a driver's license	U.S. Department of Transportation
Less physically or mentally capable	Children 0-14 years old	Children aged 0–14 years old	Census Bureau
	Older adults above 65 years old with disabilities	People aged 65 years old or older with a disability	Census Bureau
	People with disabilities	People with a disability	Census Bureau
	Minorities (ethnic) with restrictive clothing	Minorities (ethnic) with restrictive clothing	n/a; assumed to be <1%
	Women with travel restrictions	Women experiencing cultural travel restrictions	n/a; assumed to be 0%
	Pregnant people	Pregnant people	CIA World Factbook
Less access to information	Children at schools with no EWS	Children at schools with no EWS	National Oceanic and Atmospheric Administration
	Older adults with evacuation reluctance	Older adults with experiences that lead to evacuation reluctance	National Center for Biotechnology Information
	People with disabilities no EWS	People with disabilities living in nursing homes where there is no earlier warning for prolonged evacuation time	n/a; assumed to be 100%
	Low or no literacy skills	Lacking basic prose literacy skills (entire U.S. population)	Institute of Education Sciences
	People living in poverty no TV	People who live in poverty and do not own a television	Heritage Foundation

	Women no TV	Women with no access to EWS (television in the household)	n/a; assumed to be 0%
Restricted by commitments	Caregivers children	Caregivers of children	n/a; assumed same as number of children
	Caregivers older adults	Caregivers of older adults	n/a; assumed 25% of number of older adults with a disability
	Caregivers people with disabilities	Have to take care of someone who is physically unable to leave	National Center for Biotechnology Information
	Place attachment	Place attachment (American Indian and Alaskan Native living on reservations)	Census Bureau
	People worried for possessions	People who are worried their possessions would be stolen or damaged	National Center for Biotechnology Information
	Caregivers pregnant people	Caregivers of pregnant people	n/a; assumed double the number of pregnant people
	People with pet dependents	People with pet dependents	National Center for Biotechnology Information
	Livestock owners	Livestock owners (cattle, milk cows, beef cows, hogs and pigs)	Census Bureau

Appendix E: Keywords for Policy Evaluation

This appendix contains the keywords used to evaluate DRM policies from the case study countries. In cases where a keyword had multiple forms, the different forms are described in brackets. In the case of Japanese, there are multiple words describing certain keywords that are more detailed than in English and Dutch, especially in the case of ‘children.’ For these cases, the Japanese laws and policies were searched for the more detailed terms, whereas the Dutch and English laws and policies were searched for the terms in their respective languages. The translation of these detailed Japanese terms is provided in English.

Appendix E 1: Keywords Used for Policy Evaluation in Dutch, English, and Japanese

Dutch	English	Japanese (kanji – furigana)
Ramp	Disaster	災害 さいがい
Crisis	Crisis	危機 きき
Overstroming	Flood	洪水 こうずい
Hoogwater	High water	高水 たかみず
Evacuatie	Evacuat- (-ion, -e)	避難 ひなん
Dijkdoorbraak	Levee breach	破堤 はてい
Kwets- (-baar, -bare)	Vulnerab- (-ility, -le)	脆弱 ぜいじゃく
Kwets- (-baar, -bare)	Vulnerab- (-ility, -le)	弱い よわい
	Vulnerable person	弱者 じゃくしゃ
Zelfred- (-zame, -zaamheid)	Self-relian- (-t, -cy)	自助 じじょ
Zelfred- (-zaam, -zamen)	Self-reliant	自立 じりつ
Vrouw	Women	女性 じょせい
	Widow	寡婦 かふ
	Mother with dependent	母子 ぼし
Zwanger	Pregnan- (-t, -cy)	妊娠 にんしん
Kind	Child	子供 こども
(zuigeling)	Infan- (-t, -cy) (Age 1–kindergarten)	幼児 ようじ
	(Age under 1 year old)	乳児 にゅうじ
	(Child aged 6–12 years old)	児童 じどう
	(Adolescent aged 12–15 years old)	生徒 せいと
	(Child/adolescent aged 6-18 years old)	少年 しょうねん
Ouder- (-dere, -deren)	Older	年配の ねんぱいの
Ouder- (-dere, -deren)	Older	お年より おとしより
Bejaard	Elder- (-ly)	年上 としうえ
Bejaard	Elder- (-ly)	高齢 こうれい
Geriatr- (-sch, -sche)	Geriatr- (-c, cs)	高齢 こうれい
Arm	Poor	貧しい まずしい
Finan- (-cien, -cieel, -ciele)	Finan- (-cial, -ces)	財 ざい
Inkomen	Income	収入 しゅうにゅう
Armoede	Poverty	貧困 ひんこん
Laag inkomen	Low income	低所得 ていしょとく

Handicap	Disab- (-ility, -led)	身体障害 しんたいしょうがい
Handicap	Handicap	障害 しょうがい
Minderheid	Minorit- (-y, -ies)	小数 しょうすう
Etnisch	Ethnic	民族 みんぞく
Cultu- (-reel, -ur)	Cultur- (-al, -e, -es)	文化 ぶんか
(Ge-) -letterd- (-heid)	Litera- (literate, literacy)	識字 しきじ
(Ge-) discrimin- (-eerd, -atie)	Discriminat- (-ed, -ion)	被差別者 ひさべすしゃ
Buitenlander	Foreign (-er)	外国人 がいこくじん
	Immigrant	移民 いみん
Vreemdeling	Stranger	よそ者 よそもの
Patient	Patient	病人 びょうにん
Arbeidsongeschikt	Incapacitated person	禁治産者 きんちさんしゃ
Illega- (-al, -len, -le)	Illegal immigrant	不法専用者 ふほうせんようし ゃ
Speciale behoefte (-n)	Special needs	要援護者 ようえんごしゃ
	Nursing	介護 かいご
	People who need assistance during disasters	災害時要援護者 さいがいじよ うえんごしゃ

Appendix F: Sources of DRM Policies

Appendix F 1: Sources of DRM policies

Policy	Year	Source
The Universal Declaration of Human Rights	1948	Un.org
Dutch Constitution	1815	Wetten.overheid.nl
European Flood Directive	2007	www.eur-lex.europa.eu
Water Law	2009	Wetten.overheid.nl
Law Safety Regions	2010	Wetten.overheid.nl
Delta Law	2012	Wetten.overheid.nl
Law of Population Displacement (inactive)	1952	Wetten.overheid.nl
National Response Plan High Water and Floods	2007	Rijksoverheid.nl
Guidance Information for Evacuations in Flood Events and Flooding	2008	Burgemeesters.nl
National Crisis Plan High Water and Floods	2008	Nifv.nl
National Guidance Manual for High Water and Floods	2010	Helpdeskwater.nl
Policy Plan Rotterdam Rijnmond	2012	Infopuntveiligheid.nl
Regional Crisis Plan Rotterdam Rijnmond	2009	Infopuntveiligheid.nl
Regional Risk Profile Rotterdam Rijnmond	2012	Infopuntveiligheid.nl
Policy Plan Twente	2012	Infopuntveiligheid.nl
Regional Crisis Plan Twente	2011	Infopuntveiligheid.nl
Regional Risk Profile Twente	2011	Infopuntveiligheid.nl
Constitution of Japan	1947	www.kantei.go.jp
Disaster Countermeasures Basic Act	2013	Adrc.asai, additional translations
River Law	1999	www.idi.or.jp
Flood Fighting Law	2005	www.idi.or.jp
Committee for Policy Planning on Disaster Management Final Report	2012	www.bousai.go.jp
Action Policies for Supporting Evacuation Activities of Persons Needing Assistance During Forced Evacuations	2013	http://whrm-kamoto.com
Niigata Prefecture Regional Disaster Management Plan (Wind & Flood)	2013	www.pref.niigata.lg.jp
Ibaraki Prefecture Regional Disaster Management Plan (Wind & Flood)	2010	www.pref.ibaraki.jp
Sanjo City Flood Disaster Manual	2005	www.city.sanjo.niigata.jp
Sanjo City Area Disaster Prevention Plan	2012	www.city.sanjo.niigata.jp
Chikusei City Local Disaster Management Plan [summary version]	2013	http://whrm-kamoto.com
Disaster Prevention Measures at Chikusei City	2012	http://whrm-kamoto.com
Constitution of the United States of America	1787	Servat.unibe.ch
Declaration of Independence	1776	Archives.gov
Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act)	2013	Usa.gov
Louisiana Homeland Security and Emergency Assistance and Disaster Act	2009	Gohsep.la.gov

National Response Framework	2013	Fema.gov
National Incident Management System	2008	Fema.gov
Governor's Office of Homeland Security and Emergency Preparedness Strategic Plan	2013	Gohsep.la.gov
State of Louisiana Emergency Operations Plan	2009	Gohsep.la.gov
Florida State CEMP Basic Plan	2012	Floridadisaster.org
Orleans Parish 2010 Hazard Mitigation Plan Update	2010	Nola.gov
Current Local Mitigation Strategy Document Hillsborough County	2009	Hillsboroughcounty.org

Appendix G: Overview of Selected Measures in DRM Policies

Articles from the Universal Declaration of Human Rights relating to human rights and disaster management:

Article 1.

All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood.

Article 2.

Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. Furthermore, no distinction shall be made on the basis of the political, jurisdictional or international status of the country or territory to which a person belongs, whether it be independent, trust, non-self-governing or under any other limitation of sovereignty.

Article 3.

Everyone has the right to life, liberty and security of person.

Article 22.

Everyone, as a member of society, has the right to social security and is entitled to realization, through national effort and international co-operation and in accordance with the organization and resources of each State, of the economic, social and cultural rights indispensable for his dignity and the free development of his personality.

Article 25. (1)

Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control.

Articles from the Dutch Constitution relating to human rights and disaster management:

Article 1.

All persons in the Netherlands shall be treated equally in equal circumstances. Discrimination on the grounds of religion, beliefs, political opinion, race, sex or on any other grounds whatsoever shall not be permitted.

Article 21.

The concerns of the government are focused on the habitability of the land and the protection and improvement of the living environment.

Text in the Guidance Information for Evacuations in Flood Events and Flooding concerning vulnerable people:

p.29: It appears during evacuations less than 10% of the population is non-self-reliant (or: unable to evacuate by themselves), while the government often places this percentage much higher and therefore prepares much

too much facilities. For vulnerable groups it must be taken into account with the fact that the social workers are often also inhabitants of the area to be evacuated, and therefore need to take action simultaneously. Special groups during evacuations are (former) psychiatric patients and the elderly. They appear to be the largest risk groups, because they have the largest chance of remaining afflicted by the high water situation. Another non-self-reliant group consists of detainees. Evacuation of non-self-reliant people, livestock and businesses is often scheduled during the voluntary evacuation period. However, this leads to crowdedness, as the peak crowds of 'ordinary' citizens also occurs in this period. Citizens are difficult to evacuate unless every family member is present. Usually it is calculated that 10% to 15% of citizens are non-self-reliant. With the increasing aging population this percentage is likely to grow. Research in advance in the own regions which population groups can be classified as 'non-self-reliant' and schedule the necessary steps and communication to evacuate them outside of the area. Take into account the time constraints (rapid flooding of coastal areas and lakes versus the gradual flooding of rivers). Special attention must be given to entrepreneurs in the area.

p.40: First of all, the evacuation was announced shortly in advance and there were little time and few resources to achieve a complete evacuation. In addition, the number of non-self-reliant people was large, partly because people didn't have the resources (money, transportation) to evacuate.

p.58: vulnerable target groups

p.59: vulnerable groups. During a flood scenario various vulnerable groups provide a complicating factor in crisis management and emergency response. The amount of self-sufficiency varies per group. In particular, the following groups require specific attention, both in crisis and communication: detainees; hospitals; nursing homes; people who live alone and are non-self-reliant; immigrants who do not/not adequately have a command of the Dutch language; strictly religious people who do not own a radio and television.

p.60: Not only will residents have to be evacuated, even animals will have to find another place to stay. The owners of these animals will need specific information. Examples include: livestock; pets; zoos and pet shops; breeding farms; animal shelters; petting zoos etc.

p.68: In case of non-self-sufficient groups it is preferred that they do not return simultaneously with the massive general population. After consultation it may be decided to organize their return before or after the general decision to return.

p.69: Non self-reliant people in the area (residents of nursing homes etc.)

p.74: Non self-reliant people in the area (residents of nursing homes etc.)

- Shall obtain information by themselves through national media, regional (day) magazines and websites of the municipality, region and crisis.nl
- Executives wish to be informed early on concerning evacuation scenarios
- Residents are preferably informed step by step through the centers where they reside, which requires coordination with other communication initiatives

p.74: There is little to no consideration for the position of businesses and specific groups (non-self-reliant people, farmers) in (provincial, regional and municipal) contingency and emergency response plans.

p.77: Non self-reliant people in the area (residents of nursing homes etc.).

- Indicate what the policies are for deciding upon evacuation, so that residents can anticipate decision-

making.

- Indicate that government assistance focuses on non-self-reliant citizens.
- In communication, take into account that especially the elderly and families with children will take advantage of shelter locations.
- Give care providers who take care of non-self-reliant people time to also arrange their own home situation. They are also active in the area, and thus need to receive the opportunity to take action themselves.
- Pay particular attention to (former) psychiatric patients, the elderly and prisoners.

Text in the National Crisis Plan High Water and Floods concerning vulnerable people:

p.142: On the level of receivers: Consider extra vulnerable people in society when concerning high water and floods. Less self-reliant people, entrepreneurs and more specifically the agricultural businesses and animal keepers are often stricken worse and deserve specific attention in communication.

p.131: Measures after evacuation: medication, cash money

Text in the National Guidance Manual for High Water and Floods concerning vulnerable people:

p.34: However, the more time is available, the more can be done, even during a coastal threat, to for example bring vulnerable groups into safety and to instruct the population

Text in the Policy Plan Rotterdam-Rijnmond concerning vulnerable people:

Scenario 4, Storm and high winds: less self-reliant people

Scenario 5, Nursing home fire: less self-reliant people

Scenario 24, Animal infection: pregnant women and children

Scenario 14, Loss of electricity: vulnerable groups of people

Text in the Regional Crisis Plan Rotterdam-Rijnmond concerning vulnerable people:

p.64: Decontamination scenario: ethnic differences might lead to problems during separate showers

p.78: Vulnerable buildings: hospitals, GGD, nursing home for electricity/power loss

Text in the Regional Risk Profile Rotterdam-Rijnmond concerning vulnerable people:

Scenario 1: estimated 10% or 40.000 non-self-reliant people

Scenario 2: non self-reliant people

Scenario 4, lack of power: attention for provisions for non-self-reliant people necessary

Scenario 5, nursing home: 250 less/non-self-reliant people

p.21: scenario heat wave: (physically) vulnerable people: elderly, chronically ill, people who are socially isolated, people who are overweight, children, people on holiday

p.23: vulnerable buildings: nursing homes, hospitals, healthcare facilities, correctional facilities, TBS clinics

p.23: not or less self-reliant people: e.g. patients in hospitals and nursing homes, prisoners in prisons and

handicapped in institutions

p. 37: building with vulnerable civilians: retirement home, crèche

p.74: heart patients, pregnant women

p.80: children under 5 years old, elderly above 60 years old

Text in the Policy Plan Twente concerning vulnerable people:

p.19: vulnerable people, the group of less self-reliant people, physical or mental impairments

p.22: less self-reliant people, increasing self-reliance

p.34: Scenario poisonous compounds: stimulate communication for less self-reliant people

p.35: Scenario panic during events: knowledge and opportunities of self-reliance

Text in the Regional Crisis Plan Twente concerning vulnerable people:

p.4: Develop initiatives to improve the self-reliance of civilians in case of fire

p.7: Shelter region during flooding of the Randstad (West)

p.23: Public Care: shelter and care of homeless, evacuees and animals, treatment of injured; provide basic needs (food, water, utilities); special funeral care (mass burials, social bereavement)

Text in the Regional Risk Profile Twente concerning vulnerable people:

p.11: Note: no floods are thought possible in the own region, although there could be water problems, high water and incidents after abundant rainfalls

p.29: a.o. Nursing homes, monasteries, abbeys, prisons, elderly resorts, asylum seeking centers, elementary schools, high schools, nurseries, clinics, hospitals

p.30: less self-reliant people

p.32: vulnerable buildings have (large groups of) less self-reliant users

p.35: Initially the focus of shelter and care lies on self-sufficient people. In other words, the people who are in such a "normal" position that enables them to bring themselves into safety in times of need. The other groups are non-self-sufficient people, animals and valuable goods such as art treasures and national heritage.

p.39: elderly, (home) nursing or supply of medication to those in need of care or elderly

p.41: people who are not self-sufficient or depend on medical aid

p.42: severely injured or chronically ill

p.45: type of buildings in which there are less self-sufficient people, for example hospitals, retirement homes, nursing homes, elementary schools and nurseries

p.45: vulnerable users

p.53: vulnerable groups who live at home and require medical equipment

p.66: Disease wave: severely ill or elderly

p.73: groups of vulnerable people

p.76: vulnerable locations: hospitals, schools, retirement homes

Articles from the Japanese Constitution relating to human rights and disaster management:

Preamble.

We recognize that all peoples of the world have the right to live in peace, free from fear and want.

Article 13.

All of the people shall be respected as individuals. Their right to life, liberty, and the pursuit of happiness shall, to the extent that it does not interfere with the public welfare, be the supreme consideration in legislation and in other governmental affairs.

Article 14.

All of the people are equal under the law and there shall be no discrimination in political, economic or social relations because of race, creed, sex, social status or family origin. Peers and peerage shall not be recognized. No privilege shall accompany any award of honor, decoration or any distinction, nor shall any such award be valid beyond the lifetime of the individual who now holds or hereafter may receive it.

Article 25.

All people shall have the right to maintain the minimum standards of wholesome and cultured living. In all spheres of life, the State shall use its endeavors for the promotion and extension of social welfare and security, and of public health.

Articles in the Japanese Disaster Countermeasures Basic Act concerning vulnerable people:

(Exercising of care in the interest of disaster prevention in enforcing appropriate measures)

Article 8.

Both the State and the local government should exercise care so that all measures which they will carry out will contribute to preventing disaster which harms the land, the life and limb of the citizens and their property, be they specifically addressed to disaster or not.

Article 8. 2.

In the interest of preventing a disaster from occurring and of blocking the spread of a disaster that has occurred, the local government as well as the State shall particularly endeavor to carry out matters listed below:

Article 8. 2. (14)

relating to necessary disaster prevention measures for the elderly, the handicapped, infants and others requiring special care.

Article 42 (2)

Area Residents, Etc. may make proposals to the municipal disaster prevention council to jointly describe an Area Disaster Prevention Plan in the municipal government's regional disaster prevention plan. In such case, a rough plan regarding the Area Disaster Prevention Plan for the proposal must be attached.

(Preparation of Lists of Persons Needing Assistance During Forced to Evacuations)

Article 49 (10)

The mayor of the city or town or the head of the village shall endeavor to ascertain those persons from among persons requiring special care, who are living in the said city or town or village, who require special care, who have difficulty evacuating on their own when a disaster has occurred or is likely to

occur, as well as those who need special support in order to ensure their smooth and prompt evacuation (hereinafter referred to as “Persons Needing Assistance During Forced Evacuations”) and is also required to prepare lists (...) that are to serve as the basis for supporting the evacuation of Persons Needing Assistance During Forced Evacuations, the determination of their safety, and other necessary measures to be taken to protect the lives and bodies of Persons Needing Assistance During Forced Evacuations (hereinafter referred to as “Evacuation Support, Etc.”) as described under the regional disaster prevention plan

(Use and Provision of List Information)

Article 49 (11) 2.

The mayor of the city or town or the head of the village shall, in preparation for the occurrence of a disaster and to the extent necessary for implementing Evacuation Support, Etc., provide List Information to fire-fighting agencies, prefectural police, welfare volunteers commissioned pursuant to the Commissioned Welfare Volunteers Law (Act No. 198 of 1948), local social welfare council provided in Article 190 paragraph 1 of the Social Welfare Act (Act No. 45 of 1951), voluntary disaster prevention organizations, and other parties engaged in the implementation of Evacuation Support, Etc. (in the subsequent paragraph, referred to as “Parties Related to Evacuation Support Activities, Etc.”) as provided under the regional disaster prevention plan. However, unless otherwise specially provided for in the regulations of the said municipal government, the same shall not apply in cases where consent from the individual in question (meaning a specific individual identified by the said List Information, the same shall apply in the subsequent paragraph) concerning the provision of his or her List Information cannot be obtained.

(Confidentiality Obligation)

Article 49 (13)

Persons to whom List Information is provided pursuant to the provisions under Article 49 (11), paragraph 2 and paragraph 3 (if the person is a corporation, its officers and directors) or its staff members, other persons involved in the implementation of Evacuation Support, Etc. using the said List Information, or persons under those persons shall not divulge any confidential information obtained with respect to Persons Needing Assistance During Forced Evacuations in relation to the said List Information without a justifiable reason.

(Emergency measures and responsibility for their implementation)

Article 50.

Emergency measures for disaster shall be taken with respect to the matters listed below for the purpose of anticipating a disaster when there is danger of occurrence, or of conducting emergency rescue work when a disaster has occurred so as to prevent the spread of the disaster:

Article 50. (4)

matters related to emergency instruction of children and school children affected by disaster.

Articles in the Japanese Flood Fighting Law concerning vulnerable people:

(Measures for Securing the Smooth and Prompt Evacuation in the Flood Assumed Areas)

Article 15 (3)

Where there are any underground shopping complexes, etc. (this refers to the underground shopping complex and other facilities established underground and used by unspecified and large numbers of people. Same applies hereafter.), or any facilities used mainly by elderly people, people with disabilities, infant and toddlers, and other people who especially require care from the perspective of disaster prevention, and which are considered necessary to ensure the smooth and prompt evacuation of the users of such facilities at the time of cataract, the names and locations of such facilities

Article 15 (3) 3

The owners or administrators of the underground shopping complex, etc., the name and location of which have been specified in the municipal disaster fighting planning under the provision of Paragraph 1, must by themselves or jointly, in accordance with the ordinance of the Ministry of Land, Infrastructure and Transport, prepare a plan in relation to any necessary measures for ensure the smooth and prompt evacuation of the users of such underground shopping complex, etc. at the time of the occurrence of a cataract, and report to the head of the municipality, and also publish, such plan.

Commentary in the Japanese River Law concerning aging societies:

Preface

4.2 Increasing damage potential of floods and sediment disasters

(3) Risk of catastrophe

(...) As society ages, the number of people particularly vulnerable to disaster is expected to grow. A catastrophic flood or sediment disaster, therefore, must not be allowed to occur in urban areas. (...)

4.3 Increasing frequency of droughts

(4) Social structure vulnerable to drought

(...) The establishment of lifestyles dependent on intensive use of water and the growing number of elderly people who are vulnerable to water shortage have made cities particularly susceptible to drought. (...)

Selected text in the Basic Disaster Management Plan regarding vulnerable people:

Part 1, Chapter 2 Basic concept of disaster prevention and outline of measures

(2) In addition to respond for the needs of affected person flexibly and promptly, respond appropriately for the various needs arise from the circumstances of affected persons such as age, sexuality, with or without disability, including consideration for persons need special consideration (hereinafter referred to as persons need assistance) such as elderly or a person with disability.

Part 1, Chapter 3 Social Structure change related to disaster prevention and response

It has been observed that there is an increase of the number of persons needing assistance including elderly, persons with disability, or foreign national.

It is required to promote the involvement of the women, elderly and persons with disability in the decision making process of policy and principle related to disaster prevention including the appointment for a member of a regional disaster prevention committee, and to establish the

disaster prevention organization that is reflecting the various perspectives including gender equality to improve the disaster prevention capability of the region by implementation of disaster prevention measures that reflects the various point of view from the citizens living in the region.

Part 2, Chapter 1, Section 3, 2 Promotion and training of knowledge on disaster prevention

(3) In the implementation of the education and training of knowledge on disaster prevention, it is required to promote the establishment of the support system for the persons need assistance in the region and to give sufficient consideration for the perspective both from men and women including the different needs between men and women in the affected condition from disaster with sufficient consideration for the person need assistance including elderly, person with disability, foreign national, infant, and pregnant woman.

Part 2, Chapter 2, Section 6, 2 Evacuation centre

(2) (...) it is required to make effort for the operation of the evacuation centre with consideration for the needs of women and families with children including a space for drying clothes for women, a dressing room, a nursing room, providing sanitary products and underwear for women by women, and ensuring the safety in the evacuation centre including security patrol and providing security buzzers.

Part 2, Chapter 2, Section 6, 5 Consideration for persons needing assistance

In the disaster occurrence, regardless of agreement of the person need assistance for evacuation activity, municipalities shall use the list of persons need assistance for evacuation activity effectively to facilitate for the evacuation support and prompt safety confirmation of the persons need assistance for evacuation activity.

Selected text in the Committee for Policy Planning on Disaster Management Final Report concerning vulnerable people:

p.13 (Chapter 2 Basic principles of disaster management policy-Thorough pursuit of "disaster reduction" in all areas of disaster countermeasures) - React with flexibility and agility toward changes in needs; recognizing diversity in disaster affected people: As time passes after disaster occurrence, the needs of the affected people change. Some changes are brought by changes in climate or surrounding environment, and others arise from the efforts to recover normal life. Also necessary is consideration for the diversity of affected people including age, gender, disabilities, nationalities, etc. (...)

p.15: In time of a large-scale disaster, a mechanism to provide appropriate information to foreign countries using overseas media and internet should be deliberated in order to disseminate information on the safety of Japan and to ensure economic credibility.

p.15/16: [3] Safe and secure evacuation: (...) Many elderly and disabled persons must evacuate to evacuation sites immediately after the disaster; therefore, human resources should be assigned to evacuation sites for prompt and appropriate transportation of elderly and disabled persons to welfare evacuation centers. Support systems run by various actors, including local voluntary disaster management organizations, social workers for adults and children, nursing-care service providers and volunteers in the communities, should be put in place for smooth evacuation of people

requiring special assistance during a disaster. (...) The communication and collaboration system between and among municipal governments and organizations in the communities including kindergartens, day care centers, Nintei Kodomo-en (authorized child care centers) should be improved to enable safe and secure evacuation of preschool children.

p. 18/19: [5] Life-saving/healthcare activities:

- (...) DMAT training sessions should include education in transportation of patients with chronic conditions, and effective performance should be secured through joint training with relevant organizations so as to fulfill the medical needs from the people in affected area.

p.22: [2] Life in evacuation centres, shelters, etc.: Women should participate in the operation of evacuation centres as responsible roles, in order to gain better perspectives in caring for the elderly persons, disabled persons, expectant/nursing mothers, families with infants/children, etc., as well as to promote gender equality. At the same time, it is necessary to conduct surveys to understand the inclinations of affected people so as to cope with changes in needs, and to set up consultation spaces to collect opinions from affected people who, in some cases, tend to refrain from expressing their opinions. Also, guidelines on fundamentals of operation of evacuation centres should be devised so that necessary standards can be achieved with respect to the basic operation measures of evacuation centres.

p.23/24: [3] Smooth provision of goods to the affected areas: Stockpiling, securing and transporting goods should be conducted while taking into consideration differences in needs of the elderly persons, disabled persons, expectant/nursing mothers, families with infants/children, and those with dietary restrictions, and any other needs, as well as the differences in needs between men and women. Stockpiling and transporting food, serving meals, and any other food-related matters should be overseen by dietitians.

p.24: [5] Securing housing: - In addition to the move from shelters to emergency temporary housing, fair, effective and efficient methods to secure housing should be deliberated with consideration to the financial capabilities and needs of affected people; specifically, reconstructing homes, constructing public housing for affected people, utilizing private rental accommodations and other methods should be combined.

p.25: [7] Ensuring health, including mental care for the affected people: Health issues tend to be prolonged due to changes in the living environment for the elderly people and others. Such issues include an increase in incidence and aggravation of disuse syndrome and lifestyle diseases as well as mental issues. A system of individual visit by clinical and public health nurse teams, along with arrangements for consultation rounds at nearby locations where evacuees can receive health consultations, should be put in place.

p.25/26: [8] Recovering livelihoods by securing jobs, promoting industrial development, etc.: For disaster affected children, provision of mental healthcare, utilization of the kinship foster care system and family homes, support for school attendance and other measures should be taken (...)

p.26-27: [9] Measures for people requiring special assistance those with special needs during a disaster

- Laws and regulations pertaining to personal information protection are often seen as obstacles to

making lists of people requiring assistance during a disaster. This relevance to laws and regulations should be reviewed and organized.

- During the Great East Japan Earthquake, there were insufficiencies in support provided to disabled persons, the elderly persons, foreign nationals, expectant/nursing mothers, and others with special needs in various fields including information provision, evacuation, and living status during evacuation. Based on this, evacuation support guidelines for people requiring assistance during a disaster should be reviewed for each step of the evacuation process, and should include information provision, stockpiling/securing/transporting of relief supplies, evaluation of living situations at shelters, and relocation to temporary housing.
- Deliberation of a system wherein social welfare personnel providing daily care for people with special needs can be involved in evacuation support, securing of fixing household furniture on walls or ceiling, and undertaking of other emergency measures is necessary.

[10] The perspective of gender equality

- Issues pertaining to each phase of supporting affected people, emergency response measures, recovery/reconstruction, disaster preparedness on the Great East Japan Earthquake, should be understood from the gender equality perspective, and based on this understanding, necessary measures/response in regard to gender equality during disasters should be summarized and disseminated.
- In supporting affected people, it is important to focus on the perspective of women who tend to care for the elderly and children on a daily basis to meet the special needs of the elderly persons, disabled persons, infants, etc. Gender equality in decision making pertaining to disaster management should be promoted through measures such as making the women-men ratio of disaster management division employees of national and local governments similar to or greater than the ratio for that of all employees of each government. At the same time, gender equality should also be promoted in decision making pertaining to shelters, emergency temporary housing, etc.

p.27/28: [11] Creating infrastructure for supporting the affected people: (...) During this process, the organizing operating bodies in shelters comprised of residents, and specifically including women and young people, should also be deliberated. (...)

p.40/41: (Section 3 Multifaceted efforts to prevent disasters)

(2) Inheritance and development of the disaster culture, [1] Disaster education / learning, and succession of lessons learned: Disaster education/learning is necessary for children as well as local residents and working people. This will help to improve the disaster management capability of regions. Enhancement of disaster education/learning should be achieved through utilization of public seminars, workshops, and activities of organizations involved with disaster management such as women's fire-safety clubs and youth fire-fighting clubs. In carrying out such activities, knowledge and experience of fire-fighting teams and flood control teams, which play the central role in local disaster management activities, as well as local experts that have accurate knowledge on disasters should be utilized.

Selection of text in the Action Policies for Supporting Evacuation Activities of Persons Needing Assistance During Forced Evacuations concerning vulnerable people:

Foreword

[1] Obligate municipal governments to prepare lists of those needing assistance during forced evacuations and to allow them to use necessary personal information when preparing such lists.

[2] Provide information to those concerned with evacuation support activities, such as firefighting agencies and commissioned welfare volunteers, upon obtaining direct consent from those residents needing assistance during forced evacuations.

[3] In cases where a disaster has occurred or is likely to occur, regardless of whether consent has been obtained from the person, allow the provision of information contained on the lists to those supporting evacuation activities and other persons.

Part I, Matters to be Addressed in Accordance with the Revised Disaster Countermeasures Basic Law

Chapter 2 Preparation of Lists of Persons Needing Assistance During Forced Evacuations, Etc.

2. Preparation of Lists of Persons Needing Assistance During Forced Evacuations

(1) Scope of Persons Needing Assistance During Forced Evacuations

(...) It is presumed that judgments regarding the ability or inability to evacuate with respect to persons requiring special care, such as the elderly and the disabled, must be made with a focus mainly on [1] the ability to acquire disaster-related information, such as warnings, evacuation advisories and orders, etc., [2] the ability to make independent judgments regarding the necessity to evacuate, the method of evacuation, etc., [3] the physical ability necessary for engaging in evacuation procedures.

[Example case of City A with respect to persons having difficulties evacuating on their own]

Of those persons having their basis for life lie in their homes, persons falling under the following requirements

[1] A person who has received a long-term care need certification of level 3 to 5

[2] A physically disabled person having type 1 of the identification booklet for people with physical disability level 1 or 2 (Comprehensive level) (excluding those falling under the above only for heart and kidney function disorder)

[3] A person with mental disabilities having an identification booklet for people with developmental disabilities A

[4] A person with an identification welfare card for people with mental disabilities level 1 or 2 who lives in a single household

[5] A person with an intractable disease receiving livelihood support from a city

[6] A person other than the above for whom support is deemed necessary by a residents' association

As for whether a person specially needs support for the purpose of ensuring smooth and prompt evacuation, the existence or nonexistence of a family member living with the person can be one requirement. However, even if a person has a family member living with him or her, there are cases where evacuation is difficult, such as where the person may be alone during certain times of the day, etc. and where the caretakers are elderly. Therefore, it is not appropriate to exclude persons from Persons Needing Assistance During Forced Evacuations solely because they have family members living with them.

(3) Backing up Lists of Persons Needing Assistance During Forced Evacuations

Considering that the functions of municipal governments may be extremely burdened depending of the scale of the disaster, be sure to establish a backup system for Lists of Persons Needing Assistance During Forced Evacuations, by using cloud computing for data management, in collaboration with prefectural governments, etc. Also, in preparation for blackouts resulting from a disaster, etc., in addition to management by electronic media, be sure to keep the latest information in paper form.

4. Provision of List Information to Parties Related to Evacuation Support Activities, Etc. in Advance

(...) the responsible departments of municipal governments are expected to directly approach Persons Needing Assistance During Forced Evacuations by mail or through door-to-door visits. (...)

(...) Additionally, in certain cases, such as where a person has no ability judge the consequences of consenting to the handling of personal information due to severe dementia, disability, etc., it is permitted to provide List Information externally if consent is obtained from a person with parental authority, a legal representative, etc.

- (...) <Example measures taken by municipal governments>

Guidance is to be provided so that Lists of Persons Needing Assistance During Forced Evacuations are kept in a place that can be locked.

Chapter 3 Utilization of Lists of Persons Needing Assistance During Forced Evacuations in the Event of a Disaster, Etc.

1. Communication of Evacuation Information

(1) Announcement and Communication of Evacuation Preparation Information, Etc.

(...) Ensure to use words, expressions, explanations, etc. that are easily understandable even to the elderly, the disabled, etc. so that information can be communicated to them in an accurate manner. Ensure to be aware of the fact that even among people with identical disabilities, the method for communicating necessary information, etc. may vary. (...)

(2) Communication of Information Through the Utilization of Various Measures

(...) Further, in order for Persons Needing Assistance During Forced Evacuations to be able to obtain information themselves, make sure to communicate information utilizing a variety of measures, such as by utilizing the communication of disaster information to devices, etc. that support daily life. <Example cases of communicating information>

- Hearing impaired person: Dissemination of disaster information by fax, Information receiving equipment for hearing impaired person
- Visually impaired person: A mobile phone that reads our received emails.
- Physically handicapped person: A mobile phone equipped with a freehand device
- Others: Transmission by mailing list, etc., Subtitled broadcasting, explanatory broadcasting (television program using 2 or more voices, such as a second audio program and two language broadcasting: sound multiplex broadcasting) and sign language broadcasting, Provision of information through the internet, such as the use of SNS (Social networking service)

2. Evacuation Support for Persons Needing Assistance During Forced Evacuations

(2) Measures for Securing the Safety of Parties Related to Evacuation Support Activities, Etc.

(...) After that, in addition to ensuring that each of the Persons Needing Assistance During Forced Evacuations understands the utilization method, significance, etc. of the system of Lists of Persons Needing Assistance During Forced Evacuations, it is also expected for them to understand that Parties Related to Evacuation Support Activities, Etc. will attempt to help at any cost, but that there is a possibility they may not be able to help them.

(4) Evacuation Support for Persons Who Have Disagreed to the Provision of Lists of Persons Needing Assistance During Forced Evacuations During Normal Times

[1] (...) As such, municipal governments may request Parties Related to Evacuation Support Activities, Etc. and other persons, to cooperate in providing support to the greatest extent possible, even to those who have not agreed to the provision of information, in particular, where, in the disaster, such as in the case of a storm and flood, there is extra time to evacuate. (...)

4. Response to Persons Needing Assistance When Forced to Evacuate Both at the Evacuation site and Thereafter

(...) it is necessary to carry out support for Persons Needing Assistance During Forced Evacuations following their evacuation.

Part II, Matters to be Addressed to Further Support Evacuation Activities

Chapter 5. Enhancement of Joint Support in Relation to Evacuation Support Activities

In order to carry out Evacuation Support, Etc. smoothly and promptly in the event of a disaster, it is necessary to enhance disaster reduction capabilities in the area during normal circumstances, such as by building relations that would allow residents to know each other by sight. (...)

5. Disaster reduction drills

(...) In addition, when implementing disaster prevention drills with the participation of Persons Needing Assistance During Forced Evacuations, it is appropriate to try to enhance disaster awareness of each of the Persons Needing Assistance During Forced Evacuations, by providing pamphlets, etc. concerning disaster prevention in Braille or in enlarged characters, or audio pamphlets, and by preparing such pamphlets, etc. with easy to understand contents, for the purpose of ensuring the smooth evacuation of Persons Needing Assistance During Forced Evacuations in the event of a disaster.

Selected text in the Niigata Prefecture Regional Disaster Management Plan (Wind & Flood) concerning vulnerable people:

Chapter 1 Section 1 Objective of plan establishment

7 (1) In this plan, the term “people who need assistance during disaster” refers to people who have trouble getting necessary information and are limited in taking action by themselves during disaster, such as elderly, injured, sick, pregnant, infant and foreign people.

Chapter 1 Section 2 Principle of responsibility and documentation or work on people and organizations related to disaster prevention

(2) b Consideration shall be taken, in developing and executing plans, for plans to be appropriate from the viewpoint of gender equality.

Chapter 1 Section 4 Social conditions in Niigata Prefecture

4 Changes of and responses to social structures concerning disaster management

(2) The number of people who need assistance during disaster, such as the elderly (especially those living alone), the handicapped and foreign people are increasing. (...) In this context, facilities for people who need assistance during disaster shall be instructed to be built in areas of low disaster risk and shall be improved in the safety against disaster. In addition, information on such people including their whereabouts shall be acquired in normal times so that evacuation guidance, safety confirmation and other measures can be carried out promptly when a disaster occurs.

Chapter 2 Section 1 Plan for disaster management education

1. (2) b The general public shall understand the conditions of people who need assistance during disaster in normal times so that they should be able to provide necessary assistance for such people in communities and work places.

Chapter 2 Section 29 Establishment of evacuation systems

4 (5) b Considerations for designating evacuation and other sites

(g) Cities, towns and villages shall endeavor to equip planned evacuation sites with necessary facilities including air conditioners and western-style toilets for people who need assistance during disaster, such as the elderly, the handicapped, the infant and pregnant women, in addition to communication and other facilities like water storage tanks, wells, temporary toilets, mats, emergency power generators and satellite phones. (...)

(5) d (b) Welfare evacuation shelters shall be barrier-free facilities with spaces and equipment necessary for people who need assistance during disaster to live there as evacuees.

Chapter 2 Section 30 Plans to ensure the safety of people who need assistance during disaster

1 (1) d Groups associated with foreign people, such as international exchange associations, companies with foreign employees, schools with foreign students and other groups having business to do with foreign people, shall endeavor to educate foreign people with disaster knowledge to prevent them from being isolated during disaster due to differences in language, living customs and awareness towards disaster prevention. (...)

1 (1) e Local residents, neighborhood associations, local voluntary disaster management groups and other relevant groups shall endeavor to establish systems to ensure the safety of people who need assistance during disaster by developing evacuation assistance plans, i.e., individual evacuation plans to help each of such people in cooperation with all community members with help from cities, towns and villages, disaster prevention organizations, nursing-care insurance businesses, social welfare and other facilities.

2 (1) Local residents play an important role in information provision, evacuation guidance and other actions for people who need assistance during disaster, especially those at home. For this reason, all community members shall be aware of this role from normal times and shall provide assistance for such people in cooperation with cities, towns and villages, local voluntary disaster management groups, social workers, neighborhood associations and other relevant groups.

3 (3) c (...) It shall establish systems to support cities, towns, villages and other organizations for helping people with visual or hearing impairment, who have difficulty acquiring necessary

information, by using Braille, larger letters, audio devices, etc. for the former and by using letters, sign language, etc. for the latter. (...) The prefecture shall also implement appropriate financial measures such as special loan for daily living in order to stabilize the life of low-income families in need of emergency financial aid for daily living.

4 (2) a (...) In addition, cities, towns and villages shall establish systems to transport people who need assistance during disaster by vehicle, boat or other means, when such people are not independently mobile or when ways to evacuation shelters are too dangerous for them.

4 (2) b (c) Cities, towns and villages shall secure daily supplies and food at shelters that match the needs of people who need assistance during disaster, such as wheelchairs, powdered milk, and special food for people with dietary restriction. (...)

Chapter 3 Section 8 Plan for public relations

1 (1) a (c) Cities, towns and villages shall provide information given by the prefecture and collected by themselves to residents and shall endeavor to ease their anxiety. (...)

1 (2) Considerations for people who need assistance during disaster

b A wide range of information provision means should be ensured to provide information to people with visual or hearing impairment by combining audio and visual representation and arranging sign-language interpreters and helpers.

c Information related to disaster shall be communicated to foreign people by preparing translators and developing multilingual websites.

f Considerations shall be taken for people who are unfamiliar with local areas, such as tourists, workers and students commuting a long distance, etc. to be properly informed of disaster through offices, schools, etc., in order to take necessary action.

Chapter 3 Section 10 Plan for operation of evacuation shelters

1 (1) b (b) Cities, towns and villages, within six hours after setting up shelters, shall collect information on the number of evacuees and the amount of daily supplies required as well as information on people who need assistance during disaster (...).

Chapter 3 Section 10-2 Plan for supporting evacuees at places other than shelters

1 (1) (d) Social workers, child welfare workers, nursing insurance businesses, handicap welfare service providers, etc. shall endeavor to collect information on whereabouts of people who need assistance during disaster and confirm their safety, and they shall also share the information collected with cities, towns and villages.

Chapter 3 Section 13 Plan for security and traffic control

1 (2) Adequate consideration shall be taken to prioritize the evacuation of people who need assistance during disaster, such as the elderly, the handicapped, children, foreign people, etc., during evacuation guidance for residents.

Chapter 3 Section 20 Plan for epidemic prevention and health and hygiene

4 (1) b (b) To provide appropriate treatment for each case, communication and coordination is necessary among workers in medicine, rescue, epidemic control, nutritional guidance, psychological support, welfare, etc.

a Collection of information on and provision of health guidance for people who need assistance during disaster, psychologically handicapped people, etc.

b Provision of health guidance for patients with intractable diseases, psychologically handicapped people, etc.

e Provision of mental health guidance to lessen anxiety, etc.

Chapter 3 Section 21 Plan for measures for psychological care

(1) a (a) Residents, when suffer from disaster, shall be aware of possible psychological problems, such as acute stress disorder, and shall endeavor to take adequate psychological care to themselves as well as people who need assistance during disaster.

Chapter 3 Section 24 Plan for measures for toilets

1 (2) a Cities, towns and villages shall set up temporary toilets for people who need assistance during disaster within approximately 24 hours, if shelters do not have such toilets or if such toilets cannot be used for some reasons.

1 (2) c Adequate consideration concerning toilets (e.g., barrier-free environment, handles to hold on to) shall be taken not to miss the special needs of people who need assistance during disaster.

Chapter 3 Section 25 Plan for bath services

1 (2) a Arrangement of transportation to bath facilities (cities, towns, villages)

Chapter 3 Section 26 Plan for provision of food, daily supplies and other necessities

1 (2) a Provision of food in consideration of the elderly, food allergy and other factors (from 24 hours after evacuation)

Chapter 3 Section 27 Emergency measures for people who need assistance during disaster

1 (1) (g) c (measures for evacuation guidance) (Arrangement of living spaces) Emergency temporary housing, regular public housing, public inns and hotels and other places shall be secured as living spaces for people who need assistance during disaster.

Selected text in the Ibaraki Prefecture Regional Disaster Management Plan (Wind & Flood) concerning vulnerable people:

Chapter 1 Section 1. Plan for water management, Sub-section 3. Flood measures based on Flood Protection Act

4 (1) Cities, towns and villages (...) shall prescribe the following matters (...)

c Names of facilities, their locations and methods to communicate flood forecasts and other information to those facilities if there are underground malls or similar facilities (such as ones located underground for public use) or facilities mainly for people who need assistance in case of disaster, such as the elderly, in inundation risk areas, and if those facilities call for smooth and fast evacuation of users in case of flooding.

Chapter 2 Section 1. Disaster Prevention

3 (1) Cities, towns, and villages shall determine following items (...)

B Methods to communicate sediment-related disaster information, forecasts and warnings to help fast evacuation of facility users if facilities mainly for people who need assistance in case of

disaster, such as the elderly, are located in sediment-disaster risk areas

Chapter 2 Section 5 Educational Plan

4 Measures for disaster prevention on facilities and equipment of schools

(1) Fire-proof, sturdy construction using reinforced concrete, steel structure or other methods shall be promoted when buildings of schools and similar organizations are constructed in order to protect their facilities and equipment from disasters such as fires and typhoons.

(2) Appropriate preventive measures for disasters caused by hazards such as landslides and typhoons shall be taken when selecting locations and developing land for schools and similar organizations.

(3) Efforts shall be made to conduct regular safety inspection as well as necessary repair and reinforcement for parts or sites that are hazardous or need fixing in order to protect facilities and equipment of schools and similar organizations from disasters. In particular, if facilities are provided with electric devices and appliances and gas equipment, efforts shall be made to manage them appropriately.

Chapter 2 Section 13 Activity organization arrangement plan on organization related to disaster prevention

(...) To this end, in order to promote disaster prevention from male and female viewpoints, efforts shall be made to increase the participation of women in the work of disaster prevention and to establish a disaster prevention system built based on the perspective of gender equality.

Chapter 2 Section 14 Support scheme for people who need assistance in case of disaster (disaster vulnerable people, DVP)

In recent disasters, there are more and more cases where people who need assistance in case of disaster (the elderly, infant and handicapped who have trouble evacuating themselves and foreigners who have trouble understanding disaster information in Japanese) are victimized. (...) the prefecture, cities, towns and villages shall promote the implementation of disaster infrastructures in consideration of people who need assistance in case of disaster, such as evacuation routes with smooth surface and sufficient width, shelters with doorways for adequate wheelchair entry, disaster-related signs with bright, large-sized letters.

Chapter 2 Section 14 Support Plan for persons needing assistance during disaster

2 (1) The prefecture, cities, towns and villages shall endeavor to have adequate information on conditions of people who need assistance during disaster, such as where they usually are and whether or not they have care they need by sorting out and store information collected by at-home nursing service providers, social workers, neighbors volunteering to look after such people, and other sources. (e.g., whereabouts, family members, emergency contacts, level of independency in daily life, regular doctors, etc.). In addition, in close collaboration with local health centers and other organizations, the prefecture, cities, towns and villages shall endeavor to share information on people who need assistance during disaster.

2 (3) The prefecture, cities, towns and villages shall endeavor to establish mutual assistance systems to ensure the safety of people who need assistance during disaster by arranging such systems among neighbors of such people (e.g., those in local voluntary disaster management organizations) and at-

home nursing care groups and volunteer groups in local care systems for such people under the leadership of social workers. (...)

3 (1) Cities, towns and villages should make efforts to secure the number and whereabouts of foreign residents by promoting foreign resident registration in normal times in order to provide smooth assistance, such as confirmation of their safety in case of disaster.

3 (3) The prefecture, cities, towns, villages and the prefectural international exchange association shall endeavor to educate people about disaster and disseminate knowledge about disaster by distributing pamphlets written in foreign languages about disaster prevention at a variety of opportunities such as exchange meetings with foreigners and among businesses hiring foreign employees in order to foreigners who cannot understand Japanese.

3 (4) The prefecture, cities, towns, villages and the prefectural international exchange association shall distribute the disaster manual at the alien registration counter, in which the manual owners should also write their name, address, contact information, language, blood type and other information, and encourage foreigners to always have it with them in order to help identify them, make necessary contact and provide medical attention or other treatments for them promptly in case they are victimized in disaster.

3 (5) 2) Cities, towns and villages shall endeavor to install signs and signals for facilities related to evacuation, such as shelters and evacuation routes, by using standard representations and designs including the use of foreign languages, so that they can be easily understood by foreigners. In addition, the prefecture, cities, towns and villages shall discuss the standardization of representations and designs for signs and signals.

Chapter 2 Section 11 Evacuation plan

4 (1) (...) dissemination shall be conducted by using documents (including those in Braille) and bulletin boards. Thorough efforts shall be made to disseminate information to people with visual and hearing disabilities while taking necessary measures to prevent a confusion of information.

6 (1) 4) Safe evacuation of all community members shall be aimed by mutual assistance of neighbors, in which residents are asked to help each other for securing safety and prioritizing evacuation of people who need assistance in case of disaster, such as the elderly, infants, children and the handicapped.

Chapter 2 Section 15 Plan of measures to secure the safety of people who need assistance during disaster

3 (2) (...) The prefecture, cities, towns and villages, upon the request of facility managers, shall prepare emergency vehicles and arrange other facilities for people who need assistance during disaster as receiving facilities.

3 (6) Businesses in charge of utility lifelines such as electricity, gas and water shall endeavor to prioritize restoration of utility lifelines for facilities for people who need assistance during disaster to recover from damage as soon as possible.

4 (1) The prefecture, cities, towns and villages shall conduct safety conformation and rescue efforts for people who need assistance during disaster left behind at home based on lists of such people using at-home care services with help from social workers, local residents (e.g., those in local

voluntary disaster management groups), social welfare groups (social welfare associations, senior citizens' clubs, etc.) and other volunteer groups. (...)

5 (3) 2) The prefecture, cities, towns and villages shall endeavor to provide information in foreign languages by making active use of television, radio, the Internet and other means in order to communicate appropriate information to foreigners.

5 (5) 1) The prefectural international exchange association shall set up the contact for registration of volunteer interpreters immediately after a disaster occurs and shall be all ready to accept such volunteers.

Chapter 2 Section 24 Response plan on education, Part 2 Financial relief measure for disasters of extreme severity

4 (5) The national government shall loan the prefecture three times the amount that the prefecture has budgeted in the special account as the funding source for loan for welfare for single mother families and widows who are disaster victims.

Text in the Sanjo City Flood Disaster Manual concerning vulnerable people:

p.1: Evacuation Preparation Stage: Physically and mentally challenged people (people who may need assistance in evacuating or may not understand instructions on evacuating on their own) need to start evacuating. The chances of a disaster are high.

p.2: Physically and mentally challenged people should prepare emergency goods and immediately go to a primary or secondary evacuation center. Volunteers that have been chosen to help the physically and mentally people should go to their assigned places.

p.7: Take care of children and senior citizens! Give children and seniors a floatation device and carry sick people and people that are physically challenged.

p.9: In the event of a disaster, senior citizens, physically challenged people and people that may not understand the evacuation information may need the assistance of the people in the community. In order to make a "City that is resilient towards disasters" and make it safe for the rapidly aging population, there is a need to maintain or set up a "Local Disaster Prevention Organization" (...) for evacuation. (...) However, at present Sanjo City is behind in setting up such a system. Therefore, here are the steps that will be taken.

1. With the permission of the person, a list will be made for people that may have difficulty in evacuating (Physically and Mentally Challenged people). Furthermore, there will be two categories people. People that can evacuate with the help of family, friends or a care-taker and also people that cannot.

2. For people that can evacuate on their own, they will receive information from their district welfare officer, home nursing center, or Nursing Insurance service, and will be asked to evacuate beforehand so that they have ample time to go to the evacuation centers. The District welfare officer will help under the responsibility of the Sanjo City Hall. Please prepare ahead so that you can protect yourself.

3. For citizens that cannot evacuate on their own please evacuate with the help of members of the neighborhood council or your local disaster prevention organization. If it is not possible to reach the evacuation centers, go to the 2nd floor of a safe building. The neighborhood council, and local disaster prevention organization are working in cooperation under the responsibility of the Sanjo City Office. Please

keep this into consideration and try to take care of yourself as much as possible.

4. The list of physically and mentally challenged people that need assistance in evacuation is personal information and will be protected by the city, neighborhood council, local disaster prevention organization and the district welfare officer and will be used only to make the evacuation efforts as efficient as possible.

The Sanjo City Office is working as hard as possible to help the physically and mentally challenged people according to the above methods. However, the support from the community is still lacking therefore this is not a perfect system. The City Office list for people who need assistance in evacuation is used as a last resort. Please try to cooperate with your neighbors and local disaster prevention organization to insure that you, your family, and friends are safe.

p.10 : Requirements for being included in the physically and mentally challenged people's list

You must live at home and fulfill one of the requirements.

- (1) People that have nursing certification
- (2) Physically challenged people (Under the age of 65)
 - Level 1~ 6 visual impairment
 - Level 1-6 hearing impairment
 - Lower, upper body paralysis, Level 1-3 Paralysis)
 - Any other impairment between level 1 and 2.
- (3) Mentally Challenged People (Under the age of 65 and has a Mental Education Notebook A
- (4) People with mental illnesses that are receiving regular home treatments from the city.
- (5) People with incurable sicknesses that are receiving allowances from the city
- (6) Physically Challenged Senior Citizens that have over an A rank from the self-support grade
- (7) Senior citizens with dementia ranking over II

p. 11: 2. The main objective of the local disaster prevention organization is to take lead role and assist the local people in the evacuation of physically and mentally challenged people.

Selected text in the Sanjo City Area Disaster Prevention Plan concerning vulnerable people:

Chapter 1 Section 1 Purposes for development of the local disaster management plan

6. Definitions of the terms: (2) People who need assistance during disaster: People who have trouble getting necessary information and are limited in taking action by themselves during disaster, e.g., elderly, handicapped, injured, sick, pregnant, infant and foreign people.

Chapter 1 Section 4 Social conditions of Sanjo City

5. Changes in social structure concerning disaster management and responses to such changes

(2) The number of people who need assistance during disaster, such as elderly (the single-household elderly, in particular), handicapped and foreign people, are increasing. Adequate measures should be taken in many aspects of disaster management, including dissemination of knowledge of disaster management, information provision during disaster, and evacuation guidance, in careful consideration of those people in collaboration with other welfare measures.

(...)

Chapter 3 Section 5 Disaster education plan

9. (1) Dissemination of disaster knowledge

To secure the safety of people at home who need assistance during disaster, such as the elderly, the disabled, foreigners, infants, etc., it is important for those people and others who provide care or protection for them (hereafter “care providers”) to have knowledge about disaster prevention. (...)

To promote this understanding, the city shall endeavor to disseminate knowledge about disaster prevention by publishing pamphlets and leaflets for people who need assistance during disaster. (...)

Chapter 3 Section 7 Plan for organizing local voluntary disaster management organizations

1. In disaster management under such circumstances, it is very important for all residents to have a strong will that they unite and protect their communities by themselves. With this attitude, public disaster management offices and residents should cooperate with each other to promote more effective emergency response efforts by communities, facilities and businesses, each organizing disaster management groups.

Chapter 3 Chapter 26 Plan for Securing Safety of Persons Requiring Assistance During a Disaster

5. (1) C. The City shall ensure to secure life necessities for persons requiring assistance during a disaster, such as wheelchairs and milk powder, and shall endeavor to improve the system to provide support in shelters, such as the provision of food prepared for persons requiring assistance during a disaster and the securing of helpers, through obtaining the cooperation of volunteers, etc.

7. (2) C. The City shall endeavor to prepare a system that allows for the utilization of bulletin boards, facsimile machines, personal computers, etc. and the use of newspapers, radio, text broadcasting, TV broadcasting with sign language, etc. in cooperation with news organizations so that information concerning disasters, medical services, welfare, etc. and information needed for everyday life can be provided to persons requiring assistance during a disaster in an accurate manner. With regard to visually impaired persons who have difficulty obtaining information, the use of Braille, enlarged characters, and audio shall be implemented, while sign language, etc., shall be implemented for hearing impaired persons in order to endeavor to prepare a support system that allows for information provision.

8. Measures for Securing Safety at Long-term Care Insurance Service Providers, Social Welfare Facilities, etc.

(1) B. Securing the Communication of Information and Support Systems

At long-term care insurance providers, social welfare facilities, etc., the establishment of emergency alarm equipment (hotline) with disaster prevention related institutions, such as fire headquarters, shall be considered. (...)

(3) A. At long-term care insurance providers, (3) social welfare facilities, etc., efforts are to be made to ensure the stockpiling of 2 to 3 days' worth of food and drinking water, medicine for persons with chronic illness, temporary lavatories for the aged and the disabled, evacuation tents, welfare instruments, tools for living in evacuation shelter, etc., and also to improve wells, earthquake-proof water storage tanks and warehouses for stockpiling.

(3) B. At long-term care insurance providers, social welfare facilities, etc., efforts are to be made

to improve the emergency contact system of staff members and to secure manpower. In addition, efforts are to be made to build cooperative relations under normal circumstances so that the cooperation of area residents, private volunteers, neighboring facilities, etc. can be obtained.

Chapter 3 Section 27 Disaster prevention plan for educational facilities

3. (3) E. (b) Schools shall discuss and decide, with students' family members at home visits and parents' meetings, how to contact their family members during a disaster and how to hand over students to them.

Chapter 4 Section 5 Plan for emergency information dissemination

8. (2) Necessary measures shall be taken to disseminate information to people with visual or auditory impairment by using visual and auditory tools, teletext broadcasting, sign language interpreters and helpers.

(3) Necessary measures shall be taken to disseminate information to foreign people by posting information in foreign languages and providing interpreters.

Chapter 4 Disaster emergency response plan, Section 6 Plan for evacuation and shelters

7. (2) B. Considerations for evacuation shelter management

(e) The city, with support from voluntary groups organized by evacuees, shall collect information on children who need protection as a result of disaster, such as orphans. If such children are found, the city shall report to a child consultation office and seek the possibility of relatives accepting such children while taking protection measures, such as admitting them to children's homes or foster parents.

Chapter 4 Disaster emergency response plan, Section 9 Plans for security and traffic control

5. (3) B. Definition of emergency vehicles (...). Emergency vehicles are mainly used for the following purposes: (e) For the purpose of education for disaster affected children in emergency situations

Chapter 4 Section 12 Plan for emergency rescue efforts

3. (1) Activities by local residents, businesses, neighborhood associations, and voluntary disaster management organizations

E. Rescue of the injured and people who need assistance during disaster

Chapter 4 Section 14 Plans for epidemic prevention and health-related services

6. (1) A. Examination of the health conditions of bed-ridden, handicapped, infant and pregnant people as well as artificial dialysis and other patients, and provision of other health care instructions

6. (1) B. Provision of health care instructions to people with tuberculosis, intractable diseases, mental handicap and other health disadvantages.

Chapter 4 Section 18 Plan for waste management

6. (3) B. The city shall arrange toilet facilities to guarantee easy accessibility for people who need assistance during disaster by carefully considering locations for setting up toilet facilities and providing assistance for such people when they need to use them.

Chapter 4 Disaster emergency response plan, Section 20 Plan for food supply

4. (1) D. Food shall be distributed first to people who need assistance during disaster.

Chapter 4 Disaster emergency response plan, Section 21 Plan for supply daily necessities

6. (3) C. Daily necessities should be distributed first to people who need assistance during disaster.

Chapter 4 Chapter 22 Emergency Response Plan for Persons Requiring Assistance During a Disaster

2. (2) The City shall ensure to secure an evacuation time for persons requiring assistance during a disaster by making an announcement of evacuation preparation information at an early stage prior to the occurrence of a disaster, and shall secure the safety of persons requiring assistance during a disaster through obtaining cooperation from area residents, long-term care insurance providers, social welfare facilities, etc. (...) Additionally, the City shall provide appropriate information to the vulnerable, such as foreigners, visually impaired persons and hearing impaired persons, etc.

2. (4) Corporations and related organizations that employ persons requiring assistance during a disaster shall prioritize persons requiring assistance during a disaster when giving evacuation guidance and shall promptly confirm their safety.

2. (5) Corporations employing foreigners and international exchange related organizations shall, through cooperation with the prefecture and the city, implement support activities, such as confirming the safety of foreigners, provision of disaster information, and consultation.

Chapter 4 Section 38 Plan for temporary housing

4. (4) A. (c) A person to be provided a makeshift house shall be: public assistance recipients or those requiring public assistance that are defined by the Public Assistance Act (enacted in 1950; Law No. 144); those without any specific assets including the unemployed, the elderly, the physically handicapped, single mothers, workers, small business owners, or financially vulnerable people who are equivalent to the others listed here.

Articles in the Chikusei City Local Disaster Management Plan [summary version] concerning vulnerable people:

p. 7: With regard to improving evacuation centers, we will make efforts to secure facilities that give consideration to people requiring assistance during disaster such as elderly people and persons with disabilities, as well as infants and women. To be able to smoothly support people requiring assistance during disasters, we will try to make improvements to the list of people requiring assistance during disasters, and share the list among relevant agencies through cooperation with persons serving as community leaders during disasters (leaders of residents' associations, heads of voluntary disaster prevention organizations, commissioned child welfare volunteers, Japanese Red Cross Society regional leaders, etc.). We will conduct studies regarding appropriate means of information provision to elderly people, persons with disabilities, foreigners, etc., and exert efforts to make improvements.

p. 12: With regard to publicity activities, we will give consideration to people requiring assistance during disasters such as elderly people, persons with disabilities, and foreigners, and at the same time, try to publicize information thoroughly by using various means of dissemination.

p. 14: Those who particularly need time in evacuating, such as people requiring assistance during disasters, should evacuate voluntarily as soon as possible. Elderly people, children, people who are not well, etc. need to evacuate early. People in the neighborhood should cooperate in the evacuation process.

p. 15: Allocation, etc. of spaces for infants, elderly people, persons with disabilities, people in poor physical condition, etc. Improvement of the environment in consideration for women: Spaces exclusively for use by women (dressing rooms, nursing rooms, places for hanging laundry, etc.), separate lavatories and bathing facilities for men and women, distribution of women's supplies by women, securing of women's safety at evacuation centers, etc.

p. 17: We will provide appropriate support to people such as those requiring assistance during disasters who are accommodated in relevant facilities, those requiring assistance during disasters who are bed-ridden at their homes, and foreigners. In providing food supplies, we will be careful so that there will be no omissions or duplication of distribution, and at the same time, we will provide food supplies, giving consideration to elderly people, infants, etc. As in the case of food supplies we will distribute daily necessities, giving consideration to elderly people, infants and women, and at the same time, we will provide supplies, giving consideration to the timing of the distribution.

p. 18: If a disaster has occurred and there is a possibility of recurrences, we will promptly and accurately convey disaster-related information to the heads of schools, etc., and at the same time, give necessary instructions and make efforts to ensure the safety of children, students, etc. For children, students, etc. who have lost their textbooks, school supplies, etc., we will provide school supplies, etc., and at the same time, we will provide school expense subsidies such as reducing tuition fees for children and students facing difficulties attending school. By collaborating with relevant organizations, we will protect injured animals and pets whose owners are unknown, and make efforts to find their owners. We will make efforts to secure spaces at evacuation centers, etc. where pets can be accommodated.

Text in the Disaster Prevention Measures at Chikusei City concerning vulnerable people:

p. 8: The city uses the same means to convey information concerning evacuation to welfare facilities in the risk area used by people vulnerable to disaster, such as the elderly, to ensure prompt and safe evacuation.

p. 9: People who need more time for evacuation, including people vulnerable to disaster, start to evacuate to the planned evacuation area (evacuation supporters begin support action).

p. 10: Voluntary Antidisaster Organizations: Precious lives have been lost due to earthquakes, typhoons, torrential rain, and other natural disasters and fires in the past. In particular, people vulnerable to disasters, including elderly persons, persons with disabilities, infants, pregnant women, and women with infants, are often not quick enough to respond to a disaster due to the difficulty in physical movement and other reasons, which increases their risk of suffering major harm. It is necessary to prepare a framework to enable the greater community to support such people.

p. 12: We will use the system to issue disaster prevention information, including evacuation advisories, when disaster is expected to occur or when a flood, earthquake or other disaster emergency strikes; to ask fire companies for help in fighting a fire; to request a search for or information on missing people (especially the elderly); to provide information about prolonged water/electricity failure, stoppage of phone lines, and prospects for their recovery; to sound a time tone at noon and in the evening; to broadcast to elementary and junior-high school students for crime prevention when they are returning home; and to publicize a variety of administrative information.

Articles from the Constitution of the United States of America relating to human rights and disaster management:

Preamble

We, the People of the United States, in Order to form a more perfect Union, establish Justice, insure domestic Tranquility, provide for the common defence, promote the general Welfare, and secure the Blessings of Liberty to ourselves and our Posterity, do ordain and establish this Constitution for the United States of America.

Article 3, Section 2 (1) (abbreviated)

The judicial Power shall extend to all Cases, in Law and Equity, arising under this Constitution, the Laws of the United States, and Treaties made, or which shall be made, under their Authority.

Text from the American Declaration of Independence relating to human rights and disaster management:

We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable Rights, that among these are Life, Liberty and the pursuit of Happiness.

Selected articles from the Robert T. Stafford Disaster Relief and Emergency Assistance Act concerning vulnerable people:

Sec. 308. Nondiscrimination in Disaster Assistance

(a) Regulations for equitable and impartial relief operations – (...) Such regulations shall include provisions for insuring that the distribution of supplies, the processing of applications, and other relief and assistance activities shall be accomplished in an equitable and impartial manner, without discrimination on the grounds of race, color, religion, nationality, sex, age, disability, English proficiency, or economic status.

Sec. 311. Insurance, Prohibited Flood Disaster Assistance

(a) General prohibition - Notwithstanding any other provision of law, no Federal disaster relief assistance made available in a flood disaster area may be used to make a payment (including any loan assistance payment) to a person for repair, replacement, or restoration for damage to any personal, residential, or commercial property if that person at any time has received flood disaster assistance that was conditional on the person first having obtained flood insurance under applicable Federal law and subsequently having failed to obtain and maintain flood insurance as required under applicable Federal law on such property.

Sec. 403. Essential Assistance

(a) in general - Federal agencies may on the direction of the President, provide assistance essential to meeting immediate threats to life and property resulting from a major disaster, as follows:

(3) work and services to save lives and protect property - Performing on public or private lands or

waters any work or services essential to saving lives and protecting and preserving property or public health and safety, including –

- (J) provision of rescue, care, shelter, and essential needs –
 - (i) to individuals with household pets and service animals; and
 - (ii) to such pets and animals.

Sec. 408. Federal Assistance to Individuals and Households

(a) in general –

(1) provision of assistance - In accordance with this section, the President, in consultation with the Governor of a State, may provide financial assistance, and, if necessary, direct services, to individuals and households in the State who, as a direct result of a major disaster, have necessary expenses and serious needs in cases in which the individuals and households are unable to meet such expenses or needs through other means.

(b) housing assistance –

(1) Eligibility - The President may provide financial or other assistance under this section to individuals and households to respond to the disaster-related housing needs of individuals and households who are displaced from their predisaster primary residences or whose predisaster primary residences are rendered uninhabitable, or with respect to individuals with disabilities, rendered inaccessible or uninhabitable, as a result of damage caused by a major disaster.

(e) Financial Assistance To Address Other Needs -

- (1) medical, Dental, child care, and Funeral Expenses (...)
- (2) Personal Property, transportation, and other Expenses (...)

(h) maximum amount of assistance –

(1) in general - No individual or household shall receive financial assistance greater than \$25,000 under this section with respect to a single major disaster.

Sec. 410. Unemployment Assistance

(a) Benefit assistance - The President is authorized to provide to any individual unemployed as a result of a major disaster such benefit assistance as he deems appropriate while such individual is unemployed for the weeks of such unemployment with respect to which the individual is not entitled to any other unemployment compensation (as that term is defined in section 85(b) of the Internal Revenue Code of 1986) or a waiting period credit. (...)

(b) Reemployment assistance

(1) State assistance - A State shall provide, without reimbursement from any funds provided under this Act, reemployment assistance services under any other law administered by the State to individuals receiving benefits under this section.

(2) Federal assistance - The President may provide reemployment assistance services under other laws to individuals who are unemployed as a result of a major disaster and who reside in a State which does not provide such services.

Sec. 412. Food Coupons and Distribution

(a) Persons eligible; terms and conditions - Whenever the President determines that, as a result of a

major disaster, low-income households are unable to purchase adequate amounts of nutritious food, he is authorized, under such terms and conditions as he may prescribe, to distribute through the Secretary of Agriculture or other appropriate agencies coupon allotments to such households pursuant to the provisions of the Food Stamp Act of 1964 (...)

Sec. 415. Legal Services

Whenever the President determines that low-income individuals are unable to secure legal services adequate to meet their needs as a consequence of a major disaster, consistent with the goals of the programs authorized by this Act, the President shall assure that such programs are conducted with the advice and assistance of appropriate Federal agencies and State and local bar associations.

Sec. 508. National Advisory Council

(c) Membership—

(G) representatives of individuals with disabilities and other populations with special needs

Sec. 512. Evacuation Plans and Exercises

(b) Plan Development— In developing the mass evacuation plans authorized under subsection (a), each State, local, or tribal government shall, to the maximum extent practicable—

(4) identify evacuation transportation modes and capabilities, including the use of mass and public transit capabilities, and coordinating and integrating evacuation plans for all populations including for those individuals located in hospitals, nursing homes, and other institutional living facilities;

(5) develop procedures for informing the public of evacuation plans before and during an evacuation, including individuals--

(A) with disabilities or other special needs;

(B) with limited English proficiency; or

(C) who might otherwise have difficulty in obtaining such information; and

(6) identify shelter locations and capabilities.

(c) Assistance—

(2) REQUESTED ASSISTANCE— The Administrator shall make assistance available upon request of a State, local, or tribal government to assist hospitals, nursing homes, and other institutions that house individuals with special needs to establish, maintain, and exercise mass evacuation plans that are coordinated and integrated into the plans developed by that State, local, or tribal government under this section.

Sec. 616. Disaster Related Information Services (42 U.S.C. 5196f)*

(a) In General – (...) the Director of the Federal Emergency Management Agency shall -

(1) identify, in coordination with State and local governments, population groups with limited English proficiency and take into account such groups in planning for an emergency or major disaster;

(2) ensure that information made available to individuals affected by a major disaster or emergency is made available in formats that can be understood by -

(A) population groups identified under paragraph (1); and

(B) individuals with disabilities or other special needs; and

(3) develop and maintain an informational clearinghouse of model language assistance programs and

best practices for State and local governments in providing services related to a major disaster or emergency.

Sec. 689. Individuals with Disabilities

(a) Guidelines – (...) the Administrator shall develop guidelines to accommodate individuals with disabilities, which shall include guidelines for –

- (1) the accessibility of, and communications and programs in, shelters, recovery centers, and other facilities; and
- (2) devices used in connection with disaster operations, including first aid stations, mass feeding areas, portable payphone stations, portable toilets, and temporary housing.

Sec. 689b. Reunification

(b) National Emergency Child Locator Center –

- (1) In general – (...) the Administrator, in coordination with the Attorney General of the United States, shall establish within the National Center for Missing and Exploited Children the National Emergency Child Locator Center. (...)

Sec. 683. National Disaster Housing Strategy (6 U.S.C. 772)

(b) Contents – The National Disaster Housing Strategy shall – describe programs directed to meet the needs of special needs and low-income populations and ensure that a sufficient number of housing units are provided for individuals with disabilities

Selected articles in the American Louisiana Homeland Security and Emergency Assistance and Disaster Act concerning vulnerable people:

§726. Governor's Office of Homeland Security and Emergency Preparedness; authority and responsibilities

E. The office shall either directly or through authorized assignment to another state agency or department:

(14)(a) Include a proposed shelter component in the homeland security and state emergency operations plan that includes specific regional and interregional planning provisions and promotes coordination of shelter activities between the public, private, and nonprofit sectors.

(b) The proposed shelter component shall, at a minimum, include all of the following:

(vi) Procedures setting forth police guidelines for sheltering people with special needs.

(17) By May 31, 2006, promulgate standards and regulations in accordance with the Administrative Procedure Act for local governments when a mandatory evacuation has been ordered for the evacuation of people located in high-risk areas utilizing all available modes of transportation, including but not limited to school and municipal buses, government-owned vehicles, vehicles provided by volunteer agencies, trains, and ships in advance of the approach of the storm to public shelters located outside of the risk area with priority consideration being given to the special needs of the following classes of people:

(a) The people with specific special needs such as the elderly and the infirm.

(b) Tourists.

(c) Those who refuse to leave.

(d) Those without personal transportation.

(20)(a) In consultation with parish homeland security and emergency preparedness agency authorities, assist in the formulation of emergency operation plans for the humane evacuation, transport, and temporary sheltering of service animals and household pets in times of emergency or disaster.

(i) Require that persons with disabilities who utilize service animals, as defined in the Americans with Disabilities Act, are evacuated, transported, and sheltered with those service animals and inform all facilities that provide shelter to persons with disabilities who are accompanied by their service animals of their legal obligation to provide shelter to both the disabled person and the service animal.

(ii)(aa) Assist in the identification of evacuation shelters and other state facilities that are designed and equipped to accept and temporarily house household pets and canine search and rescue teams.

(iii)(aa) Enable, wherever possible, pet and pet-owner evacuations for disabled, elderly, special needs residents, and all other residents whenever such evacuations can be accomplished without endangering human life.

(bb) The office shall coordinate the establishment of an identification system to enable household pet owners who are separated from their household pets during an evacuation to locate and reclaim such household pets.

(v) Require animal shelters, humane societies, veterinary offices, boarding kennels, breeders, grooming facilities, hospitals, schools, animal testing facilities, and any other businesses or not-for-profit agencies that normally house household pets or service animals to create evacuation plans for such animals consistent with the provisions of this Paragraph. (...)

(vi) Implement a public information program to provide guidance to household pet owners in formulating their own evacuation plans for their household pets and service animals, and inform such pet owners of the resources available to assist them in such evacuations.

(vii) Ensure the primary agency designated under the provisions of R.S. 29:729(E)(13)(b) (i) and (ii) (...) that animal rescue, evacuation and sheltering needs of residents with pets are made a part of those exercises.

(c) For the purposes of this Paragraph, "household pet" shall mean any domesticated cat, dog, and other domesticated animal normally maintained on the property of the owner or person who cares for such domesticated animal

§730.3. Evacuations and curfews

C.(1) A voluntary evacuation order may be issued when the threat to lives is not yet imminent but conditions exist or such circumstances may exist in the near future.

(2)(...) Personal discretion is allowed, but remaining is not advised. Those with special evacuation needs or those with special transportation needs are particularly encouraged to leave as soon as possible after the order for the voluntary evacuation or advisory evacuation is issued.

Selection of text in the National Response Framework concerning vulnerable people:

p.4: Engaging the whole community is essential to the Nation's success in achieving resilience and national preparedness. Individual and community preparedness is a key component to this objective. By providing

equal access to acquire and use the necessary knowledge and skills, the whole community contributes to and benefits from national preparedness. This includes children; individuals with disabilities and others with access and functional needs; those from religious, racial and ethnically diverse backgrounds; and people with limited English proficiency. Their contributions must be integrated into preparedness efforts, and their needs must be incorporated into planning for and delivering the response core capabilities as defined in the Goal. Access and functional needs includes ensuring the equal access and meaningful participation of all individuals, without discrimination.

p.6: Information, warnings, and communications associated with emergency management must ensure effective communication, such as through the use of appropriate auxiliary aids and services (e.g., interpreters, captioning, alternate format documents), for individuals with disabilities and provide meaningful access to limited English proficient individuals.

p.8: Emergency management staff in all jurisdictions have a fundamental responsibility to consider the needs of all members of the whole community (...). Staff must also consider those who own or have responsibility for animals both as members of the community who may be affected by incidents and as a potential means of supporting response efforts. This includes those with household pets, service and assistance animals, working dogs, and livestock, as well as those who have responsibility for wildlife, exotic animals, zoo animals, research animals, and animals housed in shelters, rescue organizations, breeding facilities, and sanctuaries.

p.9: NGOs bolster government efforts at all levels and often provide specialized services to the whole community, as well as to certain members of the population (...). Examples of NGO contributions include:

- Identifying physically accessible shelter locations and needed supplies to support those displaced by an incident
- Supporting the evacuation, rescue, care, and sheltering of animals displaced by the incident
- Identifying those whose needs have not been met and helping to provide assistance
- Providing health, medical, mental health, and behavioral health resources
- Assisting, coordinating, and providing disability-related assistance and functional needs support services (FNSS)
- Providing language assistance services to individuals with limited English proficiency.

p.21: 4. Critical Transportation, Objective: Provide transportation (including infrastructure access and accessible transportation services) for response priority objectives, including the evacuation of people and animals, and the delivery of vital response personnel, equipment, and services to the affected areas.

p.22: Critical Tasks:

- Move and deliver resources and capabilities to meet the needs of disaster survivors, including individuals with access and functional needs.
- Establish, staff, and equip emergency shelters and other temporary housing options ensuring that shelters and temporary housing units are physically accessible for individuals with disabilities and others with access and functional needs.

p.24: Given the scope and magnitude of a catastrophic incident, waivers, exceptions, and exemptions to policy, regulations, and laws may be available in order to save and sustain life, and to protect property and the environment. However, any such waivers, exceptions, and exemptions must be consistent with laws that

preserve human and civil rights and protect individuals with disabilities and others with access and functional needs.

p.27: Upon receiving a request for assistance from a local or tribal government, state officials may:

- Order or recommend evacuations ensuring the integration and inclusion of the requirements of populations such as: children, individuals with disabilities and others with access and functional needs, those from religious, racial, and ethnically diverse communities, people with limited English proficiency, and owners of animals including household pets and service animals

p.46: Response Federal Interagency Operational Plan

In developing the Response FIOP, the following planning needs are taken into account:

- Reunification and safety of unaccompanied minors
- Accessible communications
- Animal emergency management needs

Text in the National Incident Management System concerning vulnerable people:

p.12: Jurisdictions should have outreach programs to promote and support individual and community preparedness (e.g., public education, training sessions, demonstrations), including preparedness of those with special needs.

p.53: In addition, a special needs advisor might be designated to provide expertise regarding communication, transportation, supervision, and essential services for diverse populations in the affected area.

p.70: Public Information Officers are able to create coordinated and consistent messages by collaborating to: Craft messages conveying key information that are clear and easily understood by all, including those with special needs.

p.135: Accessible: Having the legally required features and/or qualities that ensure easy entrance, participation, and usability of places, programs, services, and activities by individuals with a wide variety of disabilities.

p.144: Nongovernmental Organization (NGO): An entity with an association that is based on interests of its members, individuals, or institutions. It is not created by a government, but it may work cooperatively with government. Such organizations serve a public purpose, not a private benefit. (...) Often these groups provide specialized services that help individuals with disabilities. (...)

p.147: Special Needs Population: A population whose members may have additional needs before, during, and after an incident in functional areas, including but not limited to: maintaining independence, communication, transportation, supervision, and medical care. Individuals in need of additional response assistance may include those who have disabilities; who live in institutionalized settings; who are elderly; who are children; who are from diverse cultures, who have limited English proficiency, or who are non-English-speaking; or who are transportation disadvantaged.

Text in the Governor's Office of Homeland Security and Emergency Preparedness Strategic Plan concerning vulnerable people:

p.12: Strategy 1.1.5 Develop and maintain an all-hazards children's activity/coloring book for all first

through fourth grade classes throughout the state.

Selection of text in the State of Louisiana Emergency Operations Plan concerning vulnerable people:

p.14: State agencies and parishes should consider addressing, within their plans, citizens with disabilities or unique needs wherever applicable.

p.17: C. RESPONSE:

2. The Unified Command Group will assess the need for public sheltering, including Medical Special Needs Shelters, and DSS will initiate the opening, staffing and supplying of state-operated shelters in cooperation with local, parish and state government agencies, private industry and Non-governmental Organizations (NGO) and individuals.

3. DSS may have personnel available to assist in the operations of local general population and Medical Special Needs shelters, but the responsibility for requesting such assistance lies with local government authorities.

p.44: ATTACHMENT 4 TRIBAL AFFAIRS I. PURPOSE AND SCOPE

III. CONCEPT OF OPERATIONS B. Phases of Emergency Management: 3. Response:

a. When emergencies arise, state and parish OHSEP will transmit emergency information and warnings to tribal authorities and coordinate activities, such as evacuation and sheltering

b. As emergencies progress tribal people will be given the same level of life saving and sustaining support as the other citizens of the state

V. DIRECTION AND CONTROL:

Indian tribes are independent entities under their own control, and are not subordinate to state or parish authorities. They may take such advice and direction in an emergency as they have previously agreed for the safeguarding of the lives and property of their citizens.

p.86-87: EMERGENCY SUPPORT FUNCTION 6, MASS CARE, EMERGENCY ASSISTANCE, HOUSING AND HUMAN SERVICES ANNEX II. Department of Social Services (DSS) will provide assistance to persons without regard to race, color, religion, nationality, gender, age, disability, sexual orientation or economic status.

C. PETS: Louisiana Department of Agriculture & Forestry (LDAF) will provide for the safety and well-being of household pets and service animals during evacuations and sheltering. DSS will provide support to LDAF by sharing information regarding the ability of shelters to accommodate pets, as well as, including information about pets and owners in the evacuee tracking system for the reunification of evacuees and pets after the disaster.

III. CONCEPT OF OPERATIONS: There are two state agencies with primary responsibility for ESF-6 activities during emergencies and disasters affecting Louisiana:

The Louisiana Department of Social Services (DSS) has primary responsibility for coordinating with local, parish and tribal governments, state and federal entities, supporting agencies and non-governmental organizations to address non-medical mass care, emergency assistance, housing and human services needs of disaster victims. This includes the primary responsibility for coordinating and managing all state-sponsored Medical Special Needs Shelters (MSNS), Critical Transportation Needs Shelters (CTNS), Sex Offender

Shelters (SOS), and providing staffing and resource support for parish-run General Population Shelters (GPS) upon request from local governments. (...)

p.88: B. PREPAREDNESS

4. ESF 6 will coordinate the delivery of services to individuals that require the assistance of family members, personal assistants and/or service animals, and is committed to ensuring that the physical and mental health needs of these individuals are appropriately addressed. The individuals and assistance providers will remain together to the extent possible during evacuation, transport, sheltering and the delivery of other services. Service animals will be allowed in shelters with their owners and shall be treated as required by law (e.g., the Americans with Disabilities Act (ADA) of 1990).

p.107: Home Health patients are part of the general community as are other vulnerable individuals that may self-present during an evacuation. The parish has a responsibility to identify these individuals and to coordinate with the State the possible transportation assets that they may be needed (that exceed their parish efforts). Regardless of an individuals' disability, there are only so many types of transportation vehicles that can be "assigned" to the parish to support their evacuation plans – school bus, coach bus, ambulance, para-transit vehicles or plane. The parishes are responsible for getting their citizens to Parish Pick-Up Points.

p.127-128: III. CONCEPT OF OPERATIONS: C. RESPONSE: 4.

(...) the ESF 11 Coordinator will work with animal planning authorities to arrange for the best available shelter and care for evacuated animals of all kinds.

Selection of text in the Florida State CEMP Basic Plan concerning vulnerable people:

p.10-11: B. 1. General Operational Assumptions: Disability civil rights laws require physical accessibility of shelter facilities, effective communication using multiple methods, full access to emergency services, and modification of programs where needed. In accordance with Title II of the Americans with Disabilities Act (ADA), evacuation shelters will offer individuals with functional needs the same benefits provided to those without functional needs. This includes safety, comfort, food, medical care, and the support of family and care givers.

p.13-14: A. County Responsibilities: Providing emergency power to designated special needs evacuation shelters.

p.16: Instituting statewide public awareness programs which focus on emergency preparedness issues, including, but not limited to, the personal responsibility of individuals to be self-sufficient for at least 72 hours following an emergency or disaster. The public education campaign shall include relevant information on statewide disaster plans, evacuation routes, fuel suppliers, and shelters (general population, special-needs, and pet). Initiating community education and outreach to the public regarding the registry of persons with special needs and special needs shelters.

p.34: K. Protective Measures: 1. Evacuations: Counties may initiate their own protective measures, such as ordering evacuations and activating public shelters, including special needs shelters and pet-friendly shelters.

p.35: 3. Special Needs Sheltering: In addition to general population sheltering, the Division monitors the status of the statewide inventory of Special Needs Shelters (SpNS). All shelters must meet physical and programmatic accessibility requirements as defined by the Americans with Disabilities Act and Florida

Accessibility Codes. Special Needs Shelters provide a higher level of attendant care than general population shelters. (...)

4. Sheltering Pets or Service Animals: In collaboration with the Florida Department of Agriculture, the Division is responsible for addressing strategies for the sheltering of persons with pets. (...) A person with who uses a service animal must be allowed to bring his or her service animal into a general population or special needs shelter and has the right to be accompanied by a service animal in all areas of a public accommodation (...). In developing these strategies, the state considers the following:

- Locating pet-friendly shelters within buildings with restrooms, running water, and proper lighting.
- Allowing pet owners to interact with their animals and care for them.
- Ensuring animals are properly cared for during the emergency.

p.46: e. Other Recovery Assistance: There are other forms of emergency assistance that may be provided through state programs such as: Small Cities Community Development Block Grant, Community Services Block Grant, Low-Income Home Energy Assistance Program, Low-Income Emergency Home Repair Program, Home Investment Partnership Program, and the State Housing Initiative Partnership Program. (...)

p.50: VII. LEGAL CONSIDERATIONS: A. Compliance with the Americans with Disabilities Act and other Laws or Guidelines for Functional Needs Support Services (FNSS): The Americans with Disabilities Act (ADA) of 1990 is incorporated into emergency preparedness plans. This law prohibits discrimination on the basis of disability. A best practice used to effectively address the needs of persons with disabilities or access and functional needs in emergency preparedness plans is establishing a process to pre-identify resources which may be used to fulfill requests from these individuals for reasonable accommodations they may need in emergency situations.

Functional Needs Support Services (FNSS) are defined as services that enable children and adults with or without disabilities who have access and functional needs to maintain their health, safety, and independence in a general population shelter. This may include personal assistance services (PAS), durable medical equipment (DME), consumable medical supplies (CMS), and reasonable modification to common practices, policies and procedures. Individuals requiring FNSS may have sensory, physical, mental health, cognitive and/or intellectual disabilities affecting their capability to function independently without assistance. Additionally, the elderly, women in the late stages of pregnancy, and individuals requiring communication assistance and bariatric support may also benefit from FNSS.

On July 22, 2004, Executive Order 13347 was issued (Individuals with Disabilities in Emergency Preparedness), directing the federal government to work together with state, local and tribal governments, as well as private organizations, to appropriately address the safety and security needs of people with disabilities.

The state and all local governments will make every effort to comply with Title II of the Americans with Disabilities Act (ADA) and other applicable laws related to emergency and disaster-related programs, services and activities for individuals with disabilities and access and functional needs.

Text in the Orleans Parish 2010 Hazard Mitigation Plan Update concerning vulnerable people:

p.32: The purpose of the City Assisted Evacuation Plan is to help evacuate residents and visitors that are

unable to self-evacuate during an emergency. The plan lists relevant agencies that will participate and identifies staging and debarkation facilities, such as local hotels, Morial Convention Center, Union Passenger Terminal, and Louis Armstrong Airport.

p.248: The potential for winter storms is uniform for the entire Parish. All people and assets are considered to have the same degree of exposure. Certain populations – mainly the homeless and those with poor access to heat or utilities – are at additional risk, as are some types of infrastructure, such as pipes, and to a lesser degree electrical services. Overall, however, the risk in southern Louisiana is low compared to most other parts of the country.

p.184: With regard to vulnerability assessments, the focus of the FEMA rules and guidance for local mitigation plans is on the structures and people that are potentially at risk from hazards, including (but not limited to) “buildings, infrastructure, critical facilities, structures that house the elderly or disabled, and areas where low-income populations reside”.

p.204 and 207: Property owners who lack the means to upgrade structures or even relocate in order to be more resistant to the impacts of storm surge are often the most fragile of the Parish’s population. Residents may lack the knowledge, financial means or even the desire to enhance their properties or to move elsewhere. These fragile residents may be significantly impacted – these personal impacts may become public impacts when the property owners require assistance from City, State, Federal and relief organization resources. These impacts, including financial, have the potential to continue long term.

P335: Department of Health (...) During an evacuation situation the Health Department is in charge of implementing the evacuation plan for special needs citizens.

p.344: Community Development Block Grants (CDBG) Supplemental Appropriations: The Housing and Urban Development (HUD) provides CDBG grants to help cities, parishes and states recover from disasters, especially in low-income areas. CDBG, State-Administered Program: HUD provides financial assistance to promote development and economic opportunities for low and moderate-income persons, including mitigation actions. HOME Investment Partnership Program: HUD provides grants and loans to states and local governments and consortia for permanent and transitional housing (including support for property acquisition and rehabilitation) for low-income persons.

p.350: Community Development Block Grants/Entitlement Grants (14.218): To develop viable urban communities by providing decent housing, a suitable living environment, and expanding economic opportunities, principally for persons of low and moderate income.

p.359: Develop/maintain comprehensive GIS database that includes all properties in the City, hazard areas, service districts, public works facilities, transportation infrastructure, and special needs residents.

p.384: Continue to maintain a comprehensive Geographic Information System with data including but not limited to all properties/parcels in the City, hazard areas, service districts, public works facilities, transportation infrastructure, and special needs residents.

Selected articles in the Current Local Mitigation Strategy Document Hillsborough County (2009) concerning vulnerable people:

Appendix B-14: Limiting Development in Hazard Prone Areas Policy 41.1.7 (Comprehensive Plan)

Prohibits the location of new “special needs” facilities in the Coastal High Hazard Area, including adult congregate living facilities, hospitals, nursing homes, homes for the aged and total care facilities.

Policy 41.1.8 (Comprehensive Plan): Limits expansion of existing “special needs” facilities in the Coastal High Hazard Area only when an evacuation and shelter space plan is approved by the County Emergency Management Department.

Page I – 11: Demographics: Using the U.S. Census Bureau’s American Community Survey 3-Year Estimate for 2005-2007, racial composition during this time period was 74.5 percent (861,975) white, 15.8 percent (183,077) black and 7.8 percent (90,535) other, with 21.8 percent (252,568) identified as either Hispanic or Latino.

Page IV-61: Table IV.A.2.1 presents the population currently exposed to each hazard in Hillsborough County. Of the 998,948 (U.S. Census 2000) people that reside in Hillsborough County, 5.7% are exposed to storm surge, 25.5% are exposed to 100-year flooding, 45% are exposed to wildfire, and 36.5% are exposed to sinkholes. Of the 254,862 people exposed to flood, 31.9% are disabled and 18.9% are minorities.

Appendix I-16 Special Economic Development and Adjustment Assistance Program-Sudden and Severe Economic Dislocation (SSED) and Long Term Economic Deterioration (LTED): The Economic Adjustment Program Grants assist State and local areas in the development and/or implementation of strategies designed to address structural economic adjustment problems resulting from sudden and severe economic dislocation such as plant closings, military base closures and defense contract cutbacks, and natural disasters (SSED), or from long-term economic deterioration in the area’s economy (LTED). (...) States, cities, counties or other political subdivisions of a State, consortia of such political subdivisions, public or private nonprofit organizations representing redevelopment areas designated under the Public Works and Economic Development Act of 1965, Economic Development Districts established under Title IV of the Act, Indian Tribes.

- LTED eligibility determined by: (1) Very high unemployment; (2) low per capita income; and (3) chronic distress. For SSED eligibility, the economic dislocation must exceed certain job loss thresholds for the area.

V FUTURE PUBLIC OUTREACH: II. BEST VEHICLES FOR COMMUNICATION

The manner in which we communicate our message to the public will determine its effectiveness. Currently, we are relying upon piggy-backing on other government resources, such as public access television, utility billings, and public service announcements in the news media. To be truly effective, we need to expand for these reasons:

- (3) Public access TV is not the entertainment of choice for the majority of our citizens
- (4) Many of our elderly citizens have not converted their TV to digital, not being to afford to cable or the costs to convert
- (6) Most of our elderly do not regularly use or have access to the computer

Appendix C-4: Mass Care and human services are necessary to provide for the most immediate and post-disaster needs of any victim (normal or disaster): shelter and feeding; care of unaccompanied children, the aged, and others unable to care for themselves; disaster welfare inquiry; and provision of various types of human services assistance to victims.

Page II-10 FUTURE LAND USE: As the population growth moves inland (north and east), the result is newer, more wind resistant construction in areas not vulnerable to coastal flooding or velocity wave action. Development within the 100-year floodplain must meet strict (...) floodplain management regulations and wetlands are protected through the comprehensive plans and the permitting process. Redevelopment in areas such as downtown Tampa or the Interbay area, while still in the Hurricane Vulnerability Zone, must meet the new land development codes as well. This results in a more disaster-resistant community, albeit higher property values at risk.

Page IV-62: As the population increases in the future, the demand for shelter space and the length of time to evacuate will increase, unless measures are taken now.

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