CRN REPORT

Factsheet
Social Vulnerability to Disasters

Zurich, November 2010

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Center for Security Studies (CSS), ETH Zürich

Commissioned by the Federal Office for Civil Protection (FOCP)

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1 INTRODUCTION

The impact of disasters – understood as extreme events that cause great damage, destruction, and human suffering – is not the same on all people. Disaster losses are only at first sight the result of the respective events. At second sight, they are reflections of human vulnerabilities that arise from physical, social, economic, and political conditions and inequalities that have little to do with the event itself.

For example, 94.25 per cent of all people killed by disasters between 1975 and 2000 were from low-income or lower-middle income strata. Of these, the very poorest people comprised 68 per cent.[1] In the 1991 cyclone disaster that killed 140,000 in Bangladesh, 90 per cent of victims were women and girls, a fact that can hardly be explained by biological and physiological differences alone.[2] The concept of **social vulnerability to disasters** highlights these differences in disaster risk.

This factsheet serves three main **purposes**:

a. For readers unfamiliar with the social vulnerability concept, it offers a brief overview of its meaning and of the central topics currently discussed in both research and policy. These pertain to the definition of the concept (chapter 3), measurement (chapter 4.2), and the implementation of vulnerability reduction policies (chapter 4.3).

b. For the **disaster management policy community**, it demonstrates the important link between social vulnerability and more established concepts such as risk (chapter 3.2) and resilience (chapter 3.3), and shows the added value of a social vulnerability perspective in all phases of the disaster/risk management cycle (4.3.2).

c. For the **Swiss disaster management community** in particular, it aims to encourage a discussion on social vulnerability in Switzerland, since such a debate is de facto absent to date (chapter 5). It offers a number of practical recommendations on how a social vulnerability perspective can complement ongoing initiatives and processes in risk assessment and disaster management.

This factsheet aims to do justice to the complexity of the concept and the manifold challenges of a social vulnerability perspective in practice. In that sense, the factsheet is a menu for choice, and the footnotes direct the interested reader to additional literature. The next chapter briefly illustrates the relevance of the concept by taking a look at social vulnerabilities during Hurricane Katrina in 2005. This hurricane and the subsequent flooding were an eye-opener to many, not least because the disaster happened in the world's largest economy and greatest military power. Chapter 3 introduces and defines the concept of social vulnerability, and links it to related notions such as risk and resilience. Chapter 4 explores the challenges of a social vulnerability approach in practice, namely the assessment of vulnerabilities and the implementation of vulnerability reduction policies. The fifth and final chapter offers a number of recommendations on how a social vulnerability approach can be integrated in disaster management in Switzerland.

1 International Strategy for Disaster Reduction (ISDR), *Linking Disaster Risk Reduction and Poverty Reduction. Good Practices and Lessons Learned. A Publication of the Global Network of NGOs for Disaster Risk Reduction* (Geneva: UN/ISDR, 2008), p. iii: http://www.webcitation.org/5uKdmLr96.

2 Oxfam GB, *Gender, Disaster Risk Reduction, and Climate Change Adaptation: A Learning Companion* (Oxford: Oxfam GB, 2010), p. 4: http://www.webcitation.org/5uKeo2p1J.

2 HURRICANE KATRINA – AMERICA'S STEAMSHIP TITANIC?

> "Hurricane Katrina is America's steamship Titanic. When, almost a century ago, the Titanic hit an iceberg and sunk, less than three percent of women and children traveling first class died. In contrast, almost half of third class women and children passengers died, not only because there were too few lifeboats but also because the lifeboats were kept on the first and second class decks and third class passengers were forcibly denied access to them. Similarly, the horrors experienced by New Orleans residents stemmed not only from the hurricane but also from decisions we have made as a society." [3]

On the Titanic, vulnerabilities were defined by class: *All* children who travelled first and second class were saved, but only one out of three children in third class.[4] The case of Hurricane Katrina is more complex. When the hurricane hit the US Gulf Coast in 2005, nearly half of the estimated 1,800 victims were aged 75 or over. This was not just because they were frail, but because many nursing homes had inadequate plans for evacuation.[5] Furthermore, although New Orleans Mayor Ray Nagin had ordered a mandatory evacuation of the city on 28 August, a day before Katrina made landfall, there were insufficient provisions to evacuate the homeless, the poor, the elderly, the infirm, or those estimated 120,000 people in New Orleans who did not own a car. Moreover, Katrina struck towards the end of the month, before salaries were paid and welfare checks issued, which is why many poor residents had no means to leave the city.[6]

Katrina not only revealed weaknesses with regard to emergency planning, but also exposed weaknesses within society as a whole, a failure to see and care about the vulnerable before disaster struck. This is indeed what Barack Obama, then a senator from Illinois, meant when he termed the response to Katrina a continuation of passive indifference on the part the US government. He condemned the distorted perception of society that led to the failure of emergency plans: "[W]hoever was in charge of planning and preparing for the worst case scenario appeared to assume that every American has the capacity to load up their family in an SUV, fill it up with $100 worth of gasoline, stick some bottled water in the trunk, and use a credit card to check in to a hotel on safe ground." [7]

3 Belkhir, Jean Ait and Christiane Charlemaine, *Race, Gender and Class Lessons from Hurricane Katrina* (*Race, Gender & Class*, 14/1–2, 2007), p. 121.

4 Mersey, *British Wreck Commissioner's Inquiry: Report on the Loss of the "Titanic."* (1912), http://www.webcitation.org/5uKe5DQP3.

5 Bytheway, Bill, *The Evacuation of Older People: The Case of Hurricane Katrina,* (Understanding Katrina: Perspectives from the Social Sciences, 2007): http://www.webcitation.org/5uKe8fv3K.

6 Cutter, Susan, *The Geography of Social Vulnerability: Race, Class, and Catastrophe,* (Understanding Katrina: Perspectives from the Social Sciences, 2006): http://www.webcitation.org/5uKeBoatv.

7 Obama, Barack, *Hurricane Katrina Relief Efforts* (2006): http://www.webcitation.org/5uKeDqhM7.

3 SOCIAL VULNERABILITY, RISK, AND RESILIENCE

The following section defines the concept of social vulnerability and explores its origins and its use in different academic disciplines. Parts 3.1 and 3.2 discuss how the concept of social vulnerability relates to the notions of risk and resilience.

3.1 The concept of Social Vulnerability

Vulnerability generally denotes a susceptibility to harm. The notion of *social* vulnerability as opposed to the vulnerability of built structures refers to the potential harm to people. It refers to "the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard. It involves a combination of factors that determine the degree to which someone's life and livelihood are put at risk by a discrete and identifiable event in nature or in society."[8]

The definition highlights a number of important aspects of vulnerability:

- It defines it as an attribute of persons or groups and points to differences *within* societies.
- It emphasizes a process understanding of vulnerability and embeds the concept in the entire disaster management cycle of Prevention and Mitigation, Preparedness, Response, and Recovery.
- It includes capacity, recognizing that everyone has *some* capacity so anticipate, cope, resist, and recover.
- It emphasizes that vulnerability is a matter of degree, not an absolute quality.
- It points to the fact that vulnerability is determined by a *combination* of several factors.
- It acknowledges that not only life itself, but *livelihoods* are at risk, thus shifting the focus away from "fatalities" as the single dominant measure of disaster impact.
- It extends the threat spectrum to events that originate both in nature and in society.

The definition straightforwardly hints at the important distinction between "natural hazards" or "events" on the one hand, and the underlying characteristics or conditions of people and groups on the other hand. Society speaks of humanitarian disasters only when both conditions are fulfilled: The occurrence of a trigger event, compounded by vulnerabilities that existed prior to the event and have nothing to do with the hazard itself, as is illustrated in Image 1:

Image 1 shows the progression of vulnerability from economic, political, cultural, and other root causes to the unsafe conditions that are eventually responsible for death and destruction in a disaster. A number of dynamic pressures on the local, national, and global levels – such as population expansion or a lack of good governance – mediate between root causes and unsafe conditions.

The concept of social vulnerability found its way into the hazard literature in the 1970s and 1980s. Following a statement by US geographer Gilbert Fowler White – "Floods are 'acts of God', but flood losses are largely acts of man [sic]"[9] – hazard researchers started to challenge the "natural" quality of natural disasters. With regard to causes, they emphasized that human interventions in socio-ecological systems (e.g., land use, dams, deforestation) often trigger extreme natural events in the first instance, or make damages more severe. They also demonstrated that the impacts of these extreme events are not distributed equally within society. Socio-cultural conditions and political and economic practices that exist prior to the onset of a hazard event turn the event into a human catastrophe. The social vulnerability perspective thus marks a shift away from a focus on the hazard towards a focus on the people. A second strand of vulnerability research – known as the Sustainable Livelihoods Framework (SLF) – traces its roots back to Amartya Sen's work on deprivation and entitlements in the context of hunger and starvation.[10] The focus of the SLF is on people's vulnerabilities to (often global) influences like climate and

8 Blaikie, Piers et al., (1994): *At Risk: Natural Hazards, People's Vulnerability and Disasters* (London: Routledge, 1994), p. 9.

9 White, Gilbert Fowler, *Human Adjustment to Floods: A Geographical Approach to the Flood Problem in the United States* (Chicago: University of Chicago Press, 1945), p. 2.

10 Sen, Amartya, *Poverty and Famines: An Essay on Entitlement and Deprivation* (New York: Oxford University Press, 1981).

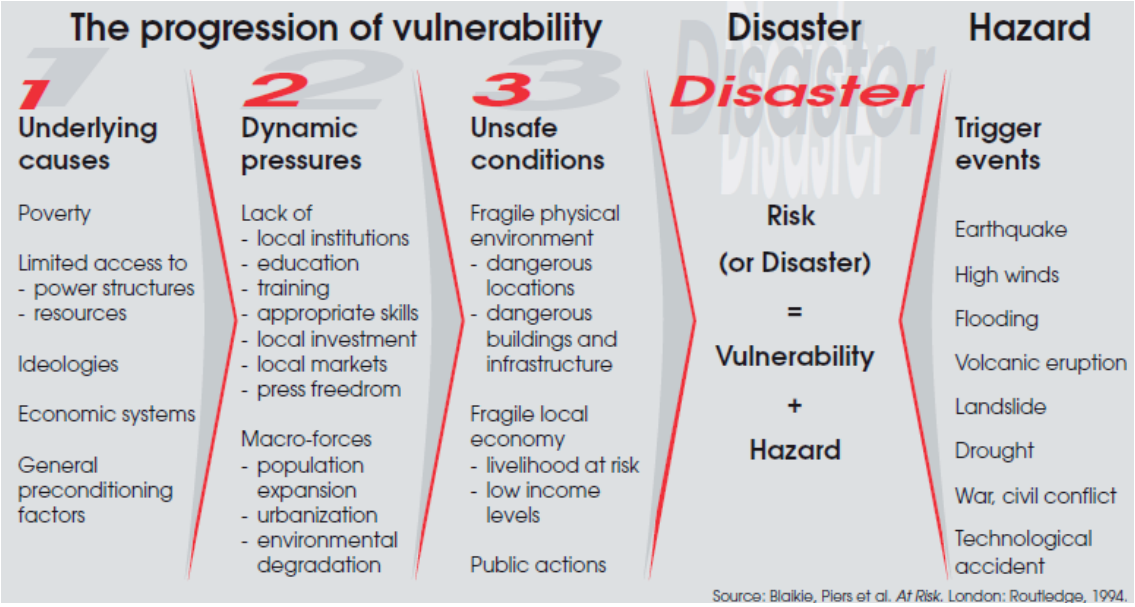


Image 1: Disasters as a combination of hazards and vulnerabilities [11]

environmental change or globalization, and their local and household adaptation and livelihood strategies. Humanitarian aid workers and development professionals have traditionally been active in all fields of vulnerability research.[12] More recently, geographers have also made important contributions with the introduction of GIS technologies in hazards mapping and emergency planning. These maps aim to provide an easily understandable visualization of risks, hazards, and vulnerabilities for the disaster management community.[13]

The fact that the concept of vulnerability has been used in different academic disciplines has led to a myriad of vulnerability definitions and various conceptualizations: Who is vulnerable? Where? To what hazards? In what way? Why? And when? Equally contested is the relationship between vulnerability and other concepts such as exposure, risk, hazard, disaster, resilience, human security, coping capacity, and adaptive capacity.[14] With regard to disaster management, two relationships are particularly important and are briefly discussed in the following part: vulnerability and risk, and vulnerability and resilience.

3.2 Social Vulnerability and risk

From the perspective of an individual, vulnerability is simply a risk. This risk can be seen as a function of the hazard (probability and damage potential), the exposure to the hazard, and the root causes that determine both vulnerability and resilience (the capacity to cope, recover, and adapt).[15]

On an aggregate level, the concept of social vulnerability recognizes that these individual risks are not equally distributed within society, and that this risk difference is not solely attributed to the hazard, but to inequalities and conditions that exist in everyday life, prior to the onset of a specific hazardous event. Nevertheless, traditional risk assessment is usually limited to the identification of dangers, composed

11 International Federation of Red Cross and Red Crescent Societies (IFRC), *Vulnerability and Capacity Assessment. An International Federation Guide* (Geneva: IFRC, 1999), p. 12: http://www.webcitation.org/5uKeLr5RC, adapted from Blaikie et al., *At Risk.*

12 See, for example, the work of the Humanitarian Policy Group of the Overseas Development Institute (http://www.webcitation.org/5uKePpJw7), e.g., Darcy, James and Charles-Antoine Hofmann, *According to need? Needs assessment and decision-making in the humanitarian sector* (London: ODI, 2003): http://www.webcitation.org/5uKeUKIQ5.

13 Cutter, Susan, *The Vulnerability of Science and the Science of Vulnerability* (*Annals of the Association of American Geographers*, 93/1, 2003), p. 8.

14 Katharina Thywissen lists 36 different vulnerability definitions in her comparative glossary of risk terms: Thywissen, Katharina, *Components of Risk: A Comparative Glossary* (Bonn: UNU-EHS, 2006): http://www.webcitation.org/5uKeY3sGL.

15 Ibid.

of the probability of occurrence and likely damage as expressed in the following formula:

Risk = Probability x Impact (Damage)

In this formula, the notion of vulnerability is hidden in the "impact" dimension of the risk, without disaggregating this impact to account for very different impacts within society. A vulnerability assessment, on the other hand, identifies weaknesses (deprivations and exclusions) of specific target populations as a basis for prioritizing the populations requiring higher or special attention.[16] While all individuals, households, and communities are exposed to multiple risks from different sources, some people are more vulnerable because they are typically more exposed to risks and have access to fewer risk management instruments that can allow them to deal with these risks.[17]

Risk is commonly understood to involve an element of choice, of risk-taking or risk-avoiding. Vulnerabilities, however, restrict this choice to a certain extent. Vulnerable population groups are those whose options to manage risks are limited.[18] Their individual risk management choices are constrained by socioeconomic, cultural, political, and physical limitations: Saving money or buying an insurance to prepare for a disaster is not an option for the poor. The choice of whether one relocates to a less hazardous area is likewise influenced by financial (is it affordable?), cultural (is it appropriate?), and political (is it secure?) considerations. It is important to recognize that everyone has *some* choices, so as not to unnecessarily victimize the vulnerable and deny them agency. However, where the focus of many risk approaches is on choice, perception, and free will, the focus of vulnerability is on constraints. Together with choice, perception is another important factor both with regard to risk and vulnerability. Vulnerability reduction measures need to account for differing perceptions with regard to own risk, and for choices regarding the individual capacities, options, and alternatives. Policy-makers might label two people equally vulnerable, depending on the factors used to assess their vulnerability. Nevertheless, the two people might still perceive risk differently and prefer different risk reduction measures.[19]

A shift to vulnerabilities could benefit governments in their quest for multi-hazard or all-hazard risk reduction, because the same vulnerabilities often make people susceptible to harm from various potential dangers.[20] For a multi-hazard approach, the focus needs to shift from acquiring accurate probabilistic information about single risks to a reduction of vulnerabilities that pertain to multiple risks. A stronger focus on unsafe conditions and root causes allows policy-makers to address several risks at once, and hence reduce overall disaster risk. In its World Vulnerability Report of 2004, the United Nations Development Programme (UNDP) presented the work undertaken to develop such a multi-hazard disaster risk index built from the socioeconomic variables associated with the risk from four different natural hazards (earthquakes, tropical cyclones, floods and droughts). The preliminary conclusion from that project, however, was rather negative. UNDP had to recognize that even vulnerabilities to disaster that are rooted in socioeconomic conditions are very hazard-specific.[21]

3.3 Social Vulnerability and resilience

Resilience and capacity are sometimes suggested as positive alternatives to the inherently negative meaning of vulnerability, which tends to focus on people's weaknesses instead of recognizing the many ways in which they can cope with hazards.[22] The concept of resilience – borrowed from the literature on ecosystem stability – has been used in hazard research to denote the ability of a society to respond to and quickly recover from catastrophic events.[23] However, the exact meaning of resilience

16 Busumtwi-Sam, James, *Contextualizing human security: A 'deprivation–vulnerability' approach* (*Policy and Society*, 27/2008), p. 24.

17 Hoogeveen, Johannes, et al., *A Guide to the Analysis of Risk, Vulnerability and Vulnerable Groups* (Washington, D. C.: The World Bank, 2004), p. 7: http://www.webcitation.org/5uKeboVsb.

18 Ibid.

19 Heijmans, Annelies, Vulnerability: A Matter Of Perception (Disaster Management Working Paper 4, University College of London: Benfield Greig Hazard Research Centre, 2001): http://www.webcitation.org/5uKeg3W4a.

20 Note that this view is contested: Some researchers emphasize the contingency of vulnerability, e.g., that vulnerability should be assessed and discussed with regard to specific hazards. See, for example, Bolin, Robert and Lois Stanford, *The Northridge Earthquake: Vulnerability and Disaster* (London: Routledge, 1998), p. 9.

21 United Nations Development Programme (UNDP), *Reducing Disaster Risk: A Challenge for Development* (New York: UNDP, 2004): http://www.webcitation.org/5uKelOzLj.

22 Klein, Richard J. T., Robert J. Nicholls and Frank Thomalla, *Resilience to natural hazards: How useful is this concept?* (Environmental Hazards, 5/2003), p. 40.

23 Holling, C. S., (1973): *Resilience and Stability of Ecological Systems*, (Annual Review of Ecology and Systematics, 4/1973); McCreight, Robert, Resilience as a Goal and Standard in Emergency

and its value compared to related concepts such as vulnerability and adaption/capacity is contested. The views expressed in the literature range from those who consider vulnerability to be the flip side of resilience [24] to those who regard resilience as one of the components of vulnerability (contributing to vulnerability reduction).[25] The diverse conceptualizations of resilience, vulnerability, and adaptation are largely explained by the distinct academic communities from which the concepts originate.[26]

Both vulnerability and resilience have been studied on different levels of analysis. In hazard research, however, the concept of resilience is used more often to refer to larger groups or entire communities, which mirrors the concept's roots in ecological systems thinking. Vulnerability, on the other hand, tends to focus on *differences* between individuals and smaller groups. A pragmatic approach combines both notions and acknowledges that all people are vulnerable to some things, and have some capacity for response – or resilience – at the same time. Vulnerable individuals exist in generally resilient societies, and vice versa. And while the resilience concept offers a valuable perspective on a society's capacities in the face of adversity, it cannot replace a focus on vulnerabilities. Or in the words of Blaikie and his colleagues: "Understandably, it was necessary to use terminology that emphasized the problem that is generated by social processes – if people's capabilities were all working properly then there would be few disasters."[27]

Management (Journal of Homeland Security and Emergency Management, 7/1, 2010).

24 Intergovernmental Panel on Climate Change (IPCC), Climate Change 2001: Impacts, Adaptation and Vulnerability (Geneva: IPCC, 2001): http://www.grida.no/publications/other/ipcc_tar/.

25 Gallopín, Gilberto C., *Linkages between Vulnerability, Resilience and Adaptive Capacity* (Global Environmental Change, 16/3, 2006), p. 301.

26 Janssen, Marco A. and Elinor Ostrom, *Editorial. Resilience, Vulnerability, and Adaptation: A Cross-Cutting Theme of the International Human Dimensions Programme on Global Environmental Change* (Global Environmental Change, 16/3, 2006).

27 Wisner, Ben et al., *At Risk: Natural Hazards, People's Vulnerability and Disaster* (London and New York: Routledge, 2004), p. 14.

4 VULNERABILITY IN PRACTICE

The following chapter looks at the practical implications of a social vulnerability approach to disasters. Part 4.1 briefly discusses social vulnerability considerations in global disaster risk reduction frameworks. Part 4.2 examines one of the main challenges for disaster management practitioners – the assessment of vulnerabilities. The final part of this chapter looks at possible vulnerability reduction policies.

4.1 Global initiatives and local implementation

The 1994 World Conference on Natural Disaster Reduction in Yokohama, Japan, was the first international conference to give serious consideration to the social aspects of vulnerability to natural disasters.[28] The Yokohama Strategy and Plan for Action states that "whilst the natural phenomena causing disasters are in most cases beyond human control, vulnerability is generally a result of human activity."[29] It also recognized the link between patterns of consumption, production, and development and the vulnerability to natural disasters. Ten years later, at another World Conference on Disaster Reduction in Hyogo, Japan, the international community had to accept that "disaster loss is on the rise with grave consequences for the survival, dignity and livelihood of individuals, particularly the poor, and hard-won development gains."[30]

The fact that many national and local governments have not yet managed to reduce social disaster risk effectively is partially due to the challenge of assessing vulnerabilities, which is a prerequisite for targeted action at all government levels. The following chapter addresses the challenges involved in the identification and measurement of vulnerabilities, and presents some projects undertaken in this regard.

4.2 Vulnerability assessment

Broadly speaking, there are two distinct possibilities when it comes to identifying those who are vulnerable to disaster: the group-based approach, and multi-dimensional vulnerability assessments.

4.2.1 Vulnerable groups

The group-based approach identifies a number of typically vulnerable groups and defines them as target groups for vulnerability reduction policies. There is a large body of research on the vulnerability of specific groups, e.g., women,[31] children,[32] the elderly,[33] members of low castes,[34] and many more. The value of such an approach is that it unveils the plight of those suffering most, and that it permits an easy targeting of prevention and mitigation measures. However, there are several problems with an approach that relies on generalizations about entire groups:

- Generalization about groups fails to take into account the situation of vulnerable individuals who do not belong to any of the typically vulnerable groups. Within the typically vulnerable groups, in turn, not everyone is equally vulnerable.
- A group-based approach is one-dimensional. It cannot capture the extreme vulnerability of individuals who carry so-called "vulnerability bun-

28 Ibid., p. 324.

29 ISDR, *Yokohama Strategy and Plan of Action for a Safer World: Guidelines for Natural Disaster Prevention, Preparedness and Mitigation* (World Conference on Natural Disaster Reduction, Yokohama, Japan, 23-27 May 1994): http://www.webcitation.org/5uKf3a8JU.

30 ISDR, *Hyogo Framework for Action 2005-2015: Building the resilience of nations and communities to disasters* (World Conference on Disaster Reduction, 18-22 January 2005, Kobe, Japan): http://www.webcitation.org/5uKf72acG.

31 Ikeda, Keiko, *Gender Differences in Human Loss and Vulnerability in Natural Disasters: A Case Study from Bangladesh* (*Indian Journal of Gender Studies,* 2/1995); Enarson, Elaine and Betty H. Morrow, *The Gendered Terrain of Disaster: Through Women's Eyes* (Westport, CT: Praeger, 1998); Enarson, Elaine and P.G. Dhar Chakrabarti, *Women, Gender and Disaster: Global Issues and Initiative* (New Delhi: Sage Publications).

32 Davis, A. P., *Targeting the Vulnerable in Emergency Situations: Who is Vulnerable?* (*Lancet*, 348/9031, 1996).

33 Bytheway, Bill, *The Evacuation of Older People: The Case of Hurricane Katrina* (Understanding Katrina: Perspectives from the Social Sciences, 2007): http://www.webcitation.org/5uKfA1zCg.

34 Bosher, Lee, Edmund Penning-Rowsell and Sue Tapsell, *Resources accessibility and vulnerability in Andhra Pradesh: Caste and non-caste influences* (*Development and Change*, 38/4, 2007).

dles"[35] because they belong to several disadvantaged groups at the same time.

- It does not explain *why* people are vulnerable and what can be done about it. The elderly are not vulnerable because they are old, nor is old age avoidable.[36] They may be vulnerable if they are infirm, socially isolated, and/or have to depend on others in the case of an evacuation; this clarification is crucial when preparing for disaster.
- It ignores the temporal and spatial contingency of vulnerability. Some groups are only vulnerable in some places, and some individuals move in and out of vulnerability during the course of their lives (children grow up, a person becomes unemployed). Others, usually those at the margins of society, are vulnerable to many hazards all through their life.

The vulnerability and resilience assessment guidelines of Emergency Management Australia offer a long list of potentially vulnerable groups, and the reason for their vulnerability (see Appendix).[37] At the same time, the authors emphasize the fact that this list consists of generalizations, and advise that it only be used as a checklist, with due regard for the complexity of both the communities and the emergency.

4.2.2 Multi-dimensional vulnerability assessments

In order to overcome the problems associated with the one-dimensional group approach, a number of multi-dimensional vulnerability assessments were developed (see Box below)[38] These assessments differ widely with regard to data collection (primary versus secondary data, quantitative versus qualitative assessments), level of analysis (region, community, household, or individual vulnerability), the indicators used, and the presentation of results (e.g., indices, maps).

35 Ahmed, Sara and Elizabeth Fajber, *Engendering adaptation to climate variability in Gujarat, India* (*Gender & Development*, 17/1, 2009), p. 36.

36 Buckle, Philip, Graham Marsh and Sidney Smale, *Assessing Resilience & Vulnerability: Principles, Strategies & Actions* (Guidelines prepared for Emergency Management Australie, 2001), p. 18: http://www.webcitation.org/5uKfCCtog.

37 Ibid., pp. 23-25.

38 IFRC, 1999; Daanish Mustafa et al., *Pinning down Vulnerability: From Narratives to Numbers*, in: Moench, M., E. Caspari and A. Pokhrel, *From Risk to Resilience Working Paper No. 2* (Kathmandu : ISET, ISET-Nepal and ProVention, 2008): http://www.webcitation.org/5uKfFGlGb; Cutter, Susan L., Bryan J. Boruff and W. Lynn Shirley, *Social Vulnerability to Environmental Hazards* (*Social Science Quarterly*, 84/2, 2003).

4.2.3 Problems and challenges of vulnerability assessments

There are some difficulties that pertain to all vulnerability assessments relying on quantitative data: Conceptual shortcomings within vulnerability science[39] (what is vulnerability, and hence, what are the proper indicators to measure it?), data quality and access (especially on a sub-national scale), the difficulty of measuring attitudinal and behavioral aspects of vulnerability, subjectivities, comparability of data and vulnerability scores, and the decision on which level of analysis to work. While the assessment of individual vulnerabilities is time-consuming and logistically difficult, any aggregation ignores differential vulnerabilities *within* the unit of analysis. Finally, no vulnerability assessment, be it qualitative or quantitative, is immune to missing the "invisible communities" that are considered to be nonexistent as far as numbers and data are concerned (illegal immigrants, homeless),[40] and those forgotten (or purposely ignored by the community) in participatory vulnerability assessments.

All these points apply to GIS practice as well, which relies on quantitative and often secondary data. To be sure, the use of GIS technology for the mapping of hazards and vulnerabilities holds a lot of potential. Results of risk assessments (likelihood, potential impacts, and spatial dimension of impacts) can be mapped onto vulnerabilities. Illustrating the spatial dimension of risks and vulnerabilities in maps offers emergency managers an easy identification of places of priority within their communities. The problem with this approach is that the concept of the vulnerability of a place assumes that vulnerabilities are actually concentrated in places. While this might hold true for societies where people marginalized by class, politics, or ethnicity are driven to the hazardous peripheries of a place, the locational dimension of hazard vulnerability is less clear-cut elsewhere.[41] Hence, a two-pronged approach to vulnerability reduction is needed: one concentrating on high-risk areas, and the other on particular needs of populations in various areas.[42]

39 Cutter, Susan L. and Christina Finch, *Temporal and spatial changes in social vulnerability to natural hazards* (Proceedings of the National Academy of Sciences, 105/7, 2008), p. 2301.

40 Masozera, Michel, Melissa Bailey and Charles Kerchner, *Distribution of impacts of natural disasters across income groups: A case study of New Orleans* (*Ecological Economics*, 63/2007), p. 301.

41 Bolin, Robert and Lois Stanford, *The Northridge Earthquake: Community-based Approaches to Unmet Recovery Needs* (*Disasters*, 22/1, 1998), p. 23.

42 Chakraborty, Jayajit, Graham A. Tobin and Burrell E. Montz, *Population Evacuation: Assessing Spatial Variability in Geophysical*

Three multi-dimensional vulnerability assessments and indices:

IFRC: Vulnerability and Capacity Assessment (VCA)
The VCA of the International Federation of Red Cross and Red Crescent Societies (IFRC) is a qualitative, participatory process. It is conducted by the national IFRC societies or their local branches and is a rather open process that can be adapted to the community in which it takes place. Sources of data may include a wide range of primary and secondary data (statistics, questionnaires, interviews, focus groups, observation, and more). Participants range from IFRC representatives, government authorities, and NGOs to community members, with a particular focus on the inclusion of vulnerable groups themselves. The community doing a VCA assesses not only vulnerabilities, but also the capacities it already has, and defines actions that have to be taken to strengthen these capacities. Results are presented in a report and shared with the community. The Swedish Red Cross, for example, has initiated VCAs in 1,600 localities in Sweden, and 150 local VCAs have already been done. One problem encountered in the Swedish case was that the local branches found it difficult to identify and really engage vulnerable individuals in the assessment process.

ProVention Consortium and ISET: Vulnerability and Capacities Index (VCI)
This is a multi-dimensional, purely quantitative index developed by the ProVention Consortium and the Institute for Social and Environmental Transition (ISET, ISET-Nepal)**.** It is field-tested and can be used by NGO teams and community activists. Vulnerabilities are assessed at the community and/or household level. The vulnerability index identifies eleven key drivers of vulnerabilities and capacities, including income source, educational attainment, assets, exposure to hazards, social networks, extra-local kinship ties, infrastructure, dependents in household, warning systems, membership in disadvantaged communities, and sense of empowerment. The weighted scores attributed to the individual drivers result in an overall vulnerability score. Data for compiling the VCI can either be drawn from primary sources, e.g., household surveys or focus group discussions for the community level VCI, or from secondary data sources (existing surveys).

Cutter et al. 2003: Social Vulnerability Index (SOVI) for the United States
The Social Vulnerability Index (SOVI) measures the social vulnerability of US counties to environmental hazards. It is meant as a tool for policy-makers and practitioners, and using GIS technology, it graphically illustrates the geographic variation in social vulnerability. County-level socioeconomic and demographic data (secondary data from the US Census) were used to construct the index, with the following individual and county-level factors identified in influencing the vulnerability of a county: personal wealth, age, density of the built environment, single-sector economic dependence, housing stock and tenancy, race, ethnicity, occupation, and infrastructure dependence. The SOVI map illustrates the spatial patterns of vulnerability, with the most vulnerable counties clustered in metropolitan counties in the east, south Texas, and the Mississippi Delta region (see Image 2).

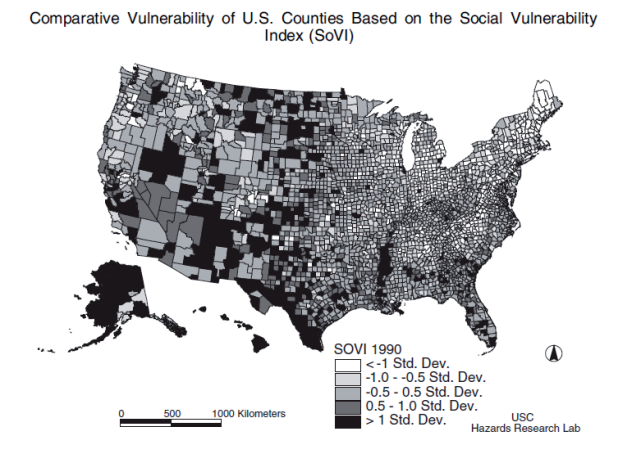


Image 2: Social vulnerability to environmental hazards in the US by county

4.3 Vulnerability reduction

Vulnerability assessments are not an end in themselves. They are designed and conducted to implement vulnerability reduction and risk mitigation programs. The following chapter illustrates some challenges with regard to vulnerability reduction, and how they could be addressed.

If disaster risk arises from political, social, and cultural inequalities, society has to address these inequalities in order to achieve sustainable risk and vulnerability reduction. This, however, is rarely what disaster management policy-makers and practitioners are hired for – to address root causes, a whole-of-government approach is needed. The World Vulnerability Report of 2004 hence distinguishes two approaches to disaster management and calls for a combination of both: Social vulnerability needs to be tackled at its roots and development and risk management should be integrated. However, as development and social change does not happen overnight, ongoing disaster risks and vulnerabilities need to be managed in what is known as "Compensatory Disaster Risk Management".[43] A number of instruments are available to individuals to manage their disaster risk, briefly described in the following part.

4.3.1 Disaster risk management instruments and their availability

In both approaches – addressing the root causes of vulnerability and in Compensatory Disaster Risk Management – it is important first to identify what the government is already doing to reach each group at risk, and what other instruments are available to individuals and groups to manage their risk.[44] The World Bank differentiates three broad groups of poverty risk management tools available to people that apply equally to disaster risk management: Informal arrangements, market-based arrangements, and public arrangements.[45]

Informal arrangements include savings, self-protection measures, and a reliance on family, friends, and the larger community for support. For many people worldwide, these informal arrangements still constitute the main source of risk management in the absence of market institutions and public provisions. A typical **marked-based arrangement** is insurance, be it private health insurance or specific disaster insurance (flood insurance, for example). **Public arrangements** include all provisions by the welfare state, and the reliance on government disaster management (prevention and mitigation, preparedness, response and recovery measures).

It is then important to identify the gap in the availability of risk management instruments. The vulnerable groups or individuals are those who for some reason cannot make use of some of these arrangements, and the most vulnerable are those who fall through all or most of these "safety nets".[46] In their analysis of the recovery from the 1994 Northridge earthquake in California, Robert Bolin and Lois Standford called this the "unmet needs" of those – mainly low-income and ethnic-minority households – who lacked both the personal resources to cope with their losses and could not qualify for sufficient federal and state relief. The reason they could not qualify was either because this relief was targeted at middle-class home-owners, or because they did not know their entitlements and had insufficient knowledge, skills, and time to work through the complicated application process. In response to those unmet needs, a number of non-governmental organizations (NGOs) stepped in to help the most vulnerable in their recovery process.[47]

4.3.2 Vulnerability reduction in the disaster/risk management cycle

The following section examines how vulnerabilities influence outcomes in all phases of the disaster management process (Image 2).

Risk and Social Vulnerability to Natural Hazards (Natural Hazards Review, February 2005), p. 32.

43 UNDP, 2004.

44 Hoogeveen et al., 2004, p. 26.

45 Holzmann, Robert, Lynne Sherburne-Benz and Emil Tesliuc, *Social Risk Management: The World Bank's Approach to Social Protection in a Globalizing World* (Washington, D. C.: The World Bank, 2003), pp. 7-8: http://www.webcitation.org/5uKfKeowg.

46 Barrett, C., *On Vulnerability, Asset Poverty and Subsidiarity* (Comments to the Ford/Rockefeller Foundations Seminar Series "Managing Vulnerability and Shocks within the Agro-Food System", New York, 20 May 1999): http://www.webcitation.org/5uKfNeA9U.

47 Bolin and Stanford, 1998.

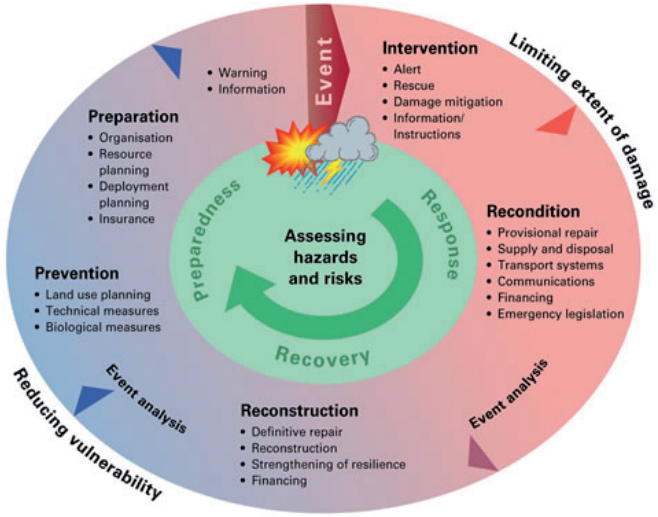


Image 2: The cycle of integrated risk management. Source: FOCP

- **Assessing hazards and risks**:

Risk or hazard assessments need to be complemented by vulnerability assessments to account for the unequal distribution of risks within society. It can and should be conducted in all phases before, during, and after a crisis, as needs and vulnerabilities may change.

- **Preparedness**:

Efforts to prevent or mitigate the effects of disasters include structural measures (dams, flood-levees, safe buildings) and non-structural measures such as land use planning and insurance. Most efforts to address the root causes of vulnerability can be considered prevention and preparation (mitigation) measures. A typical case of Compensatory Disaster Risk Management in this context is to erect flood-levees to protect a slum without changing the societal root causes that drive people to the slums in the first instance. Vulnerability reduction through prevention and preparation, then, involves an economic allocation problem that a society has to address: The question is no longer simply how much disaster prevention should be provided to society as a whole, but also includes the issue of who it should be provided to.[48] Should a state protect the largest number of people possible, or protect the most vulnerable because they will have difficulty in coping with losses if they occur? This question is an ethical one and as such closely related to the topic of *protection goals* in natural hazards management: protection goals provide guidance for when specific (risk reduction) measures need to be taken, because they help to differentiate acceptable risks from unacceptable risks.[49]

The disparate vulnerability of people also needs to be taken into account when preparing for emergencies and training emergency services. During training and exercises, awareness needs to be raised with regard to differential vulnerabilities and populations with special needs. Emergency services need to be able to access information about vulnerable individuals and groups in their communities to plan their operations accordingly.

A crucial part in the management of vulnerabilities, however, pertains to warning and evacuation. Warning must be designed to accommodate visual, hearing, and cognitive impairments, it must be redundant and communicated via multiple media, and issued in more than one language so that the foreign population (and tourists, one might add) can understand warning messages and take appropriate actions. Evacuation is a particularly crucial matter. Hurricane Katrina is a case in point: Why did so many remain in their homes when Katrina approached, in

48 Boyce, James K., *Let Them Eat Risk? Wealth, Rights and Disaster Vulnerability* (*Disasters*, 24/3, 2000), p. 256.

49 Nationale Plattform Naturgefahren PLANAT, *Schutzziel-Modell* (Berne: Federal Office for the Environment, 2009): http://www.webcitation.org/5uKfy4EE3.

spite of dramatic forecasts and evacuation orders? Several reasons are offered: Evacuation is difficult, especially so for those who are fragile because of age or illness. For those in health care facilities, evacuation may not be offered as an individual option. Ten per cent of those who died in the hurricane were in hospitals or other acute-care facilities.[50] Another reason for the low degree of compliance with evacuation orders was that Katrina struck at the end of the month, before paychecks and welfare or disability checks had arrived, hence people had no money to use for transportation and hotels.[51] In any disaster, the poor might be more reluctant to leave their residences out of fear of looting and stealing, so as not to lose the few (and uninsured) possessions they have. Considering these vulnerability factors that influence evacuation decisions, it would be wrong to blame the victims themselves, as was attempted in the official Titanic inquiry: "It is no doubt true that the proportion of third class passengers saved falls far short of the proportion of the first and second class, but this is accounted for by the greater reluctance of the third class passengers to leave the ship, by their unwillingness to part with their baggage, by the difficulty in getting them up from their quarters, which were at the extreme ends of the ship, and by other similar causes."[52]

- **Response:**

During the response phase of an emergency, vulnerable people need special protection and assistance. The poor might need quick cash to help them deal with the disaster in the first phase. As the example of the 2010 earthquake in Haiti and many examples before have shown, it is crucial that the survivors not become victims to violence (sexual violence, kidnapping of children) because of their vulnerabilities and position and status in society. This extends to sheltering, where problems that existed in society before the disaster become more acute and visible because of the spatial concentration (e.g., cases of rape in refugee camps). Attention should also be paid to the "invisible" vulnerable,[53] such as illegal immigrants who might be reluctant to make themselves visible for fear of being deported or jailed, or to the homeless or socially isolated.[54] During the response phase, the main goal will be to reduce or avoid immediate suffering and death that arose from the combination of the event that happened and the underlying vulnerabilities.

- **Recovery:**

The recovery phase is the time when efforts are made to return to "normal" state. Returning to "normal" also means reproducing and reinforcing the vulnerabilities that existed prior to the disaster. Disaster assistance programs often try to disentangle pre-existing needs from disaster-caused needs, and only provide help with losses that are directly attributable to the disaster itself.[55] If vulnerabilities are not addressed in this phase, however, they become a legacy during the next disaster. Apart from addressing the root causes, it is also important in this phase that unmet needs be addressed, helping those who either do not have the financial means or insurance to rebuild their homes and lives, and helping the survivors with bureaucratic procedures required to apply for assistance. It is important to note that the actors and organizations involved in recovery and reconstruction (e.g., insurance companies, social welfare offices, NGOs, and charities) are often different from the "traditional" disaster management actors, which is why an inclusive approach is particularly important during this phase.

Some governments have already included the concept of vulnerability in their disaster management documents (see Image 3). This needs to be followed up by the implementation of vulnerability reduction measures in all phases of disaster management, at all administrative levels, and with regard to different vulnerabilities, not just the obvious ones relating to physical disadvantages (children, women, elderly, and disabled). Moreover, good practices need to be shared, following the example of the Asian Disaster Reduction Center (ADRC), which has been publishing good-practices reports from several countries annually since 2005.[56]

50 Schmidlin, Thomas W., *On Evacuation and Deaths From Hurricane Katrina* (*Bulletin of the American Meteorological Society,* 87/6, 2006), p. 755.

51 Cutter, Susan et al., *The Long Road Home: Race, Class, and Recovery from Hurricane Katrina* (*Environment: Science and Policy for Sustainable Development,* 48/2, 2006), p. 11.

52 Mersey, 1912.

53 Masozera, Bailey and Kerchner, 2007, p. 301.

54 For a report on the various and complex vulnerabilities of the homeless, see, for example, Khandor, Erika and Kate Mason, *The Street Health Report 2007* (Toronto: Street Health).

55 Bolin and Stanford, 1998, p. 26.

56 Asian Disaster Reduction Center (ADRC), Total Disaster Risk Management – Good Practices 2009 (Kobe: ADRC, 2009): http://www.webcitation.org/5uKg10J9Y

Germany	„Auch die Wohnbevölkerung unterscheidet sich in ihrer Verletzlichkeit (Vulnerabilität) und ihrer Widerstandsfähigkeit (Resilienz) gegenüber Gefahren sozial stark. Bei der Herausgabe von Warnungen und bei Schutzmaßnahmen sind vulnerable Individuen und soziale Gruppen besonders zu berücksichtigen. Hierzu können Kinder, alte Menschen, Kranke, Behinderte sowie Menschen mit unzureichenden Deutschkenntnissen gehören." (Dritter Gefahrenbericht für Deutschland 2006)[57]
Australia	"When identifying risks it is important to consider community vulnerabilities. Because vulnerability means being susceptible to a potential impact, communities that have high exposure to hazards and are less able to adapt are vulnerable. So, depending on the scope of the study, identifying risks will reveal exposed elements at risk and their capacity to cope, in order to prioritise vulnerable (elements of) communities. When appropriate, specific (vulnerable) elements at risk can be used to generate risk statements." (National Emergency Risk Assessment Guidelines 2009)[58]
Canada	"Vulnerability – the conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards." (An Emergency Management Framework for Canada 2007)[59]
Kenya	"Kenya is a particularly disaster prone country and these risks often affect the most vulnerable people disproportionately." (...) "The Policy aims to increase and sustain resilience of vulnerable communities to hazards. This entails a shift from the short term relief responses to sustainable development and continual risk reduction and preparedness." (...) "Disaster risk management includes a development-based set of activities aimed at reducing vulnerability within populations that are at risk to particular hazards." (...) "MOSSP will ensure that response activities are undertaken in a manner that ensures that the most vulnerable groups are specifically targeted." (National Disaster Management Policy 2009)[60]

Image 3: Social vulnerability in selected government documents on disaster management

57 Bundesamt für Bevölkerungsschutz und Katastrophenhilfe (BBK), *Dritter Gefahrenbericht der Schutzkommission beim Bundesminister des Innern: Bericht über mögliche Gefahren für die Bevölkerung bei Großkatastrophen und im Verteidigungsfall* (Bonn: BBK, 2006), p. 49: http://www.webcitation.org/5uKg3VtDh.

58 Australian Emergency Management Committee, *National Emergency Risk Assessment Guidelines* (Hobart: Tasmanian State Emergency Services, 2009), p. 24: http://www.webcitation.org/5uKg8bVCo.

59 Government of Canada, An Emergency Management Framework for Canada (Ottawa: Emergency Management Policy Directorate, Public Safety and Emergency Preparedness Canada, 2007), p. 12: http://www.webcitation.org/5uKgDgagl

60 Government of Kenya, *National Disaster Management Policy* (2009): http://www.webcitation.org/5uKgHijDl.

5 IMPLICATIONS FOR SWITZERLAND

Which parts of society are the most vulnerable to disasters in Switzerland? At first sight, it is difficult to imagine extreme vulnerabilities that can be attributed to class, gender, religion, ethnicity or poverty in the ways witnessed in countries with severe social inequalities. While inequalities certainly exist in Switzerland, some of them – but by far not all – are covered by the social security system, e.g., mandatory health insurance for everybody, unemployment insurance, or the old-age, survivors', and invalidity insurance programs, or social welfare. Any assessment of vulnerabilities in Switzerland has to take into account not only the vulnerabilities, but also the social security mechanisms already in place.

5.1 Vulnerability in Switzerland

The following persons may be conceivably vulnerable to disasters in Switzerland – *apart* from those who are vulnerable because of physical and mobility restraints, e.g., children, the elderly, or the physically/mentally disabled. The list is not exhaustive, but may serve as an impetus to explore this issue further:

- Those who do not have the financial means to prepare for, cope with, or recover from a disaster individually and who do not have sufficient insurance coverage for potential losses
- Those living in municipalities with limited financial means that are at the same time situated in hazardous places (e.g., valleys exposed to landslides and avalanches)
- Those who cannot understand any of the national languages well (relevant with regard to warning, evacuation, dealing with the bureaucracy of post-disaster assistance etc.), which includes a part of the foreign residents of Switzerland, asylum seekers, and tourists
- Those who are not familiar with some hazards the Swiss have learned to live with (for example avalanches), or those who do not know the mechanisms in place to offer them protection
- Those who are socially isolated
- Those who do not have control over their own security and response to an event (those in institutions, old-age homes, prisons, hospitals, etc.)
- Those already at the margins of society; the homeless, transients (*Fahrende*), and those who do not officially exist in Switzerland (illegal immigrants/sans-papiers)

The following section offers a number of recommendations on the inclusion of the concept of differential vulnerability in disaster management in Switzerland. The suggested activities are all within the scope of influence of the Federal Office for Civil Protection (FOCP). Though civil protection is primarily a responsibility of the cantons, the FOCP collaborates with and supports the cantons and municipalities as well as the partner organizations with their civil protection activities, including the further development of civil protection, training, and research.[61] Since its formation in 2003, it has assumed a leading and coordinating role in promoting comprehensive disaster risk assessment within the federal government.

5.2 Recommendations for Switzerland

- **Include the notion of social vulnerability to disasters in key disaster management documents**

The core national policy documents in the realm of security and disaster management do not make explicit reference to the differential vulnerability to disasters *within* Switzerland that are rooted in political, social, economic, cultural, or physical inequalities.[62] This stands in some contrast to the work Switzerland does abroad: Disaster Risk Reduction that takes into account differential vulnerabilities is a priority for the Swiss Agency for Development (SDC)'s Humani-

61 Federal Office for Civil Protection (FOCP): http://www.webcitation.org/5uKgKsDqd. Note that there is a difference in Switzerland between civil protection ("Bevölkerungsschutz") and the Protection and Support Service ("Zivilschutz"). Civil protection in Switzerland is used, as it is in most European countries (and equivalent to Emergency Management in the United States), as a comprehensive approach to protect the population, its vital resources and cultural property from current security challenges. The Protection and Support Service, on the other hand, is one of five partner organizations in this system.

62 *Bericht des Bundesrates an die Bundesversammlung über die Sicherheitspolitik der Schweiz (2010)*: http://www.webcitation.org/5uKgNBP8R; *Bundesgesetz über den Bevölkerungsschutz und den Zivilschutz, Entwurf 2010*: http://www.webcitation.org/5uKgRRCht; *Sicherheit vor Naturgefahren: Vision und Strategie* (2002): http://www.webcitation.org/5uKgUdkbb.

tarian Aid branch. The SDC assists partner countries, civil society, and communities with targeted activities for the reduction of the disaster risks (hazards and/or vulnerability) of the poor.[63] The FOCP should take a leading role in promoting the concept of social vulnerability to disasters in Switzerland both within the federal government and in the cantons, and it should address the topic in its key documents. While the mere integration of a concept in national policy documents does not guarantee the implementation of vulnerability reduction and management policies at the lower levels, it raises awareness and provides a basic framework that can facilitate, encourage, and initiate thinking in terms of vulnerability on lower administrative levels.

- **Raise awareness in the cantons and with partner organizations**

The FOCP supports the cantons with their civil protection training activities, and periodically organizes training courses for cantonal staff unit personnel. The FOCP should seize this opportunity to raise awareness in the cantons and partner organizations with regard to social vulnerabilities. In doing so, it must build on existing knowledge: Partner organizations and municipal authorities usually know their communities well. They will have thought about the special needs of some of their vulnerable community members already, but chances are that these are for the most part limited to people with physical limitations. What the FOCP should do is to raise awareness with regard to all vulnerabilities, including those that do not immediately come to mind. In the area of risk communication, it should encourage the cantons to inform vulnerable groups about risks, providing solutions and recommendations for appropriate risk-minimizing individual behavior ('risk literacy').[64]

- **Encourage vulnerability assessments within cantonal disaster risk assessments**

Risk analysis in the realm of civil protection is a cantonal competency. The FOCP has no authority to issue binding directives to the cantons in this regard. The FOCP does, however, offer methodological support for the cantons in the form of guidelines (KATAPLAN) and consultancy. These guidelines offer a good basis for the inclusion of the social vulnerability concept. The KATAPLAN guidelines suggest that the cantons assess risks according to their probability of occurrence and potential impact based on detailed scenarios. The analyzed risks are compared and illustrated using a risk matrix. Vulnerability considerations are best integrated within the scenarios. While the sample scenario provided in the guidelines already mentions "special needs in a disaster", these special needs pertain mainly to physical vulnerabilities of children, the elderly, and the disabled. The cantons should build on that and identify additional vulnerabilities and vulnerable community members to be included in the scenario description.

However, vulnerability assessment is best conducted at the municipal levels, where a "community" exists and where there are people who know the community well. The FOCP should therefore encourage the cantons to include the communities in their risk assessments.

With regard to participants in the risk assessment process, the FOCP suggests an inclusive process in which civil protection authorities work together with the partner organizations (first responders), infrastructure providers, insurance companies etc. This list should be extended to include "unconventional" participants who know the community well and can contribute to the identification of vulnerable people and groups. This may include parish priests, teachers, social workers, the social welfare office, doctors, local media, and others.

- **Think of social vulnerabilities in the national risk assessment (Risiken Schweiz)**

The Swiss Confederation conducts a national risk assessment. The FOCP coordinates this process known as *Risiken Schweiz*, which involves all federal departments. An important part of the process is the development of risk files (previously called basic scenarios) for a large number of potential hazards. These files are public, and one intention is that the cantons can use and adapt them for their cantonal risk assessments. Information on vulnerable groups and those who are most likely to be affected by the event could be part of these risk files. Though vulnerabilities are context-specific, including some initial thoughts on

63 Swiss Agency for Development and Cooperation (SDC), *SDC Guidelines on Disaster Risk Reduction* (Berne, SDC: 2008): http://www.webcitation.org/5uKgZSXW9. The SDC also runs a platform with information on current activities, background information, tools, publications, and training opportunities in the realm of Disaster Risk Reduction: http://www.riskandsafetynet.ch.

64 Giroux, Jennifer, Jonas Hagmann and Myriam Dunn Cavelty, *Focal Report 3 – Risk Analysis: Risk Communication in the Public Sector* (Zurich: Center for Security Studies, ETH Zurich, 2009), p. 6: http://www.webcitation.org/5uKgmiS9x.

vulnerable individuals and groups in the national assessments will serve as an aid to cantonal authorities when assessing their own risks and vulnerabilities.

- **Develop a vulnerability checklist for the cantons, municipalities, and partner organizations**

The FOCP should work with cantons and communities to develop a vulnerability checklist similar to the one by Emergency Management Australia (see Appendix). The checklist could serve as an aide-mémoire in risk assessments and operations planning, but should be accompanied by a note on caution with generalizations about groups.

- **Promote research on social vulnerability in Switzerland**

There is a lack of research on the social vulnerability to disasters in Western Europe in general, and in Switzerland in particular. The FOCP should promote further research on vulnerabilities in Switzerland, maybe in cooperation with the Federal Office for the Environment (FOEN), which is a key actor in the management of risks from natural hazards.[65] It could also draw on the experience of the SDC with Disaster Risk Management abroad. The use of GIS technology in social vulnerability research should be explored further. Tasked by the FOEN, the cantons will complete municipality level hazard maps on floods, avalanches, landslides, and rock falls by 2011. Using GIS technology, these maps could then be combined with data on social vulnerabilities. A 2005 study demonstrates that spatial segregation with regard to social status, age structure, and foreign population is on the rise in Switzerland.[66] The concept of a "vulnerability of place" and the application of GIS technologies will become more valuable as these segregation processes continue.

65 Federal Office for the Environment (FOEN): http://www.webcitation.org/5uKgqvndU.

66 Hermann, Michael et al., *Soziokulturelle Unterschiede in der Schweiz: Vier Indizes zu räumlichen Disparitäten 1990-2000* (Neuchâtel: Bundesamt für Statistik, 2005): http://www.webcitation.org/5uKguPUcx.

APPENDIX

List of vulnerable groups and reasons for their vulnerability, Emergency Management Australia[67]

The Entire Population
Everyone is vulnerable in one way or another to some loss. Even the wealthy may be vulnerable to loss of irreplaceable memorabilia, emotional or psychological loss. Even though they have the resources to easily replace material losses. Equally, most people will have some degree of resilience, some coping capacity, some resources or networks or support services to draw upon.

The aged (particularly the frail)
In terms of mobility and physical capacity. In turn this may reduce their capacity to access information or to appreciate the urgency of certain situations

Babies, infants and young children
In terms of managing their own lives and recovery and in terms of understanding the event.

Adolescents and Youths
Young adults may have special needs given the demands made on them by the transition into the adult world and the requirements of education and other personal development matters.

Gender
Different genders may have varying skills and needs. These are often counterintuitive and need to be assessed in the circumstances. Stereotypes should be avoided.

The disabled (intellectual, psychiatric, and physical)
In terms of managing their own recovery and in getting access to information and resources.

People with limited resources to meet essential daily needs
In terms of having the financial and physical resources to achieve recovery or to protect themselves against loss through, for example, insurance.

Non-English Speakers (NESB)
In terms of understanding the potential risks and in gaining access to information and of communicating their needs.

The socially isolated
In terms of having family or friends that can provide personal and physical support and in terms of accessing information and support.

The physically isolated
In terms of having easy, cheap and fast access to resources, or in terms of being able to call on assistance from other members of the community or from agencies.

The seriously ill
In terms of already being in need and having a very low capacity to carry out protective or recovery activity.

People dependent on technology-based life support systems
In terms of being dependent on systems over which they have no control.

Large families
In terms of complex family needs and dynamics and increased costs for prevention and recovery; these needs may be offset by the extra support that a large family can offer.

Single parent families
In terms of having to manage a range of demands with limited support.

Workers at risk from machinery or equipment failure
In terms of potential severity of injury. also failure of machinery may have downstream effects, such as job losses

67 Buckle, Marsh and Smale (2001), pp. 23–25.

People with limited coping capacity
In terms of low or reduced capacity to manage life events. Many people are able to cope with and to manage daily life. But any new or additional disruption or burden may push them across a threshold from where they are unable to deal with either the new situation or their previous needs.

People with limited personal capacity to deal with stress and disruption, with limited economic resources or who have previously experienced significant stress, trauma or loss in their lives. This group may already be on the margins of successful life management or day-to-day coping with loss, damage or threat to life, safety, property or income caused by an emergency or disaster, and the new disaster may disrupt them even more.

People with limited management skills
People with limited skills in management, decision-making and resource acquisition may find it difficult to manage their needs, even if they have adequate physical and financial resources.

People with inadequate accommodation.
People already in straitened circumstances and with existing high levels of need and support.

Tourists and travellers
In terms of being absent from their own communities and resources and being in an unfamiliar environment; possibly with little knowledge of how to access resources and services.

New arrivals to the country
May have limited understanding of local services, laws and values. They are likely to have restricted support networks and may require specialist support with language and social support services.+

People affected by an emergency
In terms of needs (medical, psychological, material, etc) generated by the event.

In this list we have indicated a range (but not necessarily the full range) of groups that may have particular needs. It is important to remember that any person may belong to a number of these cohorts. That families will contain members with different needs and strengths and that communities (especially those based on area) are characterised often by diversity in detail as much as by homogeneity and commonality.

The Center for Security Studies (CSS) at ETH Zurich specializes in research, teaching, and information services in the fields of international relations and security policy. The CSS also acts as a consultant to various political bodies and the general public. The Center is engaged in research projects with a number of Swiss and international partners, focusing on new risks, European and transatlantic security, strategy and doctrine, state failure and state building, and Swiss foreign and security policy.

The Crisis and Risk Network (CRN) is an Internet and workshop initiative for international dialog on national-level security risks and vulnerabilities, critical infrastructure protection (CIP) and emergency preparedness. As a complementary service to the International Relations and Security Network (ISN), the CRN is coordinated and developed by the Center for Security Studies at the Swiss Federal Institute of Technology (ETH) Zurich, Switzerland. (www.crn.ethz.ch)