

The Vulnerable in Natural, Environmental and Technological Disasters

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Disasters

This paper is concerned with vulnerable groups in disaster situations. The initial ambition was to focus on vulnerable workers and those in precarious work.¹ It is clear, however, that insufficient research has been done on the effects of disasters on vulnerable people in the context of work and, indeed, on the effects on those in non-standard working arrangements.² The focus of this paper is therefore on the position of vulnerable people in disaster situations from which we can perhaps draw some conclusions in relation to work.

Disasters are defined by the UNISDR³ as ‘a serious disruption of the functioning of a community or a society involving widespread human, material, economic or environmental losses and impacts, which exceeds the ability of the affected community or society to cope using its own resources’. Thus disasters can have impacts on individuals or groups and also upon property, assets and economic and environmental well-being. In a comment attached to this definition, it is stated that disasters are often the result of a combination of exposure to a hazard; the conditions of vulnerability and insufficient capacity or measures to cope with the potential negative consequences.

This is a very wide definition and a more limited one can be found in UK government advice, namely ‘any unwanted significant incident which threatens personnel, buildings or the operational structure of an organisation which requires special measures to be taken to restore things back to normal’.⁴ The features of a disaster are that it is widespread or significant and that it threatens or disrupts the functioning of a community or society in a significantly negative manner. The essential difference between the definitions is the ability of the affected community or society to cope using their own resources. This may be a reflection of the magnitude of the disaster and/or of the financial and other resources available to the community to deal with the aftermath. The great Japan earthquake of 2011 and the consequent tsunami had a devastating effect and truly appalling consequences for the Japanese people with almost 16,000 people killed in Japan and many thousands more injured or missing and up to a million homes destroyed or damaged. Hurricane Katrina, which hit the Gulf Coast of the United States in 2005 resulted in deaths

¹ See below for further discussion of these concepts.

² Such as temporary, casual or seasonal workers

³ United Nations Office for Disaster Risk Reduction <http://www.unisdr.org/we/inform/terminology>

⁴ Definition taken from ‘How Resilient is Your Business to Disaster’, chapter 2; Home Office publication, 2006.

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61216/how-resilient-business-disaster.pdf

of over 1800 people with about 275,000 homes being damaged or destroyed.⁵ These are huge devastating events with large scale impacts, but the explosion and subsequent fire at the Buncefield Oil storage depot in Hertfordshire in the United Kingdom in 2011, which was tiny when compared to the Japan earthquake or the Katrina floods, also had a devastating effect upon its smaller community. Some 43 people were injured and there was significant damage to the domestic and commercial infrastructure. Buncefield, despite the limited nature of its scope was also a disaster for the people in the surrounding community. It was also an example of a technological disaster and contrasts with the natural or environmental disasters in Japan and the USA.

Vulnerability

Vulnerability in this context has been defined as the capacity to anticipate, cope with, resist, and recover from the impact of natural disaster.⁶ Vulnerability is seen as a combination of the risk of experiencing a disaster event and the ability to cope with the event and its aftermath. Presumably the lesser the likelihood of coping with the disaster the more vulnerable the individual or group becomes. Others have seen a more personal dimension to this definition and defined vulnerability as meaning 'the characteristics of a person or group and their situation that influence their capacity to anticipate, cope with, resist and recover from the impact of [in this case] natural hazards'.⁷ Thus the consideration concerns an individual's or a group's personal and economic characteristics which in turn can affect the individual's or the group's ability to cope. Wisner⁸ cites the example of the major earthquake in Guatemala in 1976 where the mortality rate was much higher for the poor slum dwellers in Guatemala City than for the middle classes. The poor lived in flimsier houses on steeper slopes than the rich and had much less access to the means of social and self-protection.

The poor are more vulnerable in disaster situations. They are more likely to die, suffer injuries and have proportionately higher material losses. They also face more obstacles during the response, recovery and reconstruction phases.⁹ Indeed the idea that natural or other disasters are somehow egalitarian in their impact, namely that all suffer from the flood or earthquake, for example, on an equal basis is not shown to be true. Natural and other disasters 'do not occur in historical, political, social, or economic vacuums. Instead, the consequences of such catastrophes replicate and exacerbate the effects of extant inequalities, and often bring into view the implications of historic

⁵ Venn, D. (2012) 'Helping Displaced Workers Back Into Jobs After a Natural Disaster: Recent Experiences in OECD Countries'; *OECD Social, Employment and Migration Working Papers* No 142, OECD Publishing. http://www.oecd-ilibrary.org/social-issues-migration-health/helping-displaced-workers-back-into-jobs-after-a-natural-disaster_5k8zk8pn2542-en

⁶ Adger, N.W. (1999) Social vulnerability to climate change and extremes in coastal Vietnam *World Development* 27(2) 249-269 cited in Michael Masozera, Melissa Bailey, Charles Kerchner Distribution of impacts of natural disasters across income groups: A case study of New Orleans *Ecological Economics* 2007 63(1-2) 299-306.

⁷ Wisner, Benjamin. *At Risk: Natural hazards, people's vulnerability and disasters* (2004) Routledge, London.

⁸ Wisner, Benjamin. *At Risk: Natural hazards, people's vulnerability and disasters* (2004) Routledge, London.

⁹ Fothergill, A., and Peek, L.A., (2004) Poverty and disasters in the United States: a review of recent sociological findings *Natural Hazards* 32 89-110.

discrimination, legal status, language barriers, poverty and geographic vulnerabilities'.¹⁰ Thus existing inequalities in society are likely to be reflected in the impact of a disaster and with the scale of the subsequent effects.

Vulnerable workers and precarious work

There is also an extensive literature on vulnerable workers and precarious work and it is perhaps important to distinguish between the two concepts. The Law Commission of Ontario's report on vulnerable workers and precarious work provides this definition of precarious work:¹¹

Precarious work is characterized by lack of continuity, low wages, lack of benefits and possibly greater risk of injury and ill health... Measures of precariousness are level of earnings, level of employer-provided benefits, degree of regulatory protection and degree of control or influence within the labour process... The major types of precarious work are self-employment, part-time (steady and intermittent) and temporary.

Precarious work is therefore the type of contractual relationship which does not consist of an open ended full time contract. It is often classified as contingent working or non-standard working. The features of precarious or contingent work are that it is work for more than one employer, it is not 'full-time' and is limited in duration.¹² According to the Ontario Law Commission study this type of work lacks security and provides workers with limited benefits; and 'the phenomenon has been a contributing factor in the rising rates of income inequality in many OECD countries, as well as a contributor to social unrest in some. There is also a strong gender bias in this work pattern with women less likely than men to be in employment and, when employed, working shorter hours than men,¹³ but

Domestic responsibilities are not the only reason for women's lower employment rates. Women have higher unemployment rates than men in many countries, and segregated employment patterns and lack of equal treatment means that once employed they have lower earnings, inferior employment conditions and poorer promotion prospects.¹⁴

¹⁰ When Disaster Strikes A Human Rights Analysis of the 2005 Gulf Coast Hurricanes; The Inter-American Commission of Human Rights General Situation Hearing on Natural Disaster and Human Rights Friday March 3 2006; International Human Rights Law Clinic Boalt Hall School of Law March 2006 http://www.law.berkeley.edu/files/IHRLC/Briefing_Paper_Report_When_Disaster_Strikes_2_Mar_06.pdf

¹¹ Law Commission of Ontario, *Vulnerable Workers and Precarious Work* (Toronto: December 2012); <http://www.lco-cdo.org/vulnerable-workers-final-report.pdf>

¹² See Feldman, D. C. 'Toward a new taxonomy for understanding the nature and consequences of contingent employment'. *Career Dev. Int.* 11(1):28-47, 2006; cited in Philip Bohle, Claudia Pitts, and Michael Quinlan 'Time to call it quits? The safety and health of older workers' *International Journal of Health Services* (2010) 40(1)23-41.

¹³ Fagan, Collette (with Tracey Warren and Iain McAllister) *Gender, Employment and Working Time Preferences in Europe* (2001) European Foundation for the Improvement of Living and Working Conditions ;<http://www.eurofound.europa.eu/publications/htmlfiles/ef0145.htm>; for further consideration see Sargeant, M. and Ori, Martina (eds) *Vulnerable workers and precarious working* (2013) Cambridge Legal Scholars.

¹⁴ Fagan, Collette (with Tracey Warren and Iain McAllister) *Gender, Employment and Working Time Preferences in Europe* (2001) European Foundation for the Improvement of Living and Working Conditions ;<http://www.eurofound.europa.eu/publications/htmlfiles/ef0145.htm>

Of relevance for this study is the link between occupational health and safety (OHS) and precarious working. There is evidence of a clear link between these types of contractual relationships and negative OHS outcomes.¹⁵ Thus, even in non-disaster situations, those in precarious work relationships are likely to be more vulnerable than others.

One useful definition of a vulnerable worker is¹⁶

..someone working in an environment where the risk of being denied employment rights is high and who does not have the capacity or means to protect themselves from that abuse’.

This is a useful starting point and, of course, one can immediately see the connection with precarious employment as probably this definition is more likely to apply to those in precarious type contracts of employment such as temporary, casual and seasonal workers. The Ontario Law Commission further illustrates this point:

Although anyone may be precariously employed, precarity is more likely to affect workers in “already marginalized social locations”. This includes women, single parents (who are disproportionately women), racialized groups, new immigrants, temporary foreign workers, Aboriginal persons, persons with disabilities, older adults and youth. The link between marginalized workers and precarious employment is partly explained by their difficulty accessing higher education and skills training. It is also significant that they are more often employed in temporary and/or part-time jobs.

Thus there is a higher likelihood of vulnerable workers being in precarious work and it is possible to identify those who make up the vulnerable workforce.¹⁷ Indeed one study estimated that one in five of the UK workforce was vulnerable in this sense.¹⁸ The figures are much higher for the developing world. The International Labour Organisation (ILO) estimated that, in 2012, some 1.49 billion workers in developing countries were in

¹⁵ Quinlan, Michael. Mayhew, Claire and Bohle, Philip (2001) ‘The Global expansion of precarious employment, work disorganization, and consequences for occupational health: a review of recent research’ *International Journal of Health Services* 31(2) 335-414.

¹⁶ *Success at Work* Department for Trade and Industry (now Department for Business and Innovation) 2006; <http://webarchive.nationalarchives.gov.uk/+http://www.dti.gov.uk/employment/employment-legislation/success-at-work/index.html>

¹⁷ The UK Trades Union Congress set up a Commission on Vulnerable Employment and reported that the following were identified as being part of that vulnerable workforce: *Agency workers*: who do not have the same employment rights as others who do the same jobs; *Other ‘atypical workers’* (for example *casual workers and some freelancers*): who face insecurity and inequality in the workplace; *Young workers*: who are not entitled to the same rates of the minimum wage as others and are more likely to face exploitation; *Industrial homeworkers*: who are often denied even the most basic employment rights; *Unpaid family workers*: employed across a range of businesses with no legal protection at work; *Recent migrants*: who are more likely to face extreme discrimination, dangerous working conditions and a range of other abuse – including forced labour.

The Ontario report identified the following groups: Women and Single Parents, Racialised Persons, Newcomers to Canada and Established Immigrants, Temporary Migrant Workers, Aboriginal Persons, Persons with Disabilities, Youth, and Non-Status Workers.

¹⁸ Policy Studies Institute (2006). http://www.psi.org.uk/news/pressrelease.asp?news_item_id=188

vulnerable employment.¹⁹ This represented some 56 per cent of all workers in the developing world.²⁰

Thus one can see that in a 'normal' work situation there are potentially large numbers of vulnerable workers, many of whom are in precarious contractual employment relationships. If one then applies the definition of vulnerability in disaster situations, namely the capacity to anticipate, cope with, resist, and recover from the impact of a natural disaster, one can hypothesise that vulnerable workers in precarious employment situations are also likely to be the most highly vulnerable in disaster situations also.

Vulnerable groups

Adopting this joint vulnerability approach we can focus on particular vulnerable groups in disaster situations and consider the implications for those who are both vulnerable and in precarious type employment. Neumayer and Plümper state that

Natural disasters do not affect people equally. In fact, a vulnerability approach to disasters would suggest that inequalities in exposure and sensitivity to risk as well as inequalities in access to resources, capabilities and opportunities systematically disadvantage certain groups of people, rendering them more vulnerable to the impact of natural disasters'.²¹

This viewpoint is supported by Oxfam who state that

...disasters, however 'natural', are profoundly discriminatory. Wherever they hit, pre-existing structures and social conditions determine that some members of the community will be less affected while others will pay a higher price.²²

In this paper we adopt the categories of discriminated groups considered in the 2007 World Disasters Report.²³ This report examined vulnerabilities based on gender, ethnicity, age and disability and considers how discrimination affects the vulnerable in emergency situations. It states that discrimination exists before any disaster strikes, but this discrimination is exacerbated during an emergency. Linking all these groups is the issue of socio-economic status:

Lack of access to economic or human resources or knowledge can limit the ability of some socio-economic groups to respond adequately to a disaster. Groups who traditionally experience low socio-economic status include minorities, woman-headed households, the elderly, the unemployed, the illiterate or uneducated, the ill

¹⁹ The ILO definition of vulnerable workers is the sum of own-account workers and contributing family workers.

²⁰ *Global Employment Trends 2013* International Labour Organisation, Geneva.

²¹ Neumayer, Eric and Plümper, Thomas (2007) The gendered nature of natural disasters: the impact of catastrophic events on the gender gap in life expectancy, 1981-2002. *Annals of the Association of American Geographers* 97(3) 551-566.

[http://www.lse.ac.uk/geographyAndEnvironment/whosWho/profiles/neumayer/pdf/Article%20in%20Annals%20\(natural%20disasters\).pdf](http://www.lse.ac.uk/geographyAndEnvironment/whosWho/profiles/neumayer/pdf/Article%20in%20Annals%20(natural%20disasters).pdf)

²² The tsunami's impact on women; Briefing Note Oxfam

<http://www.oxfam.org/sites/www.oxfam.org/files/women.pdf>

²³ *World Disasters Report 2007 Focus on discrimination* International Federation of Red Cross and Red Crescent Societies www.ifrc.org/Global/Publications/disasters/WDR/WDR2007-English.pdf

or handicapped. In addition racial and ethnic minorities may be excluded from lines of communication and action due to cultural or language barriers.²⁴

In many countries discrimination is invisible largely because of a lack of official data on the number of older people, ethnic minorities and persons with disabilities. The invisibility is made worse when aid agencies carry out emergency assessments that do not include an analysis of vulnerable people and their needs. Vulnerable groups are often excluded from the disaster planning process before, during and after an emergency.²⁵ Examples given of lack of consideration for vulnerable groups include mass distribution through air drops which can exclude the young, old and persons with disabilities. Emergency shelters also often exclude persons with disabilities and poorly designed camps make women vulnerable to sexual violence or can inadvertently prevent minorities from accessing aid.²⁶

It is suggested²⁷ that the disadvantaged can suffer proportionately larger death levels as illustrated by Hurricane Katrina when many individuals died because they were unable to evacuate from the city, and where the infirm elderly, the poor, and those with disabilities were the most likely to be affected. Preparations for disasters often neglect the special needs of vulnerable populations. In a catastrophic event the vulnerable may be disabled; pregnant women; children; the elderly; prisoners; ethnic minorities with language barriers; and the impoverished.

Hoffman²⁸ postulates three possible approaches to the ethical dilemmas associated with deciding how limited resources should be allocated in emergency situations. The first is a utilitarian approach which concerns using the resources to aid the greatest number of people. Thus the purpose of assistance is to save the greatest number of lives and to direct resources to those most likely to benefit. The second approach is the principle of equal chances, so resource providers need to give each individual an equal chance of surviving. This approach accepts that each individual's life is equally valuable and is a rejection of the utilitarian approach that balances overall benefits in deciding where treatment should be made available. A third approach is to create the best outcome for the least well off. This means prioritising resources to the most vulnerable because disadvantaged people will likely suffer disproportionate harm in disasters. This means of course that the distribution of resources is to be allocated on an unequal basis.

There are no simple answers to these dilemmas and, of course, rescuers are not always faced with these issues. If the rescue resources are adequate and prepared, or if the disaster is on a small scale relative to the resources of the country in which it takes place, then it may be possible to help the greatest number as well as to support the vulnerable with special resources. This is not always the case and sometimes the disaster may be of

²⁴ Masozera, Michel. Bailey, Melissa. Kerchner, Charles; Distribution of impacts of natural disasters across income groups: A case study of New Orleans *Ecological Economics* 63 (2007) 299-306 <http://www.d.umn.edu/~pfarrell/Natural%20Hazards/Readings/Katrina%20article.pdf>; this article cites Fothergill, A., Peek, L.A., 2004. Poverty and disasters in the United States: a review of recent sociological findings. *Natural Hazards* 32, 89-110.

²⁵ Chapter 1 p13.

²⁶ Chapter 1 p15.

²⁷ Hoffman, Sharona 'Preparing for Disaster: Protecting the Most Vulnerable in Emergencies' *UC Davis Law Review*, Vol. 42, p. 1491, 2009 *Case Legal Studies Research Paper No. 08-27*.

²⁸ Hoffman, Sharona 'Preparing for Disaster: Protecting the Most Vulnerable in Emergencies' *UC Davis Law Review*, Vol. 42, p. 1491, 2009 *Case Legal Studies Research Paper No. 08-27*.

such a scale, or the resources available may be so limited that these ethical choices are made almost by default. Perhaps the only solution lies in debating these issues before the event and making adequate preparations for helping the vulnerable as well as the many.

What is true is that

...different people have distinct capacities, vulnerabilities and needs. Consequently, humanitarian crises affect different groups in different ways. It is crucial, therefore, that humanitarian programming is based on a clear understanding of the variant impacts of a crisis on the population'.²⁹

Gender

In disasters more women die than men and more women die at an earlier age than men as a result of the disaster. 'It is the socially constructed gender-specific vulnerability of females built into everyday socio-economic patterns that lead to the relatively high female disaster mortality rates compared to men'.³⁰ In other words the discrimination suffered by women continues in disaster situations. Three possible reasons for this treatment postulated are³¹, firstly, perceived biological and physiological differences; an example given of this, but taught rather than natural, is in Sri Lanka where swimming and tree climbing skills were taught mainly to men and boys to perform tasks that are almost exclusively performed by men. This helped them survive the waves from the tsunami. Also pregnant women are less mobile than others. The second possible reason are the social norms and role behaviour adopted in societies; and an example of this might be the practice of women looking after children and the elderly and the domestic property. This can hinder their own rescue. Women are also more likely to be at home when disaster strikes, so are affected more directly when buildings are damaged. The third reason is that a shortage of resources continues existing forms of discrimination and there are many examples of this including how women and children have a subservient place in the distribution of food aid.³² The position, on a global basis, is summed up in this quotation³³:

²⁹ *Disasters and diversity: a study of humanitarian financing for older people and children under five*, HelpAge International 2013 <http://www.helpage.org/newsroom/latest-news/new-study-reveals-lack-of-humanitarian-funding-for-older-people-and-children/>

³⁰ Neumayer, Eric and Plümper, Thomas (2007) The gendered nature of natural disasters: the impact of catastrophic events on the gender gap in life expectancy, 1981-2002. *Annals of the Association of American Geographers* 97(3) 551-566
[http://www.lse.ac.uk/geographyAndEnvironment/whosWho/profiles/neumayer/pdf/Article%20in%20Annals%20\(natural%20disasters\).pdf](http://www.lse.ac.uk/geographyAndEnvironment/whosWho/profiles/neumayer/pdf/Article%20in%20Annals%20(natural%20disasters).pdf)

³¹ These come from Neumayer and Plümper 2007 op.cit.

³² Neumayer and Plümper cite the following as evidence of this: Sen (Sen, A. K. 1988. Family and food: Sex bias in poverty. In *Rural poverty in South Asia*, ed. T. N. Srinivasan and P. K. Bardhan, 453-72. New York: Columbia University Press) has reported how women and girls were systematically disadvantaged by food relief in the aftermath of flooding in West Bengal that destroyed crops and farmland. Enarson and Morrow (Enarson, E., and B. H. Morrow, eds. 1998. *The gendered terrain of disaster: Through women's eyes*. Westport, CT: Praeger) refer to a relief worker's finding of discriminatory access to relief supplies in the aftermath of the 1991 Bangladesh cyclone (similar experiences are reported by Khondker, H. 1996. Women and floods in Bangladesh. *International Journal of Mass Emergencies and Disasters* 14 (3): 281-92. Ager, A., Ager, W. and L. Long., L. 1995. (The differential experience of Mozambican refugee women and men. *Journal of Refugee Studies* 8 (3): 265-87) found in their study of Mozambican refugees in Malawi in the late 1990s that relief policies were biased in favor of refugee men.

In general, around the world, women are poorer than men.... Women are disproportionately employed in unpaid, underpaid and non-formal sectors of economies. Inheritance laws and traditions, marriage arrangements, banking systems and social patterns that reinforce women's dependence on fathers, husbands and sons all contribute both to their unfavorable access to resources and their lack of power to change things. The health dangers that result from multiple births can contribute to interrupted work and low productivity. Traditional expectations and home-based responsibilities that limit women's mobility also limit their opportunities for political involvement, education, access to information, markets, and a myriad of other resources, the lack of which reinforces the cycle of their vulnerability.

Women's working lives also place them at risk in disasters. The gendered division of labour can have an impact and the international economy 'mean women work longer hours with less social protection and are less secure economically, they are less able to prepare for and recover from destructive cyclones or floods'.³⁴ It is estimated that some 70 per cent of all women now hold atypical jobs in the informal economy. Jobs such as those in domestic work, microenterprise, and other home-based jobs put informal workers at high risk of losing both shelter and economic assets in disasters.³⁵

Of interest also of course is the position of women in the formal economy where their roles, often, are as contingent workers. This can limit their resources and make it more difficult to recover from major disasters. Self-employed women can also suffer disproportionately. On the one hand street vendors and other informal workers can lose their livelihoods when there is destruction of land, buildings and other centres of activity. On the other hand self-employed US and Canadian women in a 1997 flood reported substantial loss of business space, equipment and materials used in their home-based businesses, which ranged from child-care to professional writing and book keeping.³⁶

Perhaps because of occupational segregation women are slower at being able to return to work:

When public transportation systems shut down, day care centers and hospitals close, or family needs intensify, women may not be able to work. Some sectors are especially vulnerable. Many women are employed in the tourist industry along stormy coasts or in service and retail industries dependent upon high levels of consumption and disposable income. Women also tend to dominate as employees (and patients, students, and residents) in such public facilities as hospitals, schools, and nursing homes. When these public-sector buildings are destroyed or damaged, women may be unemployed for long periods. They also lose work indirectly. After Miami's Hurricane Andrew, for instance, many domestic workers were unemployed when the homes they cleaned were destroyed, or employers evacuated.

³³ Enarson, Elaine. Gender and Natural Disasters Working Paper 1 September 2000 Recovery and Reconstruction Department, ILO Geneva' cites at p5 Mary Anderson, 1994, "Understanding the disaster-development continuum", in *Focus on Gender*, 2/1 http://www.ilo.int/wcmsp5/groups/public/---ed_emp/---emp_ent/---ifp_crisis/documents/publication/wcms_116391.pdf

³⁴ Enarson, Elaine. Gender and Natural Disasters Working Paper 1 September 2000 Recovery and Reconstruction Department, ILO Geneva http://www.ilo.int/wcmsp5/groups/public/---ed_emp/---emp_ent/---ifp_crisis/documents/publication/wcms_116391.pdf

³⁵ Enarson 2000 op.cit.

³⁶ Enarson 2000 op.cit.

Generally in answer to the question as to why women are more vulnerable in disasters, the Pan American Health Organisation³⁷ provides the following summary:

- Women have less access to resources – social networks and influence, transportation, information, skills (including literacy), control over land and other economic resources, personal mobility, secure housing and employment, freedom from violence and control over decision-making - that are essential in disaster preparedness, mitigation and rehabilitation.
- Women are victims of the gendered division of labour. They are over represented in the agriculture industry, self-employment and the informal economy, in under-paid jobs with little security and no benefits such as healthcare or union representation.
- Because women are primarily responsible for domestic duties such as childcare and care for the elderly or disabled, they do not have the liberty of migrating to look for work following a disaster. Men often do migrate, leaving behind very high numbers of female-headed households.
- Because housing is often destroyed in the disaster, many families are forced to relocate to shelters. Inadequate facilities for simple daily tasks such as cooking means that women's domestic burden increases at the same time as her economic burden, leaving her less freedom and mobility to look for alternative sources of income.
- When women's economic resources are taken away, their bargaining position in the household is adversely affected.
- Disasters themselves can serve to increase women's vulnerability. Aside from the increase in female-headed households and the fact that the majority of shelter residents are women, numerous studies have shown an increase in levels of domestic and sexual violence following disasters.
- As one of the primary aspects of women's health in particular, reproductive and sexual health are beginning to be recognized as key components of disaster relief efforts, however attention to them remains inadequate and women's health suffers disproportionately as a result.³⁸

Women and girls are at higher risk of sexual violence, sexual exploitation and abuse, trafficking and domestic violence in disasters.³⁹ There is an interesting and somewhat alarming example given of violence against women in post-Katrina trailer parks:

Over 3.2 million people were forced from their homes after the hurricane. Of these some 99,000 relocated to temporary trailer parks in Louisiana and Mississippi. In 2006 an NGO, the International Medical Corps, conducted a survey and found very high rates of gender-based violence; Some 5.9 rapes per day per 100,000 women were reported (equivalent to 527 rapes amongst the 32,841 displaced women). This was over 53 times higher than the highest state baseline figure (0.11 per day per 100,000 women); intimate partner rape was 16 times higher than the US yearly

³⁷ Pan-American Health Organisation Fact Sheet
<http://www1.paho.org/English/DPM/GPP/GH/genderdisasters.PDF>

³⁸ This summary is supported by the information and views in an Oxfam document: 'The tsunami's impact on women' Briefing Note Oxfam <http://www.oxfam.org/sites/www.oxfam.org/files/women.pdf>

³⁹ *World Disasters Report 2007 Focus on discrimination* International Federation of Red Cross and Red Crescent Societies www.ifrc.org/Global/Publications/disasters/WDR/WDR2007-English.pdf Ch5 p121.

rate; the rate at which women experienced beatings was three times the US yearly rate.⁴⁰

There is also a special issue concerning pregnant women in disaster emergencies, particularly issues related to premature deliveries, underweight infants, and infant mortality. Some women may have to deliver babies without the benefit of hospital care. Pregnant women also run the risk of being evacuated without access to medical records containing information critical to their welfare or that of their child.⁴¹

Ethnicity

According to the World Disasters report 2007, institutional, community and individual racial prejudice can add to problems faced by minorities. In disaster relief operations, prejudice towards specific groups is often the main cause of discrimination. The report cites a number of examples concerning the Roma, who are amongst the most discriminated against population group in Europe.⁴²

In 2005 heavy rains caused floods and landslides in Romania, affecting thousands of people and destroying hundreds of homes. It was the worst flooding to hit the country in 50 years.⁴³ The floods and storms killed 76 people, and caused at least 1.66 billion Euros in damage. Flooding also affected about 656,392 hectares of agricultural land, 10,420 kilometres of roads, 23.8 kilometres of railway, 9,113 bridges and foot bridges and contaminated 90,394 wells.⁴⁴

The Roma faced not only flood water but also entrenched attitudes. The Sofia Echo 'one of Bulgaria's leading English language newspapers' reported that 'floods have also brought a considerable increase in infectious diseases to the city... Health officials said that the rate of infection among Roma was higher, because of the minority's disregard for personal hygiene'.⁴⁵ In addition to overt prejudice there was indirect discrimination. The Romanian NGO Romani CRISS is reported as stating that 'After the floods, the Romanian government offered financial and material support for rebuilding houses, but it was conditional on having property papers. Most Roma don't have such papers and are excluded from the benefits of rehabilitation'.⁴⁶

Other examples of such discriminatory attitudes are:

- After the floods from Hurricane Katrina (2005), New Orleans City Councilman Oliver Thomas says 'that people were too afraid of black people to go in and save them. He

⁴⁰ *World Disasters Report 2007 Focus on discrimination* International Federation of Red Cross and Red Crescent Societies www.ifrc.org/Global/Publications/disasters/WDR/WDR2007-English.pdf Ch5 p123.

⁴¹ Hoffman, Sharona 'Preparing for Disaster: Protecting the Most Vulnerable in Emergencies' *UC Davis Law Review*, Vol. 42, p. 1491, 2009 *Case Legal Studies Research Paper No. 08-27*.

⁴² See, for example, European Union Agency for Fundamental Rights EU-MIDIS; European Union Minorities and Discrimination Survey Data in Focus Report 1: The Roma http://fra.europa.eu/sites/default/files/fra_uploads/413-EU-MIDIS_ROMA_EN.pdf

⁴³ European Commission Humanitarian Aid and Civil Protection. http://ec.europa.eu/echo/civil_protection/civil/floods_2005.htm

⁴⁴ <http://www.climateadaptation.eu/romania/river-floods/>

⁴⁵ *World Disasters Report 2007* Ch2 p40.

⁴⁶ *World Disasters Report 2007* Ch2 p41.

claimed rumours of shooting and riots were making people afraid to take in those being portrayed as alleged looters'.⁴⁷

- After the Indian Ocean tsunamis, Dalits were forbidden by other castes from drinking water from UNICEF water tanks; there were also reports of other aid supplies not reaching them or being diverted by members of other castes. The solution was for the Tamil Nadu state government to provide segregated facilities.⁴⁸

There can be, and often is, a link between ethnicity and economic and social disadvantage. One review of studies on the relationship between poverty and disasters in the US showed that socio-economic status is significant. According to these studies 'the poor are more likely to die, suffer from injuries, have proportionately higher material losses; have more psychological trauma; and face more obstacles during the phases of response, recovery, and reconstruction'.⁴⁹

Those with these disadvantages can suffer from disproportionate harm during and after disasters. Examples of this are, firstly, the Chicago heat wave of 2007 in which some 700 people died. African Americans were one and a half times more likely to die than whites because they were impoverished, segregated, and lacked "social capital."⁵⁰

The second example is Hurricane Katrina where one report⁵¹ stated:

Twenty-eight per cent of people in New Orleans live in poverty. Of these, 84 per cent are African-American. Twenty-three per cent of people five years and older living in New Orleans are disabled. An estimated 15,000 to 17,000 men, women, and children in the New Orleans area are homeless. The lowest lying areas of New Orleans tend to be populated by those without economic or political resources. The city's Lower Ninth Ward, for example, which was especially hard hit and completely inundated by water, is among its poorest and lowest lying areas. Ninety-eight per cent of its residents are African-American.

The report also added that

Of the households living in poverty, many have no access to a car: 21,787 of these households without a car are black; 2,606 are white. This lack of access became crucial, given an evacuation plan premised on the ability of people to get in their cars and drive out of New Orleans.

The issue is not that these residents were ignored in the post disaster evacuation, but that this treatment and 'disregard by government health, safety, and environmental agencies for the lives and circumstances of the most vulnerable marks the everyday experience of these people'. According to one analysis⁵² the U.S. Government's evacuation

⁴⁷ *World Disasters Report 2007* Ch2 p47.

⁴⁸ *World Disasters Report 2007* Ch2 p47.

⁴⁹ Masozera, Michel. Bailey, Melissa. Kerchner, Charles; Distribution of impacts of natural disasters across income groups: A case study of New Orleans *Ecological Economics* 63 (2007). 299-306
<http://www.d.umn.edu/~pfarrell/Natural%20Hazards/Readings/Katrina%20article.pdf>

⁵⁰ Farber, Daniel, A. *Disaster Law and Inequality*, 25 *Law & Ineq.* 297 (2007).

⁵¹ Center For Progressive Reform *An Unnatural Disaster: The Aftermath Of Hurricane Katrina* 34-35 (2005). http://www.progressivereform.org/articles/Unnatural_Disaster_512.pdf also cited in Hoffman op.cit.

⁵² When Disaster Strikes A Human Rights A Human Rights Analysis of the 2005 Gulf Coast Hurricanes; The Inter-American Commission of Human Rights General Situation Hearing on Natural Disaster and Human

plans did not take into account the difficulties faced by low-income African American and immigrant communities and effectively abandoned these communities to fend for themselves in the face of a Category 4 hurricane. In New Orleans, many of these residents who could not self-evacuate were shuttled to shelters in the city, such as the Superdome.

The New Orleans Convention Center, although never officially designated as a place of refuge, swarmed with residents who arrived there awaiting buses to evacuate them out of the city; those buses never came. Nearly 25,000 people were eventually evacuated to the Superdome and nearly 20,000 gathered at the Convention Center. An estimated 50,000, overwhelmingly African American, remained elsewhere in New Orleans, on rooftops and in upper floors of office buildings.

A further incident occurred in the aftermath of Katrina, when a mostly black crowd of New Orleans residents attempted to escape across the bridge to Gretna. They were turned back by armed police because Gretna refused to give them shelter or help them evacuate further.⁵³

Linked to this issue is the position of immigrants who ‘also suffered disproportionately in the aftermath of Katrina’. Illegal immigrants are in even a worse position. In the aftermath of Katrina they were treated as eligible for immediate post-emergency services but not for any long-term shelter or food assistance. Of course many ‘undocumented aliens’ will avoid using the assistance available for fear of detection and capture.⁵⁴

Disability

According to the United Nations, the disabled are more likely to be left behind or abandoned during evacuation in disasters and conflicts due to a lack of preparation and planning, as well as inaccessible facilities and services and transportation systems. Most shelters and refugee camps are not accessible and people with disabilities are often turned away from shelters and refugee camps due to a perception that they need “complex medical” services.⁵⁵ Many agencies, according to the World Disasters Report 2007, regard disability as a specialised subject so refer disabled people on to specialised agencies, but often their basic needs are the same as everyone else’s – water, sanitation, shelter, food.

Disruption to physical, social, economic, and environmental networks and support systems affect persons with disabilities much more than others. There is also a potential for discrimination on the basis of disability when resources are scarce.⁵⁶

According to the World Disasters Report 2007, persons with disabilities are doubly vulnerable to disasters, both on account of their impairments and poverty. Despite this they are often ignored or excluded at all levels of disaster preparedness, mitigation and

Rights Friday March 3 2006; International Human Rights Law Clinic Boalt Hall School of Law March 2006 http://www.law.berkeley.edu/files/IHRLC/Briefing_Paper_Report_When_Disaster_Strikes_2_Mar_06.pdf

⁵³ Farber, Daniel who cites Philip Clark, *Bridge to Nowhere*, available at <http://www.law.berkeley.edu/library/disasters/Clark.pdf>

⁵⁴ Farber, Daniel, A. *Disaster Law and Inequality*, 25 *Law & Ineq.* 297 (2007).

⁵⁵ Disability, natural disasters and emergency situations; United Nations <http://www.un.org/disabilities/default.asp?id=1546>

⁵⁶ Disability, natural disasters and emergency situations; United Nations <http://www.un.org/disabilities/default.asp?id=1546>

intervention.⁵⁷ The report points out that disasters also create disabilities. It categorises the various groups as

- Those with an injury that may be at risk of developing into an impairment;
- People whose injuries result in permanent impairment;
- People who were already disabled prior to the disaster;
- People with chronic diseases which can deteriorate without medication (HIV, epilepsy, diabetes).

Article 11 of the UN Convention on the Rights of Persons with Disabilities 2006⁵⁸ is concerned with situations of risk and humanitarian emergencies. It provides that

States Parties shall take, in accordance with their obligations under international law..... all necessary measures to ensure the protection and safety of persons with disabilities in situations of risk, including situations of armed conflict, humanitarian emergencies and the occurrence of natural disasters.

Article 4.1, also provides that “States Parties undertake to ensure and promote the full realization of all human rights and fundamental freedoms for all persons with disabilities without discrimination of any kind on the basis of disability”.

In the aftermath of a conflict or disaster, people with pre-existing impairments may lose family members or carers, be moved to temporary housing or shelter, and lose mobility and other aids, thus increasing their vulnerability. Some will not have been able to flee with their families, and may have been separated or left behind. They may have difficulty accessing information, food, water and sanitation sources. Persons with disabilities are often a low priority in service provision – furthering isolation, social exclusion and marginalisation.⁵⁹

Some examples of the extra issues faced by the disabled in the Hurricane Katrina aftermath are given by Hoffman⁶⁰:

The hearing impaired found that eighty per cent of shelters⁶¹ did not have text telephones; sixty per cent of shelters had no television with open caption capability; only fifty-six per cent of shelters posted announcements that were otherwise made verbally; and American Sign Language interpreters were available in fewer than thirty per cent of shelters. Meanwhile, low-income African Americans often could not evacuate because they had no personal transportation.⁶² Furthermore, those with

⁵⁷ Ch4 p87.

⁵⁸ See <http://www.un.org/disabilities/default.asp?id=150>

⁵⁹ World Disasters Report 2007 ch4p100.

⁶⁰ Hoffman, Sharona ‘Preparing for Disaster: Protecting the Most Vulnerable in Emergencies’ *UC Davis Law Review*, Vol. 42, p. 1491, 2009 *Case Legal Studies Research Paper No. 08-27*.

⁶¹ Hoffman cites Nat’l Council on Disability, *The Impact of Hurricanes Katrina and Rita on*

People with Disabilities: A Look Back and Remaining Challenges 14 (2006),

available at http://www.ncd.gov/newsroom/publications/2006/pdf/hurricanes_impact.

Pdf Paul Campbell et al., Harvard Sch. Of Pub. Health, *Reaching Vulnerable Populations in Public Health Emergencies: Conference Proceedings* 9 (2007), available at

http://www.mcph.org/Major_Activities/Emergency_Preparedness/2007/

⁶² The Hoffman article cites Dennis P. Andrulis et al., *Preparing Racially and Ethnically Diverse Communities for Public Health Emergencies*, 26 *HEALTH AFF.* 1269, 1269 (2007) (“The White House, Congress, and State and local governments have made emergency preparedness one of their highest priorities.”); Aaron Katz et al., *Preparing for the Unknown, Responding to the Known: Communities and Public Health Preparedness*, 25 *HEALTH AFF.* 946, 946 (2006) (finding that

mobility impairments found that only five per cent of the temporary housing provided by the Federal Emergency Management Agency was accessible to them even though twenty-five per cent of the displaced population needed accessible housing.

Mobility is of course a major issue for many disabled people. After the Indian Ocean tsunami many persons with disabilities were unable to escape and drowned. A November 2005 poll by Harris Interactive Survey conducted for AARP found that about 13 million people aged 50 and older in the United States said they would need help to evacuate in a future disaster, and about half of these people would require help from someone outside of their household.⁶³

Those with chronic illnesses may also be in a vulnerable situation. Their situations can worsen due to lack of resources such as food, water and adequate medicines. Following Hurricane Katrina over 200,000 people with chronic medical conditions who were displaced or isolated by the storm had no access to their usual medications and sources of supply and even those who brought the recommended three day supply to a shelter ran out of pills, resulting in the need for emergency management.⁶⁴

There is a link between the problems experienced by the disabled and the elderly (see below).

Older people

Older people constitute a significant proportion of the global population; estimates for 2013 show those over 50 account for 21.7 per cent of the population and those over 60, 11.8 per cent. By 2050, the over-60 population will account for 22 per cent, exceeding the numbers of children under 15 for the first time in history.⁶⁵

HelpAge's analysis⁶⁶ is that often all the victims of humanitarian crises are considered as a single homogenous group and there is a lack of age analysis of a population and how this may affect levels of vulnerability. Older people (as well as young children) are 'highly sensitive to shocks associated with both chronic and sudden-onset humanitarian crises'. The specific risks associated with age include access to adequate health care and nutritional support. There are particular challenges for older people in terms of mobility and visual and aural impairment which inevitably impact on the ability to

"bioterrorism preparedness remains a high priority for federal, state, and local governments" and that "the capabilities of local public health and emergency response agencies" had improved significantly since 2004).

⁶³ When Disaster Strikes A Human Rights Analysis of the 2005 Gulf Coast Hurricanes; The Inter-American Commission of Human Rights General Situation Hearing on Natural Disaster and Human Rights Friday March 3 2006; International Human Rights Law Clinic Boalt Hall School of Law March 2006 http://www.law.berkeley.edu/files/IHRLC/Briefing_Paper_Report_When_Disaster_Strikes_2_Mar_06.pdf

⁶⁴ Disaster Planning Goal: Protect Vulnerable Older Adults; Center for Disease Control and Prevention http://www.cdc.gov/aging/pdf/disaster_planning_goal.pdf;

⁶⁵ *Disasters and diversity: a study of humanitarian financing for older people and children under five*, HelpAge International 2013 [http://www.helpage.org/newsroom/latest-news/new-study-reveals-lack-of-humanitarian-funding-for-older-people-and-children/citing_data_from_United_Nations_Department_of_Economic_and_Social_Affairs_Population_Division_\(2011\).World_Population_Propects:_The_2010_Revision,_CD-ROM_Edition](http://www.helpage.org/newsroom/latest-news/new-study-reveals-lack-of-humanitarian-funding-for-older-people-and-children/citing_data_from_United_Nations_Department_of_Economic_and_Social_Affairs_Population_Division_(2011).World_Population_Propects:_The_2010_Revision,_CD-ROM_Edition).

⁶⁶ *Disasters and diversity: a study of humanitarian financing for older people and children under five*, HelpAge International 2013 <http://www.helpage.org/newsroom/latest-news/new-study-reveals-lack-of-humanitarian-funding-for-older-people-and-children/>

access services and support. One issue, for example, is the extent to which the extended family will protect its older members, but, in the Indian Ocean tsunami of 2004, HelpAge India identified 9000 older people who had been missed in the rush for assistance.

According to the World Disasters Report 2007, factors which influence discrimination against older people in disasters include the lack of a United Nations agency dedicated to ageing issues; the failure of many humanitarian agencies to develop a clear rationale for reaching older people; the lack of specific data and information on this group; and the assumption that older people will be covered by the general response provisions.

Sometimes older people are disproportionately affected by disasters; the 2003 heat wave in France, for example, claimed nearly 15,000 lives, 70 per cent of whom were older than 75 years.⁶⁷ One view, however, is that 'these thousands of elderly victims didn't die from the heat wave as such, but from the isolation and insufficient assistance they lived with day in and out'.⁶⁸ Similarly, in the Chicago heat wave of 1995 some 600 people died and 75 per cent of the victims were aged 65 plus. One view here was also that 'the city, through its negligence, failed to realize the potential danger to those most vulnerable to temperature extremes before the heat wave arrived'.⁶⁹ When one looks at the Katrina aftermath approximately 71 per cent of the victims in Louisiana were older than sixty and 47 per cent were over 77. Over 200 of these people died in nursing homes or hospitals and, sad to say, only 41 of the 130 nursing homes around the Texas gulf coast had any evacuation plans.⁷⁰

The prevalence of disability rises with age. In Britain, for example, around 6 per cent of children are disabled, compared to 16 per cent of working age adults and 45 per cent of adults over state pension age.⁷¹ In the USA some 54 per cent of adults aged 65 and over report having some type of disability and 20.4 per cent having difficulty with going outside their home.⁷² In disaster situations where there is a need to evacuate, these mobility issues are important. Many older persons with disabilities are living in residential settings, rather than in care homes. The latter will tend to be in places with evacuation plans, but those living independently may need extra resources to be able to evacuate and also special transportation that can cope with wheelchairs, walking frames or other equipment. In addition many will have health issues which require medication and events such as the Katrina Hurricane can severely limit access to regular supplies.⁷³

⁶⁷ The searing August heat claimed about 7000 lives in Germany, nearly 4200 lives in both Spain and Italy. Over 2000 people died in the UK, with the country recording its first ever temperature over 100° Fahrenheit on 10th August.

European heat wave caused 35,000 deaths New Scientist 2003

<http://www.newscientist.com/article/dn4259-european-heatwave-caused-35000-deaths.html#.UgC89xpwaTI>

⁶⁸ Stephane Manton, Red Cross official. World Disasters Report ch3p75.

⁶⁹ Petrovic, Ana The Elderly Facing Gentrification: Neglect, Invisibility, Entrapment and Loss 15 *Elder L.J.* 533 cited in Professor Klein In the Wake of a Natural Disaster: The Elderly Left Behind California School of Law 2009 <http://www.cwsl.edu/content/klein/The%20Elderly%20Left%20Behind.pdf>

⁷⁰ Mead, Robert. St Rita's and Lost Causes: Improving Nursing Home Emergency Preparedness 4 MARQEA 153 at 167 (Spring 2006) cited in Professor Klein In the Wake of a Natural Disaster: The Elderly Left Behind California School of Law 2009 <http://www.cwsl.edu/content/klein/The%20Elderly%20Left%20Behind.pdf>

⁷¹ Disability Facts and Figures; Office for Disability Issues; <http://odi.dwp.gov.uk/disability-statistics-and-research/disability-facts-and-figures.php#gd>

⁷² McGuire LC, Ford ES, Okoro CA Natural disasters and older US adults with disabilities: implications for evacuation *Disasters*. 2007 Mar;31(1):49-56.

⁷³ McGuire LC, Ford ES, Okoro CA Natural disasters and older US adults with disabilities: implications for evacuation *Disasters*. 2007 Mar;31(1):49-56.

HelpAge's guidelines for best practice⁷⁴ states that

Isolated, older people are often left to fend for themselves as those around them struggle to ensure their own survival and that of their families. In the chaos associated with the early stages of emergencies, older people are physically less able than most other adults to struggle for food and other resources. They cannot travel long distances to where resources may be more readily available. They find it difficult to endure even relatively short periods without shelter and amenities.

The capacity of the community to take on the care of its vulnerable members is seriously compromised by the lack of food, medical, material and human resources associated with emergencies.

According to HelpAge older people identified the following as key issues and needs in an emergency: Firstly, basic needs such as shelter, fuel, clothing, bedding, household items; secondly, mobility and issues related to incapacity, population movement and transport, disability; third, health: access to services with appropriate food, water, sanitation plus psychosocial needs; fourthly, family and social: separation and issues related to dependants, security, changes in social structures, loss of status; finally, economic and legal issues such as income, land, information, documentation, skills training.

Labour market issues and precarious work

An underlying assumption in this paper is that there is a link between belonging to a vulnerable group and taking up precarious type working.⁷⁵ We have only focussed on four vulnerabilities, but it is worth noting that there are probably many others, e.g. levels of education and migration status, both of which may affect employment status. It is also worth noting that all those in precarious working relationships are likely to be vulnerable in disaster situations. In the event of a disaster, these workers would be amongst the most vulnerable in terms of losing their jobs.

Flexible forms of working are increasing and it would be wrong to say that this is entirely a gender issue, but it is an important distinction. Many more women than men work part time however, often because of caring responsibilities. In the EU15, for example, almost 9 per cent of the part time work force is male, compared to some 37 per cent being female.⁷⁶ The figures for fixed term contracts for men are 12.7 per cent and for women 14.7 per cent. One research report on Japan⁷⁷ states that 'the incidence of "non-regular" employment increased from 16.6 per cent in 1986 to 34.1 per cent in 2008. Importantly, women are disproportionately represented in non-regular employment'.

⁷⁴ Older people in disasters and humanitarian crises: Guidelines for best practice HelpAge International <http://www.helpage.org/silo/files/older-people-in-disasters-and-humanitairan-crisis-guidelines-for-best-practice.pdf>

⁷⁵ Those employment relationships which are not full-time, open ended contracts of employment; such as part time, temporary, fixed term and self employed working.

⁷⁶ Employment in Europe 2010 European Commission 2010; the actual figure for men was 8.9 per cent. The figures are for 2009.

⁷⁷ Futagami, Shiho (2010) Non-Standard Employment in Japan: Gender Issues; International Institute for Labour Studies; http://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_192841.pdf

Similarly the Law Commission of Ontario report on vulnerable workers and precarious work⁷⁸ states:

Overall, it is clear that women are much more likely to be in precarious jobs than men, although this gender disparity has remained relatively stable over the decade long period covered in this study. This trend relates primarily to women's greater tendency to work in part-time and/or temporary forms of employment, which have more features of precariousness, than men's. For some, engaging in part-time or temporary employment may be a strategy responding to the increased demands of child care which often fall to women. Even among full-time permanent workers, however, women are more likely to hold precarious jobs than men: women are more likely to earn low wages (36.7% of women compared to 22.7% of men), to lack a pension plan (58.7% of women compared to 52.6% of men), and to work in small firms (23.5% of women compared to 19.6% of men).

In the Western world white men and white women consistently fare better in employment compared to other ethnic groups.⁷⁹ The same report from the Law Commission of Ontario also stated that 'racialized workers tend to be slightly more likely to be in precarious jobs than their same-gender counterparts;..racialized women are at a particular wage disadvantage, with a third of racialized women (33.2%) reporting low wages, compared to 18.7% of non-racialized women'. It is worth noting that the major difference with regard to ethnicity is the lower levels of employment experienced by workers of a different ethnicity to that of the dominant population.⁸⁰

Unemployment rates for disabled workers are much higher than for those workers without a disability. The European Forum on Disability states that

Disabled people are two to three times more likely to be unemployed than non-disabled persons. They are more likely to be unemployed for longer periods and face higher risks of losing their jobs than non-disabled people. At present, 78% of disabled people are totally excluded from the workforce. Most of them are obliged to depend on welfare grants to survive and as a result, their income is considerably lower than that of non-disabled people.⁸¹

For many affected disabled workers it will be the loss of special measures or equipment to help them perform their jobs that will be affected by disasters and will compound their difficulty in returning to work.

Finally older workers are an important source of contingent labour for employers. Older workers were less likely to be in paid work than younger groups and when they did work they were more likely to be working as self-employed or part-time.⁸² In the UK

⁷⁸ Op cit.

⁷⁹ See Dynamics of Diversity: Evidence from the 2011 Census; Joseph Rowntree Foundation and the University of Manchester (2013) <http://www.ethnicity.ac.uk/census/CoDE-Employment-Change-Census-Briefing.pdf>

⁸⁰ See, for example a report by the British TUC cited by the European Foundation <http://www.eurofound.europa.eu/eiro/2005/07/feature/uk0507103f.htm>

⁸¹ http://www.edf-feph.org/Page_Generale.asp?DocID=13379

⁸² Characteristics of Older Workers DFEE Research Report RR45 1998.

around two thirds of such workers are part-time, with a third of the total working as self-employed.⁸³

Labour market impacts

Briefly we consider labour market issues in two very different disaster situations. Firstly we consider the outcomes of Hurricane Katrina in the US and then the Buncefield oil terminal explosion in the UK.

Hurricane Katrina

This hurricane hit the Gulf States of the USA on August 29 2005. Over 1800 lives were lost, the great majority being in Louisiana. Some 71 per cent of the Louisiana victims were older than 60 years. Approximately 275,000 homes were damaged or destroyed. Many businesses were damaged. In Louisiana, for example, some 95 per cent of all businesses were located in flooded areas, whilst, in Mississippi, nearly half of all businesses were located in areas with ‘catastrophic’ storm damage.⁸⁴

Some of the impacts of such a disaster on labour markets include disruptions to labour supply resulting from loss of life, injuries and evacuation; damage to the physical and social infrastructure and long term health problems caused by the disaster. There may be disruptions to communications and energy supplies. There may also be a resulting skill shortage due to the eventual mix of the population and employers.⁸⁵

Many will close either temporarily or permanently and this will affect employment levels, at least in the short term. In Louisiana non-farm payroll employment fell by 241 000 in the two months following Hurricane Katrina, equivalent to 12 per cent of total state employment. State unemployed claimant counts rose dramatically. September claims more than tripled in Louisiana, to 147,126, while New Orleans claims increased to 58,275, more than 5 times their August level. Women and young people showed the most dramatic increases. The number of women claimants quadrupled, and the women’s share of total claimants rose to 56 per cent. Young claimants (16-to-19-year-olds) in Louisiana totalled 2,639 in September, up from 170 in August.⁸⁶

Some 25 per cent of businesses in New Orleans had reopened within four months, 38 per cent within ten months and 66 per cent within two years of the hurricane. ‘The biggest barrier to reopening in the early months related to uncertainty about the ability of flood levees to protect the city from further disasters as well as lack of customers. After ten months, the main concerns related to the adequacy of infrastructure (including levees, utilities and communication) as well as problems finding staff’.⁸⁷ The evidence seemed to be that businesses had problems finding skilled staff as many workers had been displaced.

⁸³ Older Workers in the Labour Market 2012 Office for National Statistics
http://www.ons.gov.uk/ons/dcp171776_267809.pdf

⁸⁴ Venn, D. (2012), “Helping Displaced Workers Back Into Jobs After a Natural Disaster: Recent Experiences in OECD Countries”, *OECD Social, Employment and Migration Working Papers*, No. 142, OECD Publishing. <http://dx.doi.org/10.1787/5k8zk8pn2542-en> OECD.

⁸⁵ Ibid.

⁸⁶ Sharon P. Brown, Sandra L. Mason, and Richard B. Tiller The effect of Hurricane Katrina on employment and unemployment Bureau of Labor Statistics Monthly Labour Review August 2006 52-69
<http://www.bls.gov/opub/mlr/2006/08/art5full.pdf>

⁸⁷ Ibid.

The biggest barrier to displaced workers returning to work was lack of housing.⁸⁸ The mix of industries in an area may change after a major disaster and, in Hurricane Katrina's case, there were many job losses in the service sector leading to a disproportionate impact on women workers who predominated in the sector.

Buncefield

Early on Sunday 11 December 2011 a series of explosions and subsequent fire destroyed large parts of the Buncefield oil storage depot in Hemel Hempstead, Hertfordshire, UK. It caused widespread damage to neighbouring properties. The Buncefield depot was an important centre for the distribution of fuels to London and south-east England, including Heathrow Airport.

The main explosion took place at 6.01 am and was followed by a large fire that engulfed 23 large fuel storage tanks. Some 43 people were injured but there were no fatalities. There was significant damage to both commercial and residential properties near the site. About 2000 people had to be evacuated from their homes. The fire burnt for 5 days and destroyed most of the site. It emitted a large plume of smoke into the atmosphere that dispersed over Southern England and beyond.⁸⁹ The explosions were felt in the local area, causing widespread structural damage to both commercial and residential buildings, and were reported to have been heard as far away as the Netherlands. Further explosions occurred and the fire continued until it was finally under control by the evening of Wednesday 14th.⁹⁰

Businesses on the nearby industrial estate were badly disrupted. At the time of the explosion the estate housed 630 businesses and employed about 16, 500 people. Some premises were destroyed and others required significant repair work. A few companies went into liquidation. Some jobs had to be relocated, but many of these were temporary. Other problems for employers included increased operating costs and an inability to meet existing orders and a lack of new orders coming in. Total losses to nearby companies were estimated to be around £100m.⁹¹

The most significant community impact was on people who were 'economically fragile' – who were just about managing financially, but could not sustain a loss of income or increased expense, even for a short period. By the end of 2007 there were over 900 Buncefield-related redundancies. There were a large number of temporary and casual employees working in the business area who lost earnings immediately. Some families lost both incomes. Many people who did retain their jobs had their hours reduced and so lost income. Others were relocated, resulting in increased costs and more time spent away,

⁸⁸ Ibid.

⁸⁹ The Buncefield Incident 11 December 2005 The final report of the Major Incident Investigation Board.

⁹⁰ The Public Health Impact of the Buncefield Oil Depot Fire; Health Protection Agency (now part of Public Health England) 2006

<http://www.hpa.org.uk/Publications/EmergencyPreparationAndResponse/0607PublicHealthImpactoftheBuncefieldOilDepotFire/>

⁹¹ Buncefield Social Impact Assessment Final Report January 2007

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/78983/Buncefield-Social-Impact-Assessment-Final_20Report_0.pdf

which has affected ability to manage childcare.⁹² Official unemployment figures at the district level rose by 15 per cent in the six months between October 2005 and April 2006. Where a new job was found and individuals often had to take a pay cut (due either to time pressure related to being out of work, or to an over-supply of skilled individuals looking for work locally). This had a knock-on for many in the local employment market, onto those not directly affected by Buncefield, with similar outcomes. Seasonal or part-time workers (e.g. university students) are amongst those who were unable to find short term employment.

A large number of jobs were relocated. According to the business impact study, by March 2006 there were 90 'severely impacted' firms on the industrial estate, or around 15 per cent of the total. Of the 25 'severe impact' firms that returned a business survey, 16 (64 per cent) had moved out entirely, and a further four (16 per cent) partially. Many more were uncertain of their future on the estate.⁹³ Employees working with agencies or contractors (e.g. cleaners, caterers, etc.), were hit almost immediately. Seasonal workers were also badly affected, particularly because the incident fell into the Christmas period. Warehousing staff in particular were affected badly in this early period as products were not being traded or transported.⁹⁴

Conclusions

These two events are very different in their scale and impact but both Katrina and Buncefield have been extensively documented. In the latter case there is some information about the impacts on those engaged in precarious work. In Katrina's case there is more on the issue of the vulnerable in such disasters.

This paper set out to investigate the impact on precarious work and vulnerable workers of natural, environmental and other disasters and really the only conclusion that can be reached is that more work and research needs to be done. It is clear that the vulnerable are more adversely affected in such situations than others and that this is likely to be repeated in the work environment. It is also clear that the effect of a disaster on an area can lead to a change in the type of employment available as well as the mix of population. This is likely to adversely affect the most those who are in temporary and other forms of precarious working, or those that are seeking such work.

⁹² Buncefield Incident Community Impact; Dacorum Borough Council
<http://www.dacorum.gov.uk/docs/default-source/news-events/buncefield-incident-community-impact.pdf?Status=Master&sfvrsn=0>

⁹³ Ibid.

⁹⁴ Ibid.