

Chapter 6

ASSESSING SOCIAL RESILIENCE

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INTRODUCTION

This chapter is based in part on my own experience in planning and managing disaster relief and recovery programs in Victoria, Australia and on my research with Graham Marsh and Syd Smale investigating local perception of risks, local capacity to withstand disasters, implementation of vulnerability and resilience assessment programs and the development of community capability. It became obvious to me, professionally, that disaster relief and recovery programs for both natural and nonnatural disaster could only be developed where there was a good understanding of the losses and needs and strengths of individuals, families and communities. Of course, this is more or less easy enough to achieve after a disaster when needs may be identified through damage and needs assessment surveys. But planning requires similar assessments before the damage has occurred and this can be best achieved through vulnerability and resilience assessments. These assessments, therefore, are central to effective planning and management. They indicate what the goals of planning are, what the outcomes to be driven for actually are, that is, to reduce exposure to risk and to increase capacity to manage risk.

Resilience and vulnerability are central concepts in understanding the nature of disasters, their impacts and consequences and methods of dealing with the potential for loss. However, neither concept has been exhaustively explored (despite a clear need for intellec-

tual rigour and conceptual clarity), although much more attention has been given to vulnerability than to resilience. This methodological immaturity is reflected in the plethora of definitions (see, for example, Weichselgartner, 2001) which is both a symptom of confusion and a cause of confusion and ambiguity.

In this chapter I offer several lists setting out the qualities of resilience and vulnerability as a step towards a matrix for identifying resilience. These lists constitute different dimension of resilience and vulnerability, though it is only by considering all of these dimensions, more or less simultaneously, that we can build a comprehensive picture of vulnerability. The usual way of achieving this is by developing a matrix, well-regarded by hazard analysts and risk assessors as an analytical tool. But even matrices may inadequately reflect the complexity of the interactions between the many factors that define how people and social institutions behave towards each other and across social domains. Even within homogeneous communities or small areas the nature and type of interactions can be so complex and dynamic that mapping even the most significant interactions can be difficult.

This complexity may defeat an effort to systematically set out the linkages, dependences and networks of resilience and vulnerability. An attempt is, however, justified at least because previous assessments have been linear and static and have not taken into account the multi-layered and continuously changing nature of social interaction. Anderson and Woodrow (1998) identified the need to describe vulnerabilities and capacities. They prepared a matrix with vulnerability and capacities each measured against physical/material, social/organisational and motivational/attitudinal axes. They acknowledge that reality is even more complex. They also allow for gender, disaggregation by other differences such as wealth, and they acknowledge the need to conduct these analyses at different time periods (to build up a picture of change and they acknowledge that this sort of analysis can be applied at different scales, village, neighborhoods, districts and so on.

What this analysis does not do, but I admit achieving this is problematic, is to indicate how different levels interact with each other, how subsystems interact with each other, and how elements of subsystems interact between and across subsystems.

DEFINITIONS

There are several definitions of resilience, and its' de facto corollary, vulnerability and in practical terms the fine distinctions between these definitions are not always helpful when it comes to the practicalities of assessing "real world" resilience.

Emergency Management Australia's (1998) glossary defines resilience as a "measure of how quickly a system recovers from failures" (p. 94), and vulnerability as the "degree of susceptibility and resilience of the community and environment to hazards. The degree of loss to a given element at risk or set of such elements resulting from the occurrence of a phenomenon of a given magnitude and expressed on a scale of 0 (no damage) to 1 (total loss) (p. 114).

The United Nations International Strategy for Disaster Reduction (United Nations, 2005) offers more comprehensive definitions. Resilience is defined as the capacity of a system, community or society potentially exposed to hazards to adapt, by resisting or changing in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve the effectiveness of risk reduction measures. Vulnerability they define as the conditions determined by physical, social, economic, and environmental factors or processes, which increase the susceptibility of a community to loss from hazard impacts. Coping capacity is defined as the means by which people or organizations use available resources and abilities to face adverse consequences that could lead to a disaster. Importantly, they argue that this involves managing resources, both in normal and hazardous times. Thus, strengthening coping capacities facilitates building resilience to withstand the effects of natural hazards. Finally, they define community capacity as the combination of all the strengths and resources available within a community, society or organization that contribute to reducing the level of risk, or the effects of a disaster. Capacity can include the physical, institutional, social or economic resources and means, as well as skilled personal or collective attributes such as leadership and management that a community can bring to bear on managing hazards. Capacity may also be described as capability.

A point to note about these definitions, and they are included as

being representative of most definitions, is that they refer to "community" as a large social group but do not refer to the individual, whereas most lists refer to groups of vulnerable people, but not to individuals or communities. The intent of giving these examples is to show that resilience is a multifarious concept that can apply to the capacity to withstand loss, the capacity to prevent a loss occurring in the first place, and the capacity to recover from a loss if it occurs. Vulnerability, on the other hand, is a measure of what losses may occur and how severe they may be.

To conclude this section it does need to be pointed out that vulnerability and resilience are linked logically but are not necessarily opposite ends of a spectrum. A person or community may be both vulnerable and resilient at the same time. For example, a person who has built a house on a flood plain is vulnerable to flooding, but may have a degree of resilience, through adequate insurance that can help them recover from the loss. The capacity to recover from the loss, resilience, is independent of vulnerability. Resilience and vulnerability do not cancel each other out to arrive at a neutral state. They complement rather than confront each other.

WHO IS RESILIENT, WHO IS VULNERABLE?

Although not dependent there is some concordance between resilience and vulnerability and we may assume, for practical purposes, that if a person or group has a high vulnerability then they have a low resilience. The following is a list of vulnerable groups of people (Marsh, 1999):

1. Aged (particularly the frail) being less mobile, often poor, often isolated
2. Very young, dependent on others, lacking the capacity to care for themselves
3. Disabled (mental and physical) requiring assistance from other people or agencies for normal daily support
4. Poor/People with limited resources to meet essential needs
5. Nondominant Language speakers who may have difficulty accessing information and services
6. Indigenous groups who may be socially marginalized and poor

7. Socially isolated who may lack support physically and emotionally
8. Physically isolated with difficulty accessing services and information
9. Seriously ill who require high levels of support just to meet daily needs
10. People dependent on technology-based life support systems who also require high levels of daily support
11. Large families who have to manage multiple needs within one household
12. Single parent families with limited resources and low coping capacity
13. People with limited coping capacity who can be made highly vulnerable by the addition of small amounts of additional stress or loss
14. People with inadequate accommodation who are already in significant need
15. Those on holiday and traveling (particularly those in tent and caravan resorts) who are not familiar with local circumstances and assistance
16. Tourists from overseas who are not familiar with local conditions and who are far from their support networks.

It must be remembered also, that a person can belong to more than one of these groups where one vulnerability may exacerbate another. Lists such as these are often taken in practice to suggest that people who do not fall into one of the identified groups are not vulnerable and are therefore resilient. As I shall discuss later this is not the case. Vulnerability and resilience are neither mono-dimensional nor polar. A person, group, or community is neither vulnerable nor resilient but on a number of different axes, such as housing, income security, psychological coping capacity, and they may be assessed as being more or less vulnerable **and** resilient to particular threats. It is possible to exist in both states at the same time, because a person or group is composed of a tightly-bound skein of different attributes.

Not belonging to one of these groups does not mean that a person is not vulnerable in some circumstances. The European tourists killed and injured by the Indian Ocean Tsunami in 2004 would, in most cases, not have fallen into any of these categories but they were still

vulnerable. Their relative wealth, health, or youth did not necessarily protect them from the ravages of the tsunami and its consequences.

LEVELS OF SOCIAL RESILIENCE

Studies of resilience and vulnerability have almost invariably focussed on the individual as the unit of assessment as is indicated in the previous list. However, people do not exist solely as individuals. Social behavior results in them forming groups, behaving collectively and interacting across different levels of social grouping. These levels include:

1. Individual
2. Family
3. Tribe or clan
4. Locality or neighborhood
5. Community
6. Social associations such as clubs and faith congregations
7. Organization (such as a bureaucracy or a private sector firm)
8. Systems such as environmental systems and economic systems.

As well, resilience may be assessed for even broader areas such as region and nation. At these levels the aggregation of detail gives a very coarse resolution, although this may be adequate for policy purposes.

These categories are not exclusive. An individual may belong to several groups. For example, a person lives and exist in their own right as an individual, they may be a member of a family, they may belong to a number of groups and associations such as a church congregation, a local environmental group, a sporting club and similar, and they belong also to the wider community.

It is not just the individual that is the focus of resilience and vulnerability. Families and larger groups, up to and including whole communities, may possess capacities and weaknesses that render them more or less susceptible.

There are many post-disaster examples of groups of people, some formal volunteer groups (e.g., the Red Cross), others centred on churches and others on groups such as football clubs (not normally linked with community volunteer activity), providing support to par-

ticular individuals and families. In many cases whole communities come together, often for many weeks or months, to work together in communal projects where the output is owned by no one but shared by everyone.

Even more interesting are emergent groups that arise apparently spontaneously after events to provide mutual aid to their members. Predicting when and how these groups will arise, and what stimulates their occurrence is very difficult but has something to do with communities that are stable, have a sense of identity and have no substantial splits or enmities within them.

Equally community activity can be directed at prevention and preparedness work such as supporting volunteer fire-fighters brigades, fund raising for emergency services and prevention works such as maintaining flood protection works.

The important point about this section of the discussion is that families, groups and communities do possess internal dynamics that indicate a level of autonomous capacity to act and be acted upon and therefore exist as entities semi-independent of their constituent, individual members. It is not possible to have a community with no individual members but it is not nonsensical to talk of the same community that has so changed over time that it has a totally new complement of members, none of whom belonged originally. In this sense communities are quasi independent entities and while they cannot in substance own assets (in law this is less clear) they do have control over some assets (e.g., community halls) and they can "possess" intangible assets such as networks and values that facilitate daily individual life.

DIMENSIONS OF RESILIENCE AND VULNERABILITY

Impacts and Needs

Whilst there will be wide variations in the types of community impacts and the needs arising as a result, the following list sums up the areas of significant impact, but not in any necessary order of priority:

- Life and Injury (1,2, 3)
- Physical Health/Wellbeing (1,2, 3)

- Mental Health/Wellbeing (1,2, 3)
- Home/Shelter (1,2, 3)
- Safety and civil security (1,2, 3)
- Food (1,2, 3)
- Potable Water (1,2, 3)
- Sewerage and public health systems (4,5)
- Information about services and support (1,2, 3)
- Access to services and support (1,2)
- Income security/economic opportunity (1,2, 3)
- Social links, social networks and social support (1,2, 3)
- Community owned assets (4,5)
- Community "owned"/shared intangibles (such as values, aspirations, communal activities) (4,5)
- 1 = individual directly affected, 2 = 1st order indirect impacts on small groups, 3 = 2nd order indirect impacts on community, 4=direct impacts on community, 5 = 1st order indirect impacts on individuals

This is not a simply a list of types of losses but an indicative list of vulnerabilities; what people and communities have to lose. The converse of this list is that resilience may be subdivided into the capacity to withstand loss in these areas or to recover from this loss.

This, too, is a not untypical list but it does need some explication. Some impacts apply only to individuals directly (such as injury), indirectly to small groups (where for example, the injury of one family member affects others) and less directly still to the wider community (the shared cost of health care for the injured person). Some of these impacts are related to community assets (shared by all but owned by no one) directly and less directly to individuals (where say a water supply system is damaged)

Lists such as that set out above are valuable as aide-memoires but they are never complete and can always be added to, but their real danger is in breeding excessive confidence that the task of analysis has been completed when it is always in progress.

Elements that Support Resilience at an Individual Level: A Functional Assessment

The resilience of a person or group may be assessed on the basis of

how well they "own" and can "manage" the following attributes:

Information and advice on preparedness and assistance measures and how to access them, the normal bio-psychosocial reactions which can be expected and how people can deal with these reactions in themselves, members of their family and their community, and how to make sense of the event in terms of its cause and fitting it into their "view" of the world can be provided.

Resources include financial resources, which can be their own, insurance, or from other sources, to apply to prevention, preparedness and recovery measures. Resources also include physical goods, such as alternative accommodation, essential household items, alternative transport systems, tools and other items.

Management capacity embraces having the time and opportunity to manage appropriate resilience generating activities, as well as the physical capacity, which may include the support of other people, machinery, or support where there is a particular need. It also includes access to services and other support systems such as building services, financial services, counselors, and interpreters.

Personal and community support includes particularly post event personal support, such as outreach services, personal advisers and counselors, specialist support services, advocates and gatekeepers and community support, for example, community development officers.

Involvement refers to linkages with other people, with a wide network of family, friends and acquaintances shown to be critical in supporting and sustaining resilience. Involvements also means consultation in developing disaster management programs and encouragement in generally making a contribution to policy and program development.

These five attributes are not just relevant to individuals or even families. They apply equally to community groups. These, in a sense, have an identity separate from any particular individual or group. They also have attributes and processes, such as networks, community ceremonies, a "culture," history, potential and desired futures, that is different to the attributes of an individual. Resilience is an organic relationship between individual, group and community in the context of a hazard.

As I and others (Buckle, Marsh & Smale, 2001a) have pointed out, the traditional characterizations of particular groups of people, such as the aged, as being resilient or vulnerable does not tell us which people

in a particular situation may be vulnerable. This is because people or groups will have a specific mix of vulnerabilities and coping strategies that depend on their circumstances and the context of the hazard and its interaction with the persona and group. These lists, therefore, have an indicative value at best.

The value of a functional approach is that it defines resilience and vulnerability as characteristics that can be reduced or enhanced with observable and measurable effects. We cannot address vulnerability reduction or resilience development on the basis of characteristics such as age or gender. These may provide strong pointers to how and when and what type of action should be taken. They may indicate priorities. But, in the end, we cannot change a person's age or gender. What we can do is to improve their access to resources, to improve their health status, to empower them and to give them access to equitable treatment. However, in stating this we do recognize that empowerment is not an easy process, particular when the most vulnerable, the least resilient, are often those least able to cope generally and who may also be isolated from mainstream resources.

A limitation and danger of lists of characteristics of resilience and vulnerability is that they may instil a false confidence and may lead planners and managers to treat the list not as an aide-memory but as a definitive statement which may lead to unjustified confidence and complacency that the problem has been solved.

Elements that Support Resilience at Community Level

Resilience and vulnerability are not just characteristics that affect individuals but also groups and communities.

- **Knowledge of hazards** and of community characteristics essential in developing and maintaining capacity to avoid or reduce the impacts of disasters.
- **Shared community values**; this includes a positive sense of the future, a commitment to the community as a whole and agreement, broadly, on community goals. This does not exclude diversity, but does exclude competitive and antagonistic goals and values.
- **Established social infrastructure**, this attribute includes information channels, social networks and community organizations

- (e.g., churches, sporting clubs).
- **Positive social and economic trends** include a stable or growing population and a viable economy, both contributing to sustainability. Positive trends and sustainability assist the community to deal with adverse conditions.
 - **Partnerships** between agencies, community groups and private enterprise or any combination facilitates innovation, shared knowledge, experience and resources.
 - **Resources and skills** can be generic attributes (e.g., management or financial skills, human resource potential). These can be measured by their cost, availability and ease of access.

In research in Australian communities, we were repeatedly told that key matters could be resolved to half a dozen issues (Buckle, Marsh, & Smale, 2003, pp. 15–16):

1. The need for empowerment of local people and their communities so that planning, decision making and action were neither “top-down” nor “bottom-up” but a combination of these that reflected a genuine partnership.
2. There is a need for local leadership especially where there is population decline or economic decline (which is often accompanied by the loss of local leaders) or where the population is changing rapidly or, as in many rural areas, the population is aging and there is a net loss of young people.
3. There is a need for a focal point, a center where residents, local leaders, agency, business and government representatives can meet. This center also has a symbolic value as an area of trust and mutual support rather than as a combative arena and where isolation, mistrust and misunderstanding can be broken down. This is paralleled by a need for inclusiveness in processes of planning and decision making along with a feeling of ownership in these processes and their outcomes by all people who have an interest in them.
4. Trust in the municipal and government authorities and in the private sector is critical; there is a need for high levels of trust and social capital within networks and across networks with an active program to restrict conflict and to generate mutual respect and understanding.

5. There is an important need to develop and maintain networks and to do this between networks as many are isolated from other networks.
6. There needs to be effective and open and accessible communication processes in which all stakeholders may participate.

In general, there exists a set of principles for community capacity building and nurturing resilience that can be summarized as follows (Buckle, 2003, pp. 42–46). Local communities and organizations must be managed according to principles of good governance (legal authority, transparency, accountability, inclusiveness and agreed priorities). This addresses the extent to which programs and the policies they reflect conform to contemporary standards and to community needs and aspirations. Adequate resourcing of resilience-building programs is often overlooked with the result that resources are inadequate to fully complete programs. Resources are more than money and include skills and knowledge. Any capacity-building program needs to ensure that there is integrated development of social, economic livelihoods, environmental and cultural dimensions to community life. All programs need to be self-sustaining, not just in the sense of their having a positive effect on their environment, but also with regard to generating future resources and their capacity to interact successfully with other programs.

Change is inevitable and inherent in social life, resilient communities and the programs on which they are based need to incorporate mechanisms for change and adaptation, these mechanisms include community consultation, monitoring, audit and feedback. Any program needs to meet goals of effectiveness that include a positive cost benefit ratio, efficiency and involving sustainable partnerships.

RESILIENCE IS CONTEXT SPECIFIC

Resilience and vulnerability are not inherent characteristics of a particular individual, group or locality. They indicate relationships between appropriate skills, resources and knowledge and the risks generated by an actual hazard.

The context may be time dependent; people may be more or less vulnerable depending on the time of day, time of the week, or the time

of year. For example, earthquakes may be more threatening to life if they occur at night when people are in their homes, but bushfires are less likely to cause damage to homes if people are at home and can defend their property (and know how to do so). Droughts, floods, bushfires and cyclones are seasonal and so is exposure and vulnerability to these.

Hazards have different characteristics in terms of damage potential, rapidity of impact, duration, extent of area affected, frequency and warning time. These factors vary between hazard types, and even between the same hazard occurring at different times. The potential for harm therefore varies also with the type of hazard.

These are two dimensions, time of occurrence and type of hazard, that, together with the characteristics (resilience and vulnerability) of the person or group at risk, that make resilience and vulnerability contingent on local circumstances. Wisner (2004) indicated some different typologies of vulnerability assessment but favors a contextual approach. I agree that resilience and vulnerability can only be properly understood as constructs (not as inherent attributes) that arise from a particular set of circumstantial social, economic, political, historical and cultural conditions and to understand the cause and consequences of a particular vulnerability or capacity.

DIMENSIONS OF RESILIENCE

What I have offered so far is a series of lists relevant to a discussion of resilience and vulnerability. I want now to emphasize that the assessment of resilience prior to the event is extremely problematic given the complex interaction of the capacities of the individual, the community, the various impacts and needs caused by disasters and the significance of context in ascertaining resilience. It is therefore questionable whether resilience is ever predictable in advance except on a very coarse scale.

Any assessment must take into account that in theoretical and practical terms, resilience is not the opposite end of a spectrum to vulnerability. Assessments and rankings of vulnerabilities will only ever be an approximation, and given the complexity of this problem this is not necessarily a bad thing, at least in practical terms. What this does alert us to is the need to assess resilience at the finest level we can and to

assess it not against the individual or community who are not in themselves naturally resilient or vulnerable, as these qualities are context dependent, but against particular states of that individual and to balance vulnerability against capacity. So, for example, a rich person is much less vulnerable to loss of a home (because they have assets to restore losses) than a poor person who is asset poor, but both may be equally vulnerable psychologically.

ASSESSING RESILIENCE

Assessing resilience and vulnerability is difficult given the complex and dynamic nature of people and the communities and societies to which they belong. The complexity generated by the various permutations of factors discussed here means that they may not be possible to predict except in a very general sense.

It becomes a point of argument whether it is helpful, say, to categorize the "elderly" as vulnerable or whether it is unhelpful. I suppose that if a person is elderly and is vulnerable also this is a helpful categorization if it leads to support and action. It is less helpful if one is elderly and not vulnerable, at best it may stigmatise a person and at worse it may generate an uninformed but constraining and imposed benevolence and may lead to a loss of dignity as a person is assumed to be needy when they are not. It may be, however, harmful if an incorrect categorization leads to other people who are vulnerable receiving less support than to which otherwise they would have been entitled.

What I suggest is that a "functional" approach be taken where vulnerability and resilience are assessed on the basis of the ability of a person or group or community to work towards and to attain certain basic goals, such as the capacity to manage their own affairs, to have access to appropriate and appropriate levels of resources, including food, water, shelter, health care, education and cultural activity, social inclusion and information and access to other necessary and desirable services. This approach can also be applied to groups and communities. Can they meet their goals in the face of specified systemic shocks or disasters.

Even this is not likely to yield detailed results as local circumstances, by definition, will vary from area to area, over time and from one situation to another. Situational or contextual assessment is therefore

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needed, where local, immediate circumstances are taken into account to assess capacity and vulnerability. Only after situational assessment can an accurate view be achieved of capacities, vulnerabilities, strengths and weaknesses, needs and assets. This, in turn, provides a framework for developing appropriate mitigation, remedial and support mechanisms. Such an approach can yield useful and useable results. It is practical and can be applied to planning and management. The choice of scale can change and at larger scales the results may be applied to whole districts or regions or even countries, though the lack of sensitivity due to scaling issues will limit the applicability of the results to broad programme and policy considerations.

As Wisner, Blaikie, Cannon & Davis (2004) indicate there are many checklists or aide-memoires and they have their place as tools in the process of assessing vulnerability and resilience but they do not explain how people and groups become or remain or move out of vulnerability and resilience. The drivers of such change are structurally political, economic and cultural forces that expose people to processes and events (such as floods and wildfires). These events and processes in themselves are not harmful, it is only when humans and their institutions and artefacts are exposed to them in close proximity that a risk is generated. Avoiding proximity to wildfires, floods and so on is constrained by lack of choice and lack of resources (lack of political status, poverty etc.) and the risk can in a real sense be said to be generated by external forces that exist independently of the "hazard."

RESILIENCE AND VULNERABILITY TO WHAT, WHEN, AND FOR WHOM

Resilience and vulnerability arise from the circumstances in which an individual finds themselves. This "finding" may involve a degree of compulsion as general social, economic and political dynamics and structures constrain the opportunities of many people, especially the poor and the marginalized. Of course, resilience and vulnerability can also be owned by families, groups and communities. This is a critical dimension, especially as individuals exist within, interact with, and exert influence on their social environment. So resilience or vulnerability at one level may directly or indirectly influence resilience or vulnerability at other levels.

Lists and matrices are useful tools, but we need tools and methods to evaluate dynamic interactions within and between these various social domains. But this is a significant challenge to assess need and capacity in the full complexity of their social, economic and political circumstances.

Finally, we need to move away from simply categorizing resilience and vulnerability according to peoples' demographic status (e.g., aged or the young, or any other group). It is important to identify how they are resilient and the circumstances that generate and reduce vulnerability and generate and sustain resilience. We need to identify those attributes about which we can do something, such as poverty or knowledge, for we cannot do anything about aging, either accelerating it or slowing it down.

REFERENCES

- Anderson, M. B., & Woodrow, P. J. (1998). *Rising from the ashes: Development strategies in times of disaster*. London: Intermediate Technology Publications.
- Buckle, P. (2000). *Assessing resilience and vulnerability in the context of emergencies: Guidelines*. Melbourne: Department of Human Services.
- Buckle, P., Marsh, G., & Smale, S. (2000). New approaches to assessing vulnerability and resilience. *Australian Journal of Emergency Management*, 15, 8-14.
- Buckle, P., Marsh, G., & Smale, S. (2001a). *Assessment of personal & community resilience & vulnerability* (Project 14/2000). Mt Macedon, Australia: Emergency Management Australia.
- Buckle, P., Marsh, G., & Smale, S. (2001b). *Assessing resilience & vulnerability: Principles, strategies & actions guidelines emergency management Australia* (Project 15/2000). Mt Macedon, Australia: Emergency Management Australia.
- Buckle, P., Marsh, G., & Smale, S. (2003). *The development of community capacity as applying to disaster management capability* (Project 14/2002). Mt Macedon, Australia: Emergency Management Australia.
- Emergency Management Australia. (1998). *Australian emergency management glossary*. Canberra, Australia: Commonwealth of Australia.
- Marsh G., Smale, S., & Buckle, P. (1999). Report on community impact issues following possible major prolonged disruptions to utilities or possible Y2K situations. Melbourne: Department of Justice, Victoria, Australia.
- United Nations. (2005). United Nations international strategy for disaster reduction. Retrieved January 9, 2005, from <http://www.unisdr.org/eng/library/lib-terminology-eng%20home.htm>.
- Weichselgartner, J. (2001). Disaster mitigation: The Concept of vulnerability revisited. *Disaster Prevention and Management*, 10(2), 85-94.
- Wisner, B. (2004). Assessment of capacity and vulnerability. In G. Bankoff, G.