INPUT PAPER

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HOW DO WE MEASURE AND BUILD RESILIENCE AGAINST DISASTER IN COMMUNITIES AND HOUSEHOLDS?

Paul Arbon

Lynette Cusack

Kristine Gebbie

Malinda Steenkamp

Olga Anikeeva

Torrens Resilience Institute

Adelaide, Australia

http://www.torrensresilience.org/

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Introduction

Communities worldwide are increasingly impacted by disasters arising from natural hazards, conflict and humanitarian emergency or man-made events. These disasters frequently occur in unexpected forms, magnitudes and locations, making it virtually impossible to prevent or address all such threats. In Australia in particular, regular hazard events and incidents occur in communities every year, with many of these unanticipated, usually widespread and resulting in serious consequences for the affected communities. In 2009 the Council of Australian Governments (the country's peak intergovernmental forum) agreed to adopt a whole-of-nation resilience-based approach to disaster management. This is in line with the increasing international interest in promoting and improving resilience, rather than focusing mainly on emergency response and recovery.

Disaster preparedness involves more than efficient emergency services and rapid response during the acute phase of a catastrophic event. In order to enhance the capacity of countries to withstand and recover from emergencies and disasters, a coordinated and cooperative effort is required. Globally, there is increasing acknowledgement of the importance of continuous community engagement that facilitates preparedness prior to a disaster and allows for efficient recovery following the event. Addressing and building resilience enables communities and households to strengthen their ability to deal with, survive and recover from disasters. The *National Strategy for Disaster Resilience* published by the Australian Government in 2011 recognized that a national, coordinated and cooperative effort is required to enhance Australia's capacity to better withstand and recover from disasters (Council of Australian Governments, 2011). It identified the need for attention to disaster preparedness and strengthening of resilience at all levels of Australian society, from governments through individual communities to households and individuals. It is, therefore, important to build upon existing emergency planning arrangements to focus more on action-based resilience planning to strengthen local capacity and capability, with greater emphasis on community engagement and a better understanding of the diversity, needs, strengths and vulnerabilities within communities and households. Strengthening local communities against disaster events involves enabling them and households within them to determine how resilient they are against these adverse situations, which would allow them to subsequently address any identified gaps and shortcomings. Resilient communities and households are better able to withstand crisis events and have an enhanced ability to recover from residual impacts and return to their original state. A culture of disaster preparedness and self-reliance will allow families and entire communities to survive without

outside assistance for many days, and to recover from an emergency event quickly. The Australian framework for disaster resilience emphasises the need for increased partnerships across communities, for relationship building among governments, community groups and the organisations, both private and public, that make up communities and acceptance of responsibility for resilience building actions across all levels of civil society.

This paper describes research designed to improve understanding of key factors that comprise community resilience and further develop measurement tools that enable stakeholders to build their capacity and capability to confront and survive better through disasters. It also outlines the development of a tool that can increase disaster resilience in potentially vulnerable households.

Disaster resilience for communities and households

What is community resilience?

Community resilience has been defined and explained in a range of different ways in the literature; however, most of the definitions share key terms and concepts. Key characteristics that define resilient communities include functioning well while under stress, successful adaptation to new challenges, self-reliance and social capacity. Social support systems, such as neighbourhoods, family and kinship networks, social cohesion, mutual interest groups and mutual self-help groups are important for building community resilience. Various community assets should be considered when evaluating community resilience, such as community members' skills, knowledge, experience and motivation, as well as physical assets and the connections between them (Maguire and Cartwright, 2008). It is important to consider the internal community structure, the community history and community vulnerabilities, and to conduct an assessment of community resources and adaptive capacities (Longstaff, et al. 2010). Resilience can also be considered using a systems approach by considering subsystems such as diversity, robustness, connectedness, functional cross-scale links and learning capacity (Keil, et al. 2008). The availability and robustness of critical infrastructure, such as flood mitigation systems, water supply, information technology and buildings should also be considered (Klein, et al. 2003; Tierney and Bruneau 2007; Keil, et al. 2008; Frommer, 2011; Fekete, 2011).

What is household resilience?

Household disaster resilience is the capacity of a person or people sharing a living arrangement to sustain their household even under stress; adapt to changes in the physical, social and economic environment; and be self-reliant if external resources are limited or cut

off and learn from the experience to be more prepared for next time. Household resilience is, therefore, not a state to be attained so that attention can then be paid to other issues. It is an ongoing process that requires consistent and repeated reinforcement to be at a suitably high level should disaster strike. It is the individuals' or households' resources and preparedness, which is bolstered through their active networks, which work together, especially in times of need, to assist individuals or households to adapt, learn and recover from emergency events or disasters. Because preparedness actions take time to implement and because emergency events are frequently of sudden onset and unexpected, household resilience building must be an everyday activity. The resilience of households will depend on a range of relatively small actions and activities that build resources, preparedness and resilience networks.

Measuring disaster resilience

Developing tools to measure community and household disaster resilience

Despite the range and depth of definitions, frameworks and models of resilience, there are no standard definitions of the different types of resilience, nor are there any pragmatic and validated tools whereby these can be assessed. Also, while key aspects of community resilience have been described in the literature, there is very little discussion about how it can be measured, specifically prior to an event as an approach to disaster preparedness. Many academic publications have put forward models that require complex and sophisticated mathematical modelling and calculation of community resilience, which cannot be easily used by community members to measure and understand their degree of disaster resilience (Rose, 2004; Arianoutsou, et al. 2011; Zobel, 2011). Others discuss the concept of resilience building after a disaster event, rather than before the event, when prevention activities could aid a community to recover more rapidly from disruptions (Cox and Perry, 2011; Millen, 2011; Zobel, 2011).

The Torrens Resilience Institute[1] (TRI) undertook two projects to address the issue of measuring disaster resilience, i.e., a **Community** and a **Household** project. The first concerned the design of a community disaster resilience measurement model. The aim was to develop a straightforward and pragmatic tool for non-academic community stakeholders,

[1] The TRI comprises the University of Adelaide, Cranfield University, Flinders University and the University of South Australia. The aim is to be a national and international centre of excellence through the development of advanced thinking in the concept of resilience. Its mission is to assist the Federal and State Governments, the emergency services, organisations and civil society enhance their leadership and management capabilities, and thus enable them to prepare for, and respond better to, disruptive challenges. In addition, TRI work assists the Federal and State Governments achieve their foreign policy and humanitarian objectives by developing resilient national capacities in the countries of South East Asia and the Pacific Rim. Please see http://www.torrensresilience.org/ for more information.

while keeping sufficient effectiveness and rigour to enable objective measurement of disaster resilience in a community. The tool was designed to be used by communities interested in measuring their disaster resilience and acts to support community members in their plans to strengthen their resilience in the future. Specifically, it would enable stakeholders to establish priorities, allocate funds and develop disaster plans more effectively.

The second project was aimed at developing a household disaster resilience toolkit to be used by government, non-government and community-based organisations to assist potentially vulnerable households to prepare for emergency events, such as disasters. The foreseen outcome using this tool was the provision of relevant information on hazards and available community and regional emergency services (including information) to meet any assessed needs of a household to build their resilience.

Community disaster resilience: Developing a measurement model and a toolkit

The **Community** project was undertaken in several stages with a Project Advisory Group and a Project Working Group. The Project Advisory group was a national group with a broad perspective drawn from national and state government level. The Group met quarterly and oversaw the general direction of the project. The Working Group met in person or reviewed draft documents at varying intervals depending on the work being done. The Working Group members were drawn from the TRI collaborating universities, as well as other complementary government and sector experts. They were chosen from different specialties to contribute their varied expertise, to assist with the development of the definition of community disaster resilience and the key elements of a model and criteria for the Scorecard. Reports on the progress and key deliverables of the project were provided to the Attorney Generals Department Project Lead. A presentation on the project was also provided to the National Emergency Management Committee Subcommittees: Community Engagement, and, Risk Assessment Measurement and Mitigation.

The stages of the project included a careful review of existing community resilience models led to the development of a definition and model of community disaster resilience, as well as a Scorecard to measure community disaster resilience with a set of guidelines. A literature review informed the achievement of these key deliverables. The definition, model and Scorecard were reviewed and refined with the help of two communities before a final version was trialled in four communities across Australia. The feedback from these

communities was then used to finalise the development of the definition, model, Scorecard and guidelines for use by communities interested in measuring their resilience to disasters from all hazards.

Terms and Definitions

- The term community referred to a geopolitical community such as a town, district or local government area.
- A disruptive event was defined as an unwanted situation, which has the potential to become an emergency or even a disaster.
- An emergency was an event, actual or imminent, which endangered or threatened to endanger life, property or the environment, and which required a significant and coordinated response.
- A disaster was defined a condition or situation of significant destruction, disruption and/or distress to a community.
- A community was considered to be resilient when members of the population were connected to one another and worked together, so that they were able to function and sustain critical systems, even under stress; adapt to changes in the physical, social or economic environment; be self-reliant if external resources were limited or cut off; and learned from experience to improve itself over time. Community resilience was defined as more than the resilience of individuals, families or specific organisations, though all of those were considered to be key components of community resilience.

Literature review

A search of the scientific and grey literature revealed a wealth of information, definitions, frameworks and models of community resilience. Many articles provided practical tools that could be used by communities to build their overall resilience to issues that may affect their health and wellbeing. Those articles that specifically considered community disaster resilience had a focus on individuals and community vulnerability and risk assessments. Despite the range and depth of material, no standard definition of community disaster resilience and no published validated tool that communities could easily use to assess their resilience were found. The papers and reports collated by the literature review enabled the Project Working Group to compare models and frameworks and to tease out re-occurring themes and concepts to develop a tool to measure community disaster resilience. Having and using such a tool at the community level could initiate the process of community engagement through enabling conversations and contributing to awareness about the hazards and risks in local areas.

Process

The literature search was conducted from information published on measuring community resilience within the context of disaster preparation, response and recovery, focusing in particular on tools that have been developed to measure community disaster resilience. An exhaustive search had been conducted in a number of online databases to seek out relevant papers, book chapters, policy documents, and various other publications. The keywords used in this searched consisted of two sets, namely, '*Measurement and Community Resilience*' and '*Measurement tools and Community Resilience and Disaster*.' The main databases searched, as well as the results obtained are outlined in Table 1.

	Measurement and Community Resilience	*Measurement tools and Community Resilience*
Pro-Quest Central	0	3,964
Springer Link	5,797	2,909
SAGE Journals Online	2,024	823

Table 1: Databases searched and results obtained

These databases were chosen on the basis of the wide selection of subjects and topics to which they enable access. The searches were restricted only to scholarly articles and those that have been peer-reviewed. The majority of the academic publications included in this review have been obtained from these databases. Most of the results obtained were duplicates among the data bases, or were not relevant to the community self-assessment focus of this project. Articles which had no content or clear relationship to the development of resilience measures were set aside. All in all, after having eliminated what was not needed, 65 relevant publications were included. Google was also searched for non-academic publications/grey literature, and out of 193,000 results, 50 were selected as being the most relevant to this project. These were systematically reviewed and further numbers were eliminated from this review. Additional material suggested by the members of this project's working-group have also been reviewed, and if found relevant, were included here.

Findings

The included papers described various factors that relate to community resilience, though there was very little discussion about how to measure community disaster resilience, specifically prior to an event as an approach to disaster preparedness. The main themes that emerged from the review were: using mathematical modelling to measure community resilience; components of community resilience; measuring social vulnerability, and frameworks for understanding community resilience.

Mathematical modelling of community resilience

A broad and general summary of the publications in this review seemed to indicate that many academic publications, most of which are in the form of academic journal articles, devise models that require complex and sophisticated mathematical modelling and calculation of community resilience or one aspect of this such as infrastructure (Rose, 2004; Arianoutsou, et al. 2011; Zobel, 2011). Though these may be relevant from a theoretical perspective they are not tools that can be easily used by community members to measure and understand their degree of disaster resilience. Components of these models appear, however, in many other publications discussed below.

Components of Community Resilience

Both published articles and the non-academic publications had several similarities, in that community resilience measures are a function of different components, characteristics or aspects of a community. In many cases, authors of these publications had arrived at similar or comparable components. Some authors termed them 'capitals' such as social, economic, health, political, physical (Cocklin and Dibden, 2005; Mayunga, 2007; Callaghan and Colton, 2008). Others named them 'aspects', 'resources', 'enablers', or 'outcomes'. There were differences in emphasis, focus, or prioritisation, but most publications had two or more similar components. This literature had been the most useful in trying to draw out the comparable components that, if measured, give an indication of a much broader community resilience approach. An example of this comes from the work of Maguire and Cartwright (2008) who developed resilience criteria consisting of equity, quality, sustainability and ownership. In measuring resilience, they recommended that the users of their Toolkit consider their community assets when evaluating their communities. They identified assets comprising of people and their skills, knowledge, experience and motivation, encompassing associations or groups of people working with common interests as volunteers, institutions or paid groups of people who are structurally organised. Community assets also include physical assets and the connections between these physical assets. A different approach based on similar concepts was that proposed by Longstaff, et al. (2010), in which resilience was identified through a social assessment tool that assessed three connected issues, i.e., the internal community structure, community history and community vulnerabilities. The assessment of community resources and adaptive capacities were also included in this grouping. The value for measuring community connectedness emerged as one item that needed to be captured in a community disaster resilience tool. Keil, et al. (2011) took a systems approach, which could be assessed through subsystems analysis using a number of

community characteristics. The subsystems identified were diversity, robustness, connectedness, functional cross-scale links and learning capacity. The three examples discussed demonstrated the different types of approaches considered by various authors, but with similar concepts emerging. There was, however, not one usable tool published that measured community disaster resilience.

A number of other assessments and possible measures of resilience specifically related to critical infrastructures, such as those designed for flood mitigation, water supply, information technology and buildings (Klein, et al. 2003; Tierney and Bruneau, 2007; Keil, et al. 2008; Frommer, 2011; Fekete, 2011). These articles highlighted the importance of having appropriate risk assessments for community disaster planning, response and recovery in place. Many articles on building community disaster resilience discussed the concept of resilience building, at either an individual or community level, but with a focus on *after* rather than *before* a disaster event (Cox and Perry, 2011; Millen, 2011; Zobel, 2011).

Measuring Social Vulnerability

A number of articles sought to measure social vulnerability as an indicator of community resilience. This concept of vulnerability involved, not only specific disadvantaged groups within a community, but also a strong emphasis on socio-economic factors that may affect the quality of community resilience (Fekete, et al. 2010; Flanagan, et al. 2011). The literature clearly supported vulnerability as an important consideration within a community disaster measurement tool. Of particular importance was the level of risk and vulnerability in the community, especially for non-English speakers, new migrants and the frail elderly.

Frameworks for Understanding Community Resilience

Some peer-reviewed papers featured frameworks for better understanding the concept of community resilience. A number focused on processes or procedures that would measure community resilience (Centre for Community Enterprise, 2000; Bay Localize, 2009; Cottrell, 2009). Many non-academic papers, such as those published by non-governmental organisations, civic organisations, or even a few academic writers and researchers introduce models and tools that do not require sophisticated mathematical knowledge or skill to use (Emergency Volunteering, 2011; Emerald Community House, 2011).

Summary

This project sought to design a community disaster resilience measurement model with an accompanying tool that would be easy for non-academic community stakeholders to use, while keeping sufficient effectiveness and rigour to enable an objective measurement of

disaster resilience in a community. The literature review revealed a wealth of information, definitions, frameworks and models of community resilience. Many articles provided practical tools that could be used by communities to build their overall resilience to many issues that may affect their health and wellbeing. Those articles that focused specifically on community disaster resilience had a focus on individuals and community vulnerability and risk assessments. Despite the range and depth of material, no published validated tool that communities could use to measure their resilience in preparing for an event at the community level, rather than the individual level was found. The papers and publications included in the literature review made it possible for the Project Working Group to compare models and frameworks and to tease out the recurring themes and concepts to develop a tool that community members can use to measure community disaster resilience. By having such a tool for use at the community level, the process of community engagement, conversations and awareness about the hazards and risks in their local area can be initiated. This is the first step to building community disaster resilience.

Developing the model and the tool

The Community Resilience Model

Based on a synthesis from the literature review, a model of community disaster resilience was developed by the Project Team, Working and Advisory Groups (Figure 1). The model identified the overlapping relationships of community connectedness, risk/vulnerability, planning/procedures and available resources as comprising a community's disaster resilience. The model was based on sets of physical, organisational and social capital, which all communities possess to varying degrees and can be used to respond to one or more disruptive events. Four components of community resilience in an emergency or disaster were identified:

1. How connected are the members of your community?
2. What is the level of risk and vulnerability in your community?
3. What procedures support community disaster planning, response and recovery?
4. What emergency planning, response and recovery resources are available in your community?

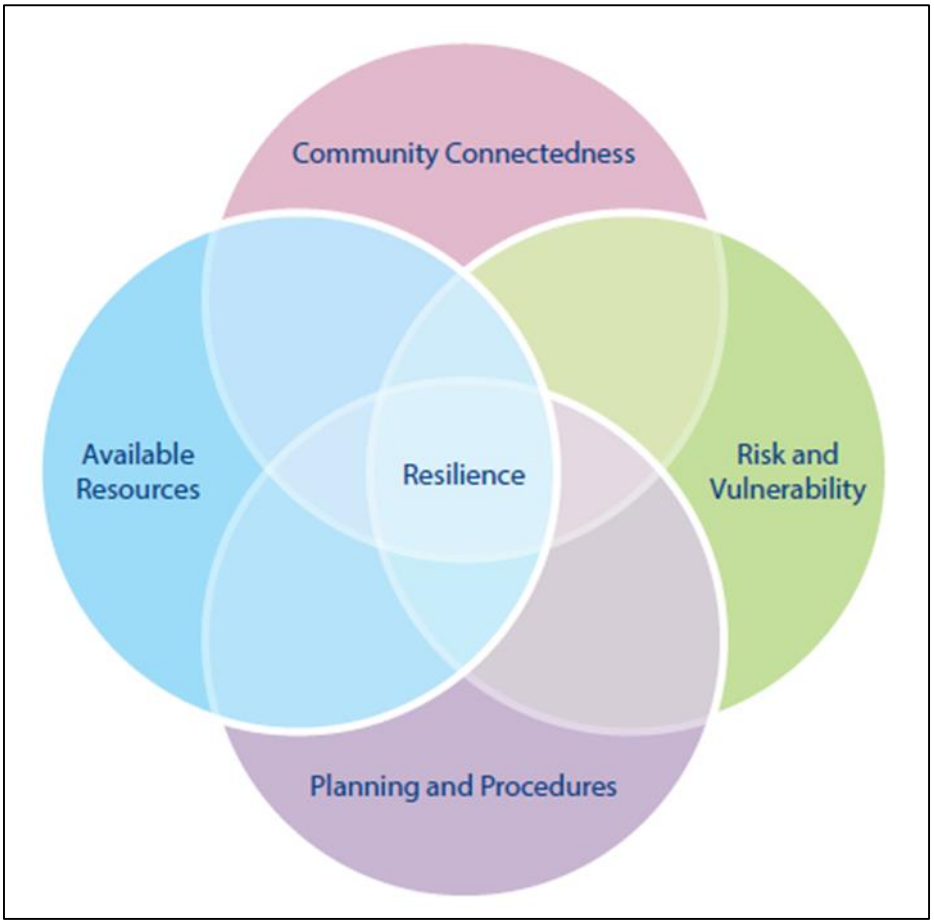

Figure 1: Community Disaster Resilience Model

Developing the Toolkit

Using the model shown in Figure 1, questions that could illuminate each of the four components were drafted. A decision was then made that the response to each question should be a ranking on a five-point Likert-style range, with the possible responses indicating a level of contribution to potential resilience from extremely low to very high. Based on the need to have a tool of practical length for completion by a community, and the likelihood that information for scoring would be readily available, the initial draft of nearly 100 questions was reduced to 22 by the Working Group (see Table 2).

1.1	What proportion of your population is engaged with organisations (e.g., clubs, service groups, sports teams, churches, library)?
1.2	Do members of the community have access to a range of communication systems that allow information to flow during an emergency?
1.3	What is the level of communication between local governing body and population?
1.4	What is the relationship of your community with the larger region?
1.5	What is the degree of connectedness across community groups? (e.g. ethnicities/sub-cultures/age groups/ new residents not in your community when last disaster happened)
2.1	What are the known risks of all identified hazards in your community?
2.2	What are the trends in relative size of the permanent resident population and the daily population?
2.3	What is the rate of the resident population change in the last 5 years?
2.4	What proportion of the population has the capacity to independently move to safety? (e.g., non-institutionalised, mobile with own vehicle, adult)
2.5	What proportion of the resident population prefers communication in a language other than English?
2.6	Has the transient population (e.g., tourists, transient workers) been included in planning for response and recovery?
2.7	What is the risk that your community could be isolated during an emergency event?
3.1	To what extent and level are households within the community engaged in planning for disaster response and recovery?
3.2	Are there planned activities to reach the entire community about all-hazards resilience?
3.3	Does the community actually meet requirements for disaster readiness?
3.4	Do post-disaster event assessments change expectations or plans?
4.1	How comprehensive is the local infrastructure emergency protection plan? (e.g., water supply, sewerage, power system)
4.2	What proportion of population with skills useful in emergency response/ recovery (e.g., first aid, safe food handling) can be mobilised if needed?
4.3	To what extent are all educational institutions (public/private schools, all levels including early child care) engaged in emergency preparedness education?
4.4	How are available medical and public health services included in emergency planning?
4.5	Are readily accessible locations available as evacuation or recovery centres (e.g., school halls, community or shopping centres, post office) and included in resilience strategy?
4.6	What is the level of food/water/fuel readily availability in the community?

Table 2: The 22 final Scorecard questions

The scoring levels for each question were based on research where available or the best judgment of the Working Group, and where possible information such as the census or locally developed planning documents was used. Examples of the scoring options are presented in Table 3. Instructions suggest to the community that when there is disagreement among committee members on a score, a lower rather than higher score should be identified, as the disagreement itself is indicative that there is work to be done. Summary scoring consists of summing up the total points for questions in each section and then the total scorecard. This sum identifies whether the community ranks in the lowest quartile (red or danger zone), the middle two quartiles (caution zone) or the highest quartile (green or going well).

The Working Group considered five versions of the Scorecard. Version Five was reviewed in one rural and one local government area in South Australia with members of the local government and community. This was to gain feedback on the components of resilience identified in the Scorecard, the flow of the different components, the language and the criteria used to score the level of community disaster resilience. The feedback was presented to the Working Group for further discussion and changes were made resulting in a final working draft, Version Six, being presented to the Advisory Group for the trial in the test sites. The final test version of the scorecard, with instructions, was reviewed and approved by the Project Advisory Committee and comprised:

1. **Community Disaster Resilience Scorecard**

   This Scorecard comprised detailed questions and assessments of each of the four components of the disaster resilience model. The choice of criteria was not an exact science. The selected criteria were developed from the best available evidence related to the four components of the model. If a specific criterion were supported by the literature and provided a readily accessible data source, it was used. In all other cases, the criteria were selected by best judgement of the experts on the Working Group with input from the Advisory Group.
2. A **guideline** that outlines the process for completion of the Scorecard.
3. A **glossary of terms** used in the Scorecard, ensuring consistent interpretation.
4. A resource **sheet** to assist the Community Scorecard Working Group to find data sources required to assess their community disaster resilience.

1. How connected are the members of your community?						
Question	Score					Information source
1.1 What proportion of your population is engaged with organisations (e.g., clubs, service groups, sports teams, churches, library)	**1** <20%	**2** 21-40%	**3** 41-60%	**4** 61-80%	**5** >81%	***Census***
1.2 Do members of the community have access to a range of communication systems that allow information to flow during an emergency	**1** Don't know	**2** Has limited access to a range of communication	**3** Has good access to a range of communication but damage not known	**4** Has very good access to a range of communication and damage resistance is moderate	**5** Has wide range of access to damage-resistant communication	***Self-Assessment***
1.3 What is the level of communication between local governing body and population?	**1** Passive (government participation only)	**2** Consultation	**3** Engagement	**4** Collaboration	**5** Active participation (community informs government on what is needed)	***International Association for Public Participation (IAP2) Spectrum*** http://www.iap2.org/associations/4748/files/IAP2%20Spectrum_vertical.pdf
1.4 What is the relationship of your community with the larger region?	**1** No networks with other towns/regions	**2** Informal networks with other towns/ regions	**3** Some representation at regional meetings	**4** Multiple representation at regional meetings	**5** Regular planning and activities with other towns/regions	***Self-Assessment***
1.5 What is the degree of connectedness across community groups? (e.g. ethnicities/sub-cultures/age groups/ new residents not in your community when last disaster happened)	**1** Little/no attention to subgroups in community	**2** Advertising of cultural/cross-cultural events	**3** Comprehensive inventory of cultural identity groups	**4** Community cross-cultural council with wide membership	**5** Support for and active involvement in cultural/cross-cultural events (in addition to previous)	***Self-assessment tied to demographic profile; local survey to assess***
Connectedness score:		**25% (5-10)**	**26-75% (11-19)**		**76-100% (20-25)**	

Table 3: Example of the Scorecard

Testing the model and tool

The original aim was to trial the tool with three communities in separate jurisdictions across Australia. The Project Team with the Working and Advisory Groups identified a number of communities across the different Australian jurisdictions to be invited to be test sites for the Scorecard. The communities represented a mixture of rural and metropolitan areas, as well as those communities that had recently experienced a disaster and those that had not. With support of the Commonwealth Attorney General's Department a letter was sent to the Mayor or Chief Executive Officer of the identified local government organisations seeking their support to participate in the trial. Four communities in four different Australian jurisdictions completed the process.

The Project Team liaised with a representative from each participating local government service to provide more information about the project. Each community identified a Community Scorecard Working Group of 10-15 members that would gather three times to complete the Scorecard and give feedback to the project team. Two members of the project staff went to each test community for the first meeting of the community committee, to provide an orientation, note the responses and answer questions about the Scorecard. It was explained to the committee that they would be expected to meet in approximately two weeks to complete a draft score, and then approximately two weeks later for a final scoring meeting and evaluation. Two members of the project staff subsequently attended this final meeting in each community to conduct an evaluation.

Evaluation of feedback from the test sites on the model and the tool was based on responses to a series of questions asked of all participants functioning as a focus group. Participants were asked whether or not they thought that the components in the Scorecard adequately assessed community disaster resilience as they understood it. Although an additional individual evaluation form and a self-addressed envelope were left for members to complete and return to the Project Team, very few individual responses were received, so evaluation was based primarily on the community group discussions.

The support of local government personnel was consistently excellent in all communities participating as trial sites. The experience of the test communities highlighted the importance of the local government's role in supporting this initiative by bringing the Community Scorecard Working Group together, providing the venue and in particular the personnel to coordinate the meetings and access information from the data bases, which many of the community members were unfamiliar with.

Summary

The testing of the Scorecard with a range of communities was extremely valuable as the feedback enabled both the instructions for the process and the tool itself to be refined. The conclusion was that this community-friendly Scorecard is a workable tool for a community to measure its disaster resilience and consider action plans that would further strengthen resilience. The definition of community disaster resilience was thought to be understandable and the four components of disaster resilience, their questions and criteria were considered appropriate measures of resilience at this time. The suggested process of three community meetings was user friendly and the Community Scorecard Working Group members reported enjoying the discussions that the scoring generated, finding them to be as valuable as the final score itself, thus affirming the process nature of community resilience building. Participants suggested that the use of this scorecard can help identify the degree to which members of communities:

1. Are able to foresee and/or acknowledge threats and risks;
2. Work with the emergency services and other agencies, especially the local government to build disaster resilience;
3. Have a sense-of-community and social capital.

The identified actions can feed into the cycle of quality improvement for local government and local services. A critical point identified is that the outcomes also need to be fed back into the wider community in a way that will engage their interest.

The final Scorecard with Toolkit is available under the "Tools" tab on the Torrens Resilience Institute's website: www.torrensresilience.org and includes:

- An introduction to the kit and the process
- Instructions for a local government unit on getting the process started, including suggestion on potential members of a scorecard working group
- A working copy of the scorecard for duplication and distribution to the working group
- A master copy of the scorecard, to be completed by group consensus
- Discussion of reviewing the score and next steps.

Household disaster resilience: Developing a measurement toolkit

The relative level of resilience within communities depends, at least in part, on the resilience of each household within the community. Households are an important building block of community resilience. During the development of the Community Resilience Scorecard, community members highlighted the importance of the resilience building actions and associated knowledge and plans of households. They argued that work to improve the general resilience of households would translate into improved resilience for the community as a whole, and, potentially, improve the effectiveness of disaster relief and recovery efforts. A second complementary project was undertaken to respond to this concern. The project focussed on development of an assessment and referral toolkit designed to identify the most likely and most consequential hazards for each community, assess the vulnerabilities in individual households in relation to these threats and referral to pre-existing available community resources and support. The project was designed to encourage and empower households to take positive resilience building action.

Terms and Definitions

- The term vulnerable refers to households that may be more susceptible to disruptive events, emergencies and disasters. Vulnerability may be related, for example, to household socio-economic status, social situation (Including isolation) or health status such as disability; chronic medical or mobility problem.
- A household is defined as a person or group of people sharing a living arrangement.
- A disruptive event is an unwanted situation that challenges the safety of the household and the community in which it is situated and which has the potential to become an emergency or even a disaster.
- An emergency is an event, actual or imminent, which endangers or threatens to endanger life, property or the environment, and which requires a significant and coordinated response.
- A disaster is a serious disruption to community life which threatens or causes death or injury in that community and/or damage to property which is beyond the day-today capacity of the prescribed statutory authorities and which requires special mobilisation and organisation of resources other than those normally available to those authorities.
- Household disaster resilience is the capacity of a person or people sharing a living

- arrangement to sustain their household during a disaster; including adapt to changes in the physical, social and economic environment; be self-reliant if external resources are limited or cut off and learn from the experience to be more prepared for next time.

Developing the model and the tool

The Project Team developed a framework for the tool with input from the Project Advisory Committee and discussions with key staff from the organisations trialling the tool and a review of current literature. A number of versions were reviewed and edited before completion of the final tool. The first part of the Household tool was the Agency Resource Tool, which was to be completed by an agency set to visit a particular household. The tool provided an expert assessment of the hazard and risk profile for households in that locale. Instructions were that the information for this first part needed be obtained before any conversations with individual households were initiated. The second part of the Household tool was a structured conversation guide that was to be completed by community volunteers during a visit to each household. The guide covered four areas: local hazards and threats, health related vulnerability, property and environment and connectedness to the local community (please see http://www.torrensresilience.org/household-resilience-toolkit) Information about local hazards and threats was included in the Agency Resource Tool and taken to each household. It provided the discussion starter as each household was introduced to the disaster-related hazard mapping for their location. The health assessment covered health issues which may be relevant during a disaster such as decreased mobility, mental health problems or other chronic diseases that may affect the ability to evacuate or prepare adequately to confront an emergency. Property issues included storage of hazardous materials such as bottled gas or other petroleum products and difficulty in preparing the household such as in clearing foliage and rubbish in fire prone areas. Connectedness included an assessment of each household's connection and support network. Did individuals live alone? Did they know others in their community who may need special assistance during an emergency? These assessment questions were subsequently used to refer households to existing health and community services that could assist and build household resilience. For example, the elderly in many Australian communities can receive assistance with clearing and cleaning up their property to prepare for the fire season. Those with hazardous materials stored on their property, such as fuel, may not be aware of services that will remove and dispose of these materials. Others who live alone and may require assistance may not be aware that they can receive support from community-based volunteers to

prepare the household and to form better community networks through clubs and associations.

Testing the model and tool

The tool was tested by representatives of St John Ambulance Australia SA Inc.[2] and Queensland Alliance for Mental Health Inc. St John provided the project team with an opportunity to test the tool using community volunteers with access to potentially vulnerable people in South Australian households. The Queensland Alliance for Mental Health tested the tool with mental health service clients in Queensland. Once the trialling process had concluded the Project Team again attended a meeting of St John volunteers, this time to gather feedback and evaluate the use of the tool. Conference calls were used in order to explain the project and collect the feedback from the Queensland Alliance for Mental Health

Findings

St John Ambulance SA Inc.

Eight staff members who had experience in using the household resilience tool in a range of metropolitan local government areas of South Australia participated in a group meeting to provide feedback.

A number of participants indicated that initially the process was unclear and a little overwhelming although after completing the process with two or three households their confidence had greatly improved. Instructions relating to some sections of both Part One and Two of the tool were considered inadequate and therefore changes were made accordingly. As the discussion continued it became apparent that some of the volunteers had not been clear on the objective of the household assessment in relation to disaster preparation and resilience building and as result discussions related to what household members should do in the event of a disaster and were at times focused solely on the response and recovery phases. This outcome demonstrated the importance of a clear orientation to the resilience concept and the changing emphasis of disaster management toward the pre-event phase and the development of community disaster resilience. This outcome may have been exacerbated by the fact that many St John Community Care volunteers have entered this area of community service following retirement from the uniformed emergency/ambulance services sections of the organisation. A lesson for the future is that a detailed orientation will be especially important when/if community emergency services volunteers are tasked to use

[2] St John Ambulance Australia provides a volunteer-based federally funded Community Care program which includes services such as support for older people who live alone and those with disabilities or who are frail and need assistance with simple tasks of daily living.

the tool. It was suggested that if an organisation was to incorporate use of the tool into its community service activities, an orientation and training session would be required to discuss the process

The first part of the toolkit provided an assessment of local hazards and emergency risks and community information and resources within the local community in which the household was situated. The participants collected their own information required for this first part. This was because they were working in a number of different local government areas. Some participants used the local government websites, though they indicated that the quality of information and ease of access varied across local governments. Some local governments provided good quality hazard assessments and information, but others had very little information available. Some of the community care workers testing the tool visited local government offices to ask questions about the local hazards and to collect information pamphlets before meeting with household members participating in the evaluation. Although time consuming, this was found to often yield better results than searching the website.

It was mentioned that website access to information was not an option for many of the households as they did not have access to computers. Therefore the community care workers had written down telephone contact numbers for available service providers or had provided the telephone number for emergency services information lines for the household member.

Part Two of the tool guides the community resilience assessment conversation with household members. Some participants thought that first part did not link directly with the second part. However on exploring this further it was identified that this comment was made with the view to 'what to do in a disaster' rather than 'preparing for a disaster event'. All of the participating St John representatives concurred that the second part the tool covered all relevant aspects of disaster resilience. The four sections of the tool were discussed and the wording of some of the questions and measures was changed based on the feedback. In addition, participants suggested that providing examples for many of the questions would help in explaining the item better. These changes were made to the final version of the Tool. Originally there was a question based on budgeting and financial preparation which many of the community care workers found difficult; they were uncomfortable about asking this question.

It was reported that respondents could easily understand the questions. Although the answers provided for each question appeared to be influenced by the householder's

perception and understanding of their level of vulnerability. The information provided in the first part of the tool was very useful in setting the scene for the assessment although there was a range of understanding and acceptance of the hazard and risk information provided.

All the community care workers found it easy to compile the list of actions although some went into more detail than others. Some mentioned that they searched for additional information sources after completing the second part with the households, in order to provide the household with more information on their identified areas of weakness.

Participants reported that a couple of community members were very excited to have someone talk to them about the subject of emergency and disaster because they had been thinking about what they should do in the case of an emergency event. Overall there was consensus that it was a worthwhile process. Participants mentioned making some changes following the assessment process, including, for example, having up to date emergency phone numbers, talking to their family about extra support if needed and purchasing extra pantry supplies.

The St John representatives believed that the households would be more resilient, however, there were concerns expressed that the process had to be managed sensitively as they did not want to scare households. The assessment process caused households to think about the importance of preparing for and considering what would happen in the event of an emergency or disaster. The community care workers mentioned that the majority of households involved in the trial are heavily connected with the community already. Connectedness is an important domain of disaster resilience. As a result potentially more vulnerable households may need to concentrate greater effort on other aspects of resilience including planning and preparing their household and surrounding environment. It should be noted however that this project accessed clients who are receiving services from well-established community service providers. Those households who are not connected to the community services sector in some way may well be isolated and lacking the community network and connections that are an essential part of community resilience.

To complete Part 1 which included the searching, reading and following up on resources it took approximately 3 hours. To complete Part 2 the process took on average longer than an hour, with some taking up to 2 hours.

It was widely agreed that the questions were conversation starters and many household members used the opportunity to ask other questions about their local community. It was

noted that the majority of participants in this trial are very well connected to services within their local community already. The on-going impact of professional community service organisations on the "connectedness" aspect of community disaster resilience should not be under-estimated. Furthermore, there was a consensus among the St John representatives that the tool is a worthwhile exercise and that Part One of the process (Hazard profile and finding locally available resources) requires a group or agency effort.

Queensland Alliance for Mental Health Inc.

The response provided by one community care worker from the QAMH was overwhelmingly positive. Locating the information sources for Part 1 was reasonably time-consuming and it was difficult to provide useful information to households who were not accessing HACC services or were not elderly. Middle-income households with slight mobility issues would have to pay for services. It was added that the questionnaire was a good guide although they found some questions came across as too simplistic for a particular household and it was best to reword some questions to suit the audience. The community care worker found that an interview always took more than an hour although a lot of that time involved making a connection, as it is hard to ask these questions without building a rapport beforehand. For implementation as a routine exercise for clients of QAMH it would be recommended that the tool be used on the second or third visit so that the household is more comfortable opening up and answering questions. Overall, the QAMH would like to undertake interviews with more households. Although there are websites and televised information, the QAMH representative argued that it is the face-to-face conversation that is most effective in contributing to disaster preparedness. As with other community engagement exercises, QAMH suggested that the biggest hurdle is to get households to commit their time. Generally it was considered that families would make changes as a result of using the tool or tweak plans already in place.

Summary

It is important that individuals and organizations utilizing the tool adequately understand the purpose of the assessment tool and the meaning of resilience. If not they may focus on the general community's understanding of disaster and be drawn into response and recovery phase questions and issues rather than an assessment of the present day resilience level of the household. It is important that the agency staff complete the first part of the tool as many of the St John representatives found this component very time consuming. Collecting information for the tool often proved difficult because the information for each local government varied, and if available was not easy to find. A concerted effort coordinated by a

single organization committed to making this kind of community service contribution, focusing on one local government area and utilizing volunteers to canvass many households in a single campaign would appear to be the most effective and sustainable approach. In this way information for the first part could be prepared centrally and with the assistance of local government, emergency services and community services; volunteers could canvass the community undertaking assessment conversations; and, finally, referral advice could be written up after each interview by an organizational panel with responsibility for oversight of the completeness and accuracy of the advice to be given. In this way, community organisations committed to disaster resilience building could make a useful contribution that builds household disaster resilience and provides a rewarding and constructive activity for their own organization and membership.

The way forward

The remaining challenge associated with the development of practical tools capable of facilitating the processes of assessment, discussion and planning for greater community disaster resilience is encouragement of community willingness to participate in the Scorecard process and the motivation of communities to accept collective responsibility to reduce the destructive impact of disruptive events, emergencies and disasters.

The research will build over several stages including: Assessment of existing resilience definitions and key concepts, in a large part through the development of consensus; Determination of the key features of disaster resilience and the factors that promote or disable the resilience of a community; and, practical and pragmatic approaches to support and sustain the process of resilience assessment and of resilience building within communities. A broad range of methods will be employed to complete this program of research with each stage building on the previous. This includes literature reviews, consensus building, and engagement with stakeholders. The recently completed community resilience scorecard and household vulnerability assessment projects provide TRI with the underpinning research required to support the development of an improved understanding of resilience, its measurement and its improvement.

This research has global geographic application for its basic research findings with country and culture-specific modifications required for any definitions and assessment tools that might be developed.

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