COMMUNITY RESILIENCE

Understanding the Concept and its Application

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2 March 2011

Abstract: In early 2011, the Council of Australian Governments approved a National Strategy for Disaster Resilience. The strategy, which was prepared prior to the severe 2010/11 floods in Queensland, marks an important change in Australia's approach to disaster planning and preparation. It emphasises that disaster resilience involves society as a whole - it is not solely the domain of governments, local authorities and the emergency services. In promoting a whole-of-nation, resilience-based approach to disaster planning and preparation, the strategy stresses the role of communities in building local and national resilience. The concept of *community resilience* is appealing to politicians, practitioners and scholars. It provides a comforting response to major emergencies and local disasters by suggesting that Australian communities can bounce back from such events. Despite its popularity, however, there are widely differing views on the meaning and utility of the concept, not least as the terms *community* and *resilience* are both contested. The paper examines the context in which the concept has developed: an increasingly volatile, complex and inter-connected environment, and a contemporary Australian society with demanding needs and expectations. The paper proposes a framework involving three sets of capital (physical, procedural and social) which can be used by communities in times of need. A capital-based approach to *community resilience* is attractive as it lends itself to measurement, which in turn is appealing to policy makers and planners aiming to enhance Australia's capacity to withstand and recover from emergencies and disasters.

Key words: Community, resilience, risk, vulnerability, tenacity, capacity.

INTRODUCTION

We live in an age of unparalleled growth and opportunities. The United Nations' Human Development Report of 2010 proclaims that great progress has been made over the past two decades in human development. It provides evidence which shows that many people today are healthier, live longer, are more educated and have more access to goods and services than ever before. The changes have been most pronounced in the Developed World where a rise in disposable income with easy borrowing has enabled the average family to have a lifestyle that would have been inconceivable just a generation ago.

In Australia we are able to enjoy life because our air conditioners and telephones work, we have access to a constant supply of water, gas and electricity, and our supermarkets are well stocked with food. In reality, much of what we take for granted could be interrupted by human error, natural disaster or some malicious act. Indeed, recent events such as the Haiti earthquake which killed over 250,000 people, the 2010/11 summer floods in Queensland and other Australian states, the rapid onset of the 2008/09 global financial crisis, and terrorist attacks around the world have all contributed to a heightened awareness of personal risk and vulnerability.

The concept of resilience is attractive as it suggests the ability of something or someone to cope in the face of adversity – to recover and return to normality after confronting an abnormal, alarming and often unexpected threat. In Australia we are rightly proud of our reputation to "take a punch" and bounce back, and the willingness of our people to assist neighbours in need of help. We seem to be a resilient nation.

But national and community resilience cannot be taken for granted; indeed there are signs that we are more brittle than our parents' generation. Our society is becoming ever more

complex and our organisational systems are becoming more interdependent, and thus more vulnerable to disruption. If not properly managed, a disruptive event could escalate into an emergency, a disaster or even a catastrophe. There is a fine dividing line between a well functioning state where organisations adopt “just in time” practices and supermarkets operate “lean supply chains”, to one where the utilities fail, the tanks at petrol stations are empty, and our shops run out of food.

Although the concept of resilience is used enthusiastically by policy makers, practitioners and the broadcasting media, there is little agreement in its meaning and application. This lack of consensus undermines its usefulness in developing policies and plans at national, state and local levels.

This paper discusses the meaning and utility of the concept of *community resilience* in mitigating the impact of natural and human-made disasters. Although the term *resilience* can be applied to people who share a common location or interests or circumstances or position, in this paper it refers primarily to the first category - a group, larger than a household, living and working in a common location such as a village, town or neighbourhood.

The paper concludes by proposing a framework involving three sets of capital (physical, procedural and social) which can be used by communities in times of need to survive a disruptive event and recover in a timely manner.

AN AGE OF CHANGE AND UNCERTAINTY

Each year a report is prepared for the World Economic Forum (WEF) on global risks. The report outlines the issues most likely to impact on society, and makes recommendations on actions required. A theme which has been repeated in recent reports is that global risks are becoming more interconnected and frequent. Shocks and vulnerabilities are truly international, even if the impact and response may differ at the local level. The 2010 WEF report describes an environment which is increasingly volatile, uncertain, complex and ambiguous (VUCA) - an acronym borrowed from US military planners which seems equally applicable to the situation facing many families, communities, local authorities and organisations in the private, public and non-governmental sectors. (US Army War College, 2004)

On November 9, 2010, in the wake of a series of natural and industrial disasters with major international social, economic and political implications, the Financial Times (2010) published a special report on *Risk Management*. The report commented on the growing number of high-impact, hard to predict, and rare events: so-called ‘black swans’ referred to by Nassim Nicholas Taleb in his book *The Black Swan: The Impact of the Highly Improbable* (2007). Taleb suggests that many governments, local authorities, organisations and communities do not prepare for such events as they are so unlikely. But recently we have experienced a series of ‘unlikely’ events which the Financial Times concludes are not adequately addressed by existing risk and business continuity thinking and practice.

The threats to society from natural and man-made disasters and malicious attacks are now being considered by governments alongside traditional threats to national security. On 4 December 2008, then Prime Minister Rudd defined the security of Australia and its people in a broad sense to include threats to human security other than attacks from foreign states and terrorist acts. Such non-traditional threats include attacks on public utilities, transnational crime including the trafficking of people, drugs and arms, and the impact of climate change which may bring unregulated population movements, declining food production, reductions in arable land, violent weather patterns and resulting catastrophic events.

The UK’s first National Security Strategy, published in 2008, departed from previous national defence strategies by considering the broader security needs of the UK. It pointed out that

threats are no longer directed only at the UK's defence and security capabilities, but at the country's utilities, infrastructure, financial mechanisms, information systems and society at large. The strategy emphasised the importance of national and community resilience in facing up to such threats. (UK Government, 2008)

In an age of uncertainty, we are continually facing new and unforeseen threats at both the national and local levels. The UK's 2010 National Security Strategy states that "…. we need to place more emphasis on spotting emerging risks, and dealing with them before they become crises. (UK Government, 2010, p.3) The strategy continues "…. we must do all we can, within the resources available, to predict, prevent and mitigate the risks to our security and wellbeing. For those risks that we can predict, we must act to reduce the likelihood of their occurring and develop the resilience to reduce their impact." (p.25) In an age of uncertainty, it is impossible to predict every risk, be they severe weather events, bushfires, health pandemics, industrial accidents or malicious acts. In an age of change and uncertainty, fostering community resilience is a fundamental part of building a strong and enduring national resilience.

NEEDS AND EXPECTATIONS OF SOCIETY

Perhaps the greatest challenge facing governments, organisations and communities today is satisfying society's needs and expectations in the event of a disaster, or indeed the fear of a future disaster. Robert Putman, in his influential book *Bowling Alone* (2000) identified changes in the way Americans relate to one another in the workplace and through clubs and societies. He observed a lack of civil engagement which undermined community and organisational identity and cohesion, which in turn reduced the nation's ability and willingness to recover after confronting abnormal, alarming and unexpected threats.

In his book *Disconnected*, Andrew Leigh – a Member of Parliament for the Canberra seat of Fraser – notes similar trends in Australia. Leigh (2010, p.153 and 154) claims that "…. the data clearly point towards certain conclusions. When it comes to organisational membership, surveys show that we are less likely to be active members of *any* association today than we were in the 1960s. When it comes to sport, we are about as likely to watch a live sporting match as in the past, but we are substantially less likely to play an organised sport." Leigh found evidence of a decline in the number of close friends and neighbourhood connections from the 1980s to the 2000s. He argues that over time, some of us seem to have replaced friends with (the TV show) *Friends* and neighbours with *Neighbours*.

Heartfield (2002) suggests that society's "…. more diminished and more isolated, sense of self" has altered our confidence to deal with change and the problems it creates. In our technically networked world we may be more aware, but we are also easier to scare. Being more isolated leaves us more self-centred, as well as risk averse. Durodié (2005, p.17) goes further by suggesting that our politicians have become "…. societal risk managers around issues such as security, health and the environment. They pose as the people who will protect us from our fears and regulate the world accordingly." The more such concerns are highlighted, he argues, the more difficult it becomes for authorities to satisfy the insecurities they drive.

Edwards (2009) believes that Britain has become a brittle society. In the DEMOS publication *Resilient Nation* he suggests that just-in-time lifestyles provide the British with a seemingly infinite number of goods and services, made possible by greater social and economic interdependencies and mass communications. He notes that this lifestyle relies on an infrastructure that is "outmoded and archaic, and which increasingly lacks the capacity to support our complicated lives." Today some 85% of the UK's critical national infrastructure is owned by the private sector, adding another layer of complexity to the brittle system.

Edwards suggests that "… our everyday lives and national infrastructure operate in a fragile union, vulnerable to even the smallest disturbances in the network."

Over the past few decades we have benefited greatly from improvements to our health and safety, and we look to our governments and others in authority to mitigate threats and remove risks. We demand information, guides, standards and regulations to assist us reduce the likelihood and consequences of a disruptive event, and we expect financial support to enable us recover as quickly and completely as possible. There is little evidence to suggest that society, at least in the Developed World, will revert to the norms of earlier times and accept greater personal and collective responsibility. Indeed, Furedi and Roberts (2004, p.8) suggest that self-reliance is old fashioned and self-seeking is now actively promoted, and "…. for whatever self-intentioned reason we are unlikely to see a truly resilient society emerge."

Others are less pessimistic. On 4 December 2008, in his first national security statement to Parliament, Prime Minister Kevin Rudd stated that "…. one of the fundamental assets we have …. is our underlying strength, resilience and cohesion as a nation …. in Australia we have a strong tradition of volunteering support to our communities, especially in times of emergency, demonstrating the innate resilience and collective responsibility we all share as Australians." Others agree. "Ordinary human beings are at their most social and rational in a crisis. It is this that should be supported, rather than subsumed or even subverted." (Durodié, 2005, p.19)

AGREEING THE TERMINOLOGY

The literature provides a broad range of definitions and meanings to the common terms used in emergency and disaster management. In order to provide consistency, clarity and understanding to the subsequent discussion on community resilience, this section of the paper proposes one set of definitions.

Disruptive events

In the context of an emergency or disaster, the term *event* usually refers to an occurrence or change of a particular set of circumstances. (ISO 31000:2009) Events which interrupt the normal functions of a community or business, and may result in harm, are referred to as *disruptive events*. An event without consequences may be referred to as an *incident*, or more informally as a "near miss" or "close call". (ASIS SPC.1-2009)

Emergencies, disasters and catastrophes

Emergencies are disruptive events which endanger or threaten to endanger life or property or the environment, and which require an immediate, significant and coordinated response. (EMA, 2010) An emergency is likely to have local impact, and the response is likely to be provided by local emergency and health services, often with pre-planned involvement of volunteer organisations, such as the Country Fire Service (CFS) or State Emergency Service (SES) in Australia. A large industrial fire involving hazardous materials or a local flood requiring the evacuation of families could be described as an emergency. Most emergencies require urgent intervention to prevent a worsening of the situation, although in some cases mitigation may not be possible and agencies may only be able to offer palliative care.

The draft international standard on Societal Security (ISO/PAS 22399:2007) defines a *disaster* simply as "…. an event that causes great damage or loss." Others such as Emergency Management Australia use the term to describe serious disruptions to life that threaten or cause death or injury or extensive damage to property, the environment or

economic activity, and are usually beyond the day to day capacity of local emergency and health services. (EMA, 2010)

Some researchers and practitioners use the term *catastrophe* to describe extreme disasters such as Hurricane Katrina - which was one of a handful of true catastrophes in US history, and the only catastrophe to strike on US soil in recent times. Only the 1900 Galveston Hurricane, the San Francisco earthquake of 1906 and the Great Mississippi floods of 1927 are comparable to Katrina in terms of loss of life, physical devastation and the disruption of social order. (Tierney, 2009)

The literature has long pointed out that disasters are not merely large emergencies, and distinctions between emergencies, disasters and catastrophes are qualitative rather than quantitative. Public and organisational behaviour and response challenges differ significantly across the three types of events. (Quarantelli, 2005) The Community and Regional Resilience Institute's (CARRI) report on disaster response describes the key differences in terms of the severity and scale of impacts; complexity of the organisational and government response; the applicability of disaster plans and standard operating procedures; the extent to which the public becomes directly involved in the response; and the nature of the challenges faced by communities following the event. (Tierney, 2009) The key differences between emergencies, disasters and catastrophes are summarised in Table 1.

Emergencies	Disasters	Catastrophes
Impacts localised	Impacts widespread and severe	Extremely large physical and social impacts
Response mainly local	Response multi-jurisdictional, intergovernmental and bottom up	Response requires federal initiative, proactive mobilisation
Standard operating procedures used	Disaster plans put into effect – but challenges remain	Massive challenges exceed those envisaged in pre-existing plans
Vast majority of response resources are unaffected	Extensive damage to, and disruption of, key emergency services	Emergency response system paralysed at local level and even state levels
Public generally not involved in response	Public extensively involved in response	Public extensively involved in response, with long term mass convergence
No significant recovery challenges	Major recovery challenges	Cascading long-term effects, with massive recovery challenges.

Table 1: Key differences between emergencies, disasters and catastrophes (CARRI Research Report 6)

As will be discussed later in this paper, the extent of a community's resilience depends on the severity of an event. Everyday emergences typically do not severely test the ability of a community to absorb the impact, respond or recover; communities typically are sufficiently resilient to contain the relatively small-scale impact of emergencies. In disasters, the ability to absorb the full impact, respond and recover becomes more challenging. These difficulties are further compounded in catastrophes. Community resilience must thus be judged in relation to the scale, form and severity of each event.

Threats and risks

Early English dictionaries defined *risk* as "…. the chance of harm". Today's definitions retain the notion of *chance*, but they also introduce the concept of *exposure to harm*. In everyday language, therefore, the term involves two elements: the degree of exposure to harm and the extent of harm.

Nearly thirty years ago, Britain's Royal Society published a report on the concept of *risk assessment*. (Royal Society, 1983) The report drew together the prevailing international views on the subject of risk, and became a major work of reference which is still used today. In particular, it recognised the need to assess both the probability and magnitude of harm, although rather confusingly introduced the term *detriment*, instead of *risk*. The report also drew a distinction between objective and perceived risk: the former being the probability and magnitude of harm assessed formally, often by experts, and the latter being a layperson's assessment of potential harm. People respond to their perceived risk, rather than the actual likelihood and severity of harm. The most recent international standard on risk management (ISO 31000:2009) defines *risk* in an opaque way as the "effect of uncertainty on objectives", but then adds some clarity by noting that risk is often expressed in terms of likelihood and impact.

A *threat* is an act by someone or something which aims to cause harm, loss and/or pain in a manner considered to be menacing and/or evil. It is often used in security literature to describe something which could be carried out by individuals or groups acting alone or as agents of a foreign state or cause. But the term *threat* is increasingly being used in a more general sense to describe issues and trends which have the potential to cause harm, loss or distress such as global warming, internet viruses and flu pandemics. The draft international standard on societal risk (ISO/PAS 22399:2007) defines *threat* as "…. the potential cause of an unwanted incident which may result in harm to individuals, a system or organisation, the environment or the community."

Thus *threat* describes something which may lead to harm and/or loss; whereas *risk* addresses the probability of someone or something being exposed to harm and/or loss, the duration of that exposure, and the expected severity of harm and/or loss.

Communities

The term *community* has a number of contemporary meanings and applications. Originally it was used to describe a group of people living and working in a common location, usually in social groups larger than a household. The concept is now also applied to people who share common interests or circumstances.

Communities of location can range from street level, through to recognised administrative boundaries such as a parish, district, county or even state. They provide an easily definable area in which a community exists and operates. This is particularly useful for emergency planning and recovery as it provides an easily recognisable group of people facing common risks and threats, and with a common interest in responding together to disruptive events.

Communities of interest are groups of people who have affiliations which have grown as a result of their interaction with each other through a shared interest such as hobbies, faith, employment, education, sport, politics and entertainment. The common interests may include skills and resources which a community can use when preparing for, responding to, and recovering from disasters.

Communities of circumstance are created when groups of people are affected by the same incident or have a common immediate need, such as the terrorist attacks of the London transport system in July 2007, or major industrial accidents. These groups of individuals are unlikely to have the same interests but may form a community in the aftermath of an event. Although the sense of community may be temporary, some communities of circumstance grow and sustain in the long term following a disaster.

For the purposes of this paper, which is addressing the concept of community resilience to disruptive events, the focus will be on social groups who share a common location such as a village, town or neighbourhood.

Resilience

Defining resilience has proven elusive. Scholarly work often starts with its Latin root *(resilire)* then departs in a number of directions reflecting the many applications of the term. It is used to describe a property of materials, species, ecosystems, people, households, communities, organisations and even nations, and is often coupled with the concept of security. Resilience is a contested term and critics have argued that the concept is ambiguous, contradictory and raises unresolved questions.

In the paper *The Concept of Resilience: Understanding its Origins, Meaning and Utility,* McAslan (2010) suggests that differences in its definition are not as wide as some literature may suggest. Regardless of its application, McAslan points out that the term resilience has a number of common characteristics such as the ability to absorb and then recover from an abnormal event; being ready and prepared to face threats and events which are abnormal in terms of their scale, form or timing; an ability and willingness to adapt to a changing and sometimes threatening environment; a tenacity and commitment to survive; and a willingness of communities and organisations to rally round a common cause and a shared set of values.

Thus resilience is the ability of something or someone to cope in the face of adversity – to recover and return to normality after confronting an abnormal, alarming and often unexpected threat. It embraces the concepts of awareness, detection, communication, reaction (and if possible avoidance) and recovery. These are essential features of the daily struggle for life and are founded in our basic instinct of survival. Resilience also suggests an ability and willingness to adapt over time to a changing and potentially threatening environment.

Brian Walker and David Salt define resilience concisely as "…. the ability of a system to absorb disturbance and still retain its basic function and structure." (Walker and Salt, 2005, p.1) This succinct definition can be applied to the resilience of ecosystems, organisations and social systems, including communities impacted by disruptive events.

Is resilience the same as robustness?

It is important to note the difference between *resilience* and the concept of *robustness*. Robustness is the ability of a system to maintain its functions and characteristics in the face of disruptive events. (Cork et al, 2008, p.5) A robust community should be able to withstand all external shocks with little or no impact on its people, homes, infrastructure, services and values.

In contrast, a resilient community recognises that its people, homes, infrastructure and services may be affected by some disruptive events, but it has the innate ability to cope during such events and to recover afterwards. A resilient community must ensure that its critical infrastructure and warning systems are sufficiently robust to minimise the harm to its people, property and the environment.

In practice few communities can claim to be robust or enjoy absolute security. By definition, a robust community should be able to confront and overcome all threats at all times with little or no socio-economic impact from disruptive events. Such a goal would be prohibitively costly. A more realistic and achievable goal is community resilience.

Is resilience the same as sustainability?

Resilience and sustainability are sometimes incorrectly used to mean the same thing. The two concepts are not interchangeable.

Sustainability is the capacity to endure. In ecology, the word is used to describe how biological systems remain diverse and productive over time. Long-lived and healthy wetlands

and forests are examples of sustainable biological systems. For humans, sustainability is the potential for long-term maintenance of well-being, which has environmental, economic, and social dimensions.

Thus a sustainable community is able to maintain the quality of life of its people over time from external pressures and from internal influences such as demographic change. Such external pressures and internal influences are usually incremental and repetitive. In contrast, a resilient community is able to cope in the face of adversity – to recover after confronting an abnormal, alarming and often unexpected threat. Communities may aim to be both sustainable and resilient.

Aftermath of the 2005 South Asian Tsunami

Aishath Shiuna is having a busy day. At the age of nineteen she is the family's eldest child and is entrusted with baby-sitting duties. Today she is looking after her little brothers and sisters as well as several cousins. What would be considered a tedious errand by most adolescents is actually a source of delight to her. After over a year of waiting, Shiuna and her siblings can now finally relax as a family in the comfort of their own new home.

Two years ago the tsunami crashed through Aishath Shiuna's island of Muli in Meemu Atoll. Located on the eastern side of the country, it was one of the worst hit islands. Twenty-nine houses were completely destroyed and over a hundred others were severely damaged in this small island community of less than 800 people. Traditionally, the process of building a house takes many years to complete in the Maldives. As families save, they gradually add rooms to accommodate their growing families. The tsunami washed away decades of hard work in a matter of minutes, leaving the people of Muli with the task of putting together their shattered homes and lives.

While she waited for the house to be built, Shiuna and her immediate family ate with her grandmother and slept in the home of a relative. Now that their house is finished, Shiuna and her family are happy to reciprocate the hospitality they enjoyed during their time of need. As part of the concept of building back better, UNDP seeks to ensure that the new houses are finished to a higher safety standard than those they replace.

Faced with the enormity of the reconstruction work on the island, the community rallied together to overcome constraints. Three new construction groups were formed; the island's office employees worked part-time shifts on an elderly resident's house; and a 'householders committee' was established to work actively with all stakeholders on the rehabilitation process. Today the mood on the island is hopeful - a prospect that most would have found difficult to entertain in the initial weeks following the tsunami.

Box 1: Extract from Tsunami Recovery in the Maldives, UNDP, 2004 - 2006

Is resilience the opposite of vulnerability?

Vulnerability arises from the intersection of human systems, the natural environment and the built environment. The most obvious factor contributing to community vulnerability is its proximity to hazards such as coasts, floodplains, seismic zones, highly combustible forests or industrial contamination. Poorly constructed buildings, inadequately maintained public infrastructure and the density of the built environment also increase the vulnerability of communities. Equally important is the economic health of the community, which is closely tied to commercial and industrial development (Chang and Falit-Baiamonte, 2002). Finally, there are demographic and social characteristics of residents that make some communities more vulnerable than others. The social vulnerability of communities is borne from inequalities which affect access to resources and information, the ability to absorb the impacts of hazards and disasters without government interventions, housing choice and location, and the political marginalisation of impoverished residents.

Central to the conception of vulnerability is the way in which insecurity is experienced *locally*. Vulnerability is context-specific and varies as a consequence of inter-related factors at the individual, household and community level. As Kathleen Tierney points out "…. Hurricane Katrina was an illustration of the vulnerability perspective writ large. Although the effects of diversity and inequality on the fate of disaster victims had been documented in other US

disasters, notably the Loma Prieta earthquake, Hurricane Andrew, and the Northridge earthquake, these effects were highlighted in Katrina." (Tierney, 2009, p.7)

High levels of social vulnerability do not automatically indicate low levels of resilience; even very vulnerable communities can be well organised and can possess significant social and cultural capital, with close-knit community ties, active social support networks, and vibrant community institutions, such as churches. However, other things being equal, vulnerable populations are more likely to live in poorly constructed buildings with inadequately maintained public infrastructure. Furthermore, they may be less able to identify and exercise options to escape from danger when confronted by a major threat. Vulnerable communities tend to be less resilient.

BUILDING COMMUNITY RESILIENCE

Assessing the resilience of communities is a complex process as it involves the interaction of individuals, families, groups and their environment. Theoretical models address different aspects of the concept (e.g. Adger, 2003; Paton & Johnston, 2006; Pendal et. al., 2007; Norris et. al, 2007; Mayunga, 2007). Most focus on the issues which reduce the vulnerability of communities, such as information and knowledge, supportive networks, shared community values, and the community's ability and willingness to adapt.

It is beyond the scope of this paper to develop a comprehensive model of community resilience. Indeed, such a model could never be universal due to the many different types of community and the diverse range of threats and potential disruptive events. Instead, this section of the paper adopts a functional approach by identifying and discussing the key physical, intellectual and social components of community resilience. This reductionist approach will provide a common framework which should assist policy makers, community development workers and emergency managers share a common perspective, and thus develop complementary policies and priorities for building community resilience in Australia.

The components discussed below are not a complete list of the assets, measures, relationships and capabilities which together define resilient communities. They would, however, help enable a community to become more resilient, and are therefore better described as 'enablers'.

Physical enablers of community resilience

Abraham Maslow's *Theory of Human Motivation* proposes a hierarchy of human needs: physiological, safety, belonging, esteem and self-actualisation. (Maslow, 1943) Maslow's ideas have been critically assessed over the past seven decades and are still relevant today. Physiological needs – which are considered of greatest importance - define the key metabolic requirements of human survival: air, water, food and shelter. If these requirements are not met, the human body simply cannot continue to function. Safety – which is considered to be the next greatest need - includes personal security, health, well-being, and protection against accidents and illness.

Physical enablers of community resilience aim to satisfy these two basic human needs. In particular, improvements in national and local infrastructure should ensure that the utilities (water, electricity and gas), food, health services, transportation, communications and banking can operate at a level which provides individuals and groups with the means to survive and recover.

This category of community resilience includes systems and structures such as flood barriers, reinforced homes to withstand extreme weather events, bunkers to provide safe havens, and stocks of food and water. Such investments provide the physical capital which

communities can use during disruptive events to reduce the likelihood of harm, and to accelerate their recovery.

Local emergency and health services, trained volunteers and warning systems, and access to external assistance can also be considered within this category of resilience. Indeed, many of the improvements to community resilience in Australia in recent years has involved significant investments to upgrade national and local infrastructure, and to equip the emergency services to respond better to events which could become disasters or even catastrophes if not dealt with immediately and effectively.

Whereas physical assets can provide the means to protect, sustain and aid recovery, of equal importance is the physical state of individuals. Evidence shows that strong, fit and healthy people are more likely to survive and recover from disasters than those who are weak, frail and disadvantaged.

Procedural enablers of community resilience

Procedural enablers of community resilience provide the information and ideas needed to plan and prepare for, respond to, and recover from a major disruptive event. Such information and ideas draw on experience, improvements to operational practice (gained through lessons learned and experimentation) and a thorough analysis of immediate risks and future threats. They provide policy makers, emergency planners, community leaders and individuals with the ability to understand the context in which plans can be developed, and serve as the foundation upon which adaptability and innovation may be exercised.

This category of community resilience includes continuity and risk strategies, disaster policies and plans, and the proper application of standards, regulations, local knowledge and information. They enable the community to plan and prepare for, respond to, and recover from a major disruptive event. Whereas physical assets provide the means to survive and recover, improved policies, plans, procedures and information enable the assets to be applied effectively and efficiently.

In the immediate aftermath of the Victorian bushfires of February 7, 2009 there were calls to ensure that people living in vulnerable areas be much better prepared and protected against future similar events. Although the Royal Commission's final report includes some recommendations which aim to enhance the physical component of resilience, such as building community refuges and providing access to Commonwealth aerial fire-fighting equipment, most of the recommendations involve policy, standards, procedures, warnings and plans. Of particular note is the need to review the overarching policy: "Prepare, Stay and Defend or Leave Early".

Social enablers of community resilience

In the midst of chaos and uncertainty, individuals need to overcome fear and rise above their personal circumstances to assist others survive. The social component of resilience is about getting people prepared and willing to confront and overcome dangerous and difficult circumstances. It involves two related elements: community cohesion and motivation.

Community cohesion occurs when individuals want to stay together and provide each other with support to achieve a common outcome; it draws on shared experiences, a common sense of worth and an expressed collective identity, which is sustained by shared values and beliefs. Motivation is the product of a common will to survive and recover, confidence in protective measures and the work of the emergency services, effective local leadership, mutual respect and a clear understanding of the threats and risks.

Community self-reliance will see Queensland through

For many urban Australians it is easy to assume natural disasters only occur in the bush. It is a town and country cultural divide that shapes different attitudes to the environment. Where urban idealists romanticise the environment, country folk respect nature - knowing the landscape that nurtures life can also kill. Certainly, disasters have hit cities before. Darwin was flattened [in 1974] by Cyclone Tracy, bushfires took lives on the fringes of Sydney, Canberra and Melbourne in the last two decades. But the idea of a city suffering an onslaught of natural forces that reshapes the lives of millions of people seems [unlikely] in the city .... except in Brisbane and neighbouring Ipswich this morning, where inner-city residents and suburban families are united with their country cousins in understanding nature's deadly force.

It is hard to imagine a crueller reminder of humanity's relationship with nature. The photos showing the extent of the inundation with country roads ruined, homes lost and crops destroyed, do not do it. The videos of brown tides ebbing into Brisbane cannot explain the enormity. But what is now clear to all is that what unites the people of Queensland is infinitely stronger than anything that divides them; that nature does not distinguish between town and country.

Australians are [now] mainly an urban people who live in the present. Yet our settler society has its roots on the 19th century frontier where self-reliance was essential, where men and women learned to look to their own efforts and ingenuity to survive in times of trouble. And Queenslanders, in the city and the bush, both have these qualities in spades.

But it is also a society that understands self-reliance must be community-wide. People have to help each other: people like policewoman Chloe Beattie, who assembled an impromptu evacuation effort in her local Lockyer Valley community; like the big-rig owner-drivers who are rescuing stranded strangers; and like Linda Weston who explained to ABC TV on Tuesday evening how her community would cope as the water drained away and the long rebuilding efforts began. "This is a strong community, it really is. And a lot of people will support each other. If everybody stays strong like now we will be fine. You've got to strong and keep going – that's the Australian way."

Box 2: Extract from The Australian, Friday 14 January 2011

The resilience of communities is dependent on social bonds and collective action based on networks of relationships, reciprocity, trust, and community norms. Platteau (1994 and 2000) and Cantor and Rayner (1994) promote the concept of social capital as a means of assessing the potential of a community to demonstrate resilience to disruptive hazards. More recently, Adger (2003) and Morrow (2008) have stressed the relationship between social capital and resilience in explaining the responses of different communities to hurricanes and other natural disasters.

Community resilience outcomes

These three sets of enablers describe the 'ingredients' of community resilience. Physical systems and assets provide the ***means*** to survive and recover; policies, plans and operational procedures provide the ***ideas*** on how to survive and recover; and social cohesion provides the ***will*** to survive and recover. Together, they aim to achieve community resilience.

Earlier in this paper, the concept of resilience was described as "…. the ability of a system to absorb disturbance and still retain its basic function and structure." (Walker and Salt, 2005, p.1) In the case of community resilience, this definition can be expanded to become ".... the ability of a community to survive a disruptive event and recover in a timely manner."

Having suffered a major disruptive event, resilient communities: (1) are less likely to suffer death or serious injury; (2) have less damage to homes and impact on their livelihoods; (3) have more secure infrastructure and utilities, with access to water, food, finance and public services; (4) recover in a manner that is acceptable to the community; and (5) is able to maintain hope and a sense of community. These can be described as the intended outcomes of a resilient community.

It is self evident that communities can be made more resilient by enhancing physical assets, by gaining access to better information and developing better plans, and by drawing on people with a strong sense of community spirit and will to survive. The framework in Figure 1 shows the relationship between these three sets of 'enablers' and community resilience outcomes.

A community resilience framework

Although this paper has categorised the components of community resilience into just three sets of 'enabling' activities, it is important to acknowledge that the activities are interconnected and interdependent. For example, enhanced physical security and improved information will increase people's confidence and morale; whereas poor local leadership may result in the development of bad policies, inadequate planning and the inefficient use of physical assets. Similarly, communities with a strong social responsibility are likely to engage with the local authorities and emergency services in understanding the threats and evaluating local risks.

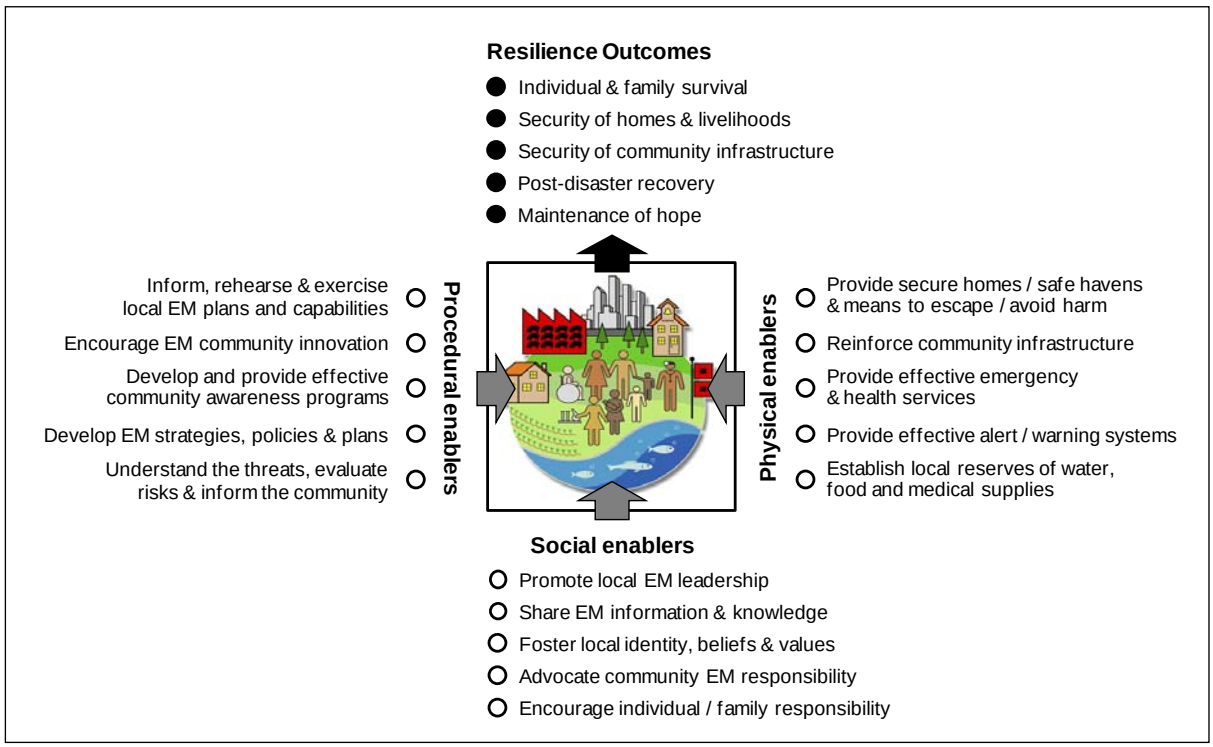

Figure 1: Community resilience framework

The reductionist approach proposed in this paper does not ignore the complexity of the concept of community resilience. Communities are elaborate adaptive systems operating in an increasingly volatile, uncertain and ambiguous environment. Indeed, they are so complex it would be almost impossible to develop a complete and accurate model of a community showing all the relationships, feedback loops, stocks and flows of information. And importantly, such a model would be difficult to understand or use in a meaningful way to assist policy makers, local authorities, emergency planners and community groups.

The physical, procedural and social enablers can be considered as three sets of capital which require investment in a balanced way, and which can be used by the community in times of need. A capital-based approach is attractive as it lends its self to measurement, which in turn is appealing to policy makers and planners. The component parts of physical, procedural and social capital can be used as indicators of community resilience.

Identifying suitable indicators of physical capital (e.g. the number and availability of safe havens, the redundancy of community infrastructure, and stocks of water, food and medical supplies) is relatively easy. Equally straight forward is choosing indicators to measure procedural capital (e.g. access to information on the frequency of weather-related hazards, the completeness of emergency management strategies and plans, and the reach of emergency alerts and warnings).

Measuring capital has intrinsic appeal (Inkenes, 2000) however, as Fukuyama (2001, p.12) states, ".... one of the greatest weaknesses of the social capital concept is the absence of a consensus on how to measure it." The measurement of social capital and the assessment of its contribution are certainly in their infancy. Daniere, Takahashi *et al* (2002) suggested that existing measures of social capital are subject to criticism because researchers often define terms differently and because it is difficult to develop concrete, tangible evidence of social capital that lends itself to quantitative analysis.

In the case of social capital's contribution to mitigating the impact of disasters, however, we are interested in a sub-set of social capital: the issues which make people able to confront and overcome dangerous and difficult circumstances. In particular we are interested in selecting indicators which aim to measure community cohesion, leadership and motivation.

CONCLUSIONS

The 2009 Black Saturday bushfires in Victoria were a wake-up call to the governments, local authorities and emergency services in Australia. It tested the resolve of our political leaders, and the suitability of our disaster plans and capabilities. The 2010/2011 'biblical' flooding of central Queensland has further challenged the way we plan and prepare for disruptive events, respond to emergencies, and recover from disasters.

In the wake of the bushfires and floods, and in the context of a broader definition of national security, we are drawn to the concept of resilience. Community resilience provides a positive response to an increasingly volatile, uncertain, complex and ambiguous environment. It suggests an ability to cope in the face of adversity, and a want to return to the status quo, or become even stronger as a result of the experience. More recently, national strategies, policies and Government statements have begun to use the term alongside national security.

Despite its popularity, there are widely differing views on the meaning and utility of community resilience, not least as the terms community and resilience are both contested. Policy makers, emergency planners and social scientists tend to view the concept from three different perspectives: the need to improve the means to survive and recover, the need to develop smarter ideas on how to survive and recover, and the need to encourage greater community engagement.

The paper brings these three perspectives together and proposes a framework involving three sets of capital (physical, procedural and social) which communities can use in times of need to survive a disruptive event and recover in a timely manner. A capital-based approach is attractive as it lends itself to measurement, which in turn is appealing to policy makers and planners aiming to enhance Australia's capacity to withstand and recover from emergencies and disasters.

The Torrens Resilience Institute intends to apply this framework in 2011 to a number of communities in Australia facing a range of potential disruptive events. The intention is to develop a tool to measure community resilience with local and national benefits. It is envisaged that such a tool will enable policy-makers local authorities, emergency planners and community groups to establish priorities, allocate funds and develop emergency and disaster management programs more effectively. It aims to help implement COAG's vision of a whole-of-nation, resilience-based, all-hazards approach to disaster management.

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