

DEVELOPING LOCAL PARTNERS IN EMERGENCY PLANNING AND MANAGEMENT:

Lyttelton Time Bank as a Builder and Mobiliser
of Resources during the Canterbury Earthquakes



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EXECUTIVE SUMMARY

This research examines a surprising partner in emergency management—a local community time bank. Specifically, we explain the role of the Lyttelton Time Bank in promoting community resiliency following the Canterbury earthquakes in 2010 and 2011. A time bank is a grassroots exchange system in which members trade services non-reciprocally. This exchange model assumes that everyone has tradable skills and all labour is equal in value. One hour of any labour earns a member one time bank hour, which can be used to purchase another member's services. Before the earthquakes struck, the Lyttelton Time Bank (TB) had organised over 10% of the town's residents and 18 local organisations. It was documenting, developing, and mobilising skills to solve individual and collective problems. This report examines the Lyttelton Time Bank and its role before, during, and after the earthquakes based on the analysis of over three and a half years of fieldwork, observations, interviews, focus groups, trading activity, and secondary data.

Before the earthquakes struck, the TB created a local marketplace of its members' skills. All members recorded the skills they wished to trade, which was captured in an online system. The explicit purpose of the trading was to solve individual problems; a member might request help on a range of issues from transportation and child minding, to computer problems and gardening. New skills were developed in many of these exchanges, such as learning to prune a tree or build a retaining wall. Across the 30,000 trades prior to the crisis, a stronger social network was built through these exchanges. Moreover, the TB facilitated these trades through a robust communication system that was regularly used and trusted by its members. Members enjoyed trading and many accumulated surplus hours, which were donated into a community chest. These hours were invested back into the community on larger scale projects, such as building local capacity by investing in the local information centre and schools. Indirectly, members were learning to be self-organising work teams that could quickly work together to solve community problems. Over time, a virtuous cycle emerged through which citizens identified problems, the TB organised members to solve the problem, individual and collective efficacy was enhanced, and residents enthusiastically identified additional problems to be tackled. In the years leading up to the earthquakes, the TB evolved a well-oiled system to communicate with and mobilise qualified residents to solve individual and community problems.

During the earthquakes, the Lyttelton Time Bank had the best local communication system through which vital information flowed to members and local residents. Using a range of communication modes, timely information was provided to residents on practical and safety precautions, as well as the availability of clean water, food, services, and other resources. As a partner working with emergency workers and first responders, the Lyttelton Time Bank had a better knowledge of the community. It acted as a hub organisation activating its extensive social network through which valuable resources could flow. For example, when at-risk families and groups were identified, TB members offered home visits, emotional support, food, accommodations, repairs, and so forth. Problems were solved in the immediate aftermath of the earthquakes, such as dismantling chimneys that could be safely removed, thereby freeing emergency workers to assist on projects that needed greater skill. Or, TB members visited elderly residents providing emotional labour, which freed medical personnel to deal with more acute medical problems.

After emergency personnel left the community, the TB provided on-going support in the months and years that followed. Individual assistance continued to be provided to residents, such as helping with home repairs or finding rental accommodations when houses were deemed uninhabitable. But the Lyttelton TB was particularly adept both working with other community organisations to solve larger community problems and harnessing human labour and resources to complete these initiatives. For example, when recreational and gathering spaces were damaged by the earthquakes, the TB worked with other community organisations to build new community gathering opportunities and infrastructure.

Community resiliency involves the process through which a community positively adapts following a crisis. Research suggests that community resiliency improves when communities can quickly mobilise a range of resources. This is a real strength of the time bank model since resources are identified, developed, and activated through hundreds and thousands of trades. This report concludes with recommendations for how the time bank model can be expanded to assist in emergency planning and management. Fundamentally, investments in local time banks are an economical method of building a trusted and practiced local communication infrastructure, which is critical during a crisis. Moreover, time banks currently identify and develop communities' assets; but this model can be expanded to map vulnerabilities. Knowledge of both local strengths and weaknesses is essential in effective planning for emergencies. The community enhancement projects that time banks tackle allow people to practice skills of self-organising teamwork, which are also useful during emergency response. Time banks are hub organisations that can also employ local members to help in preparing local emergency plans that are based on community-wide involvement and leverage local expertise. Bottom-up, grassroots organising often provides a more effective and nuanced response than is provided by top-down bureaucratic processes that offer a one-size-fits-all approach that does not consider local strengths and weaknesses.

CHAPTER 1 - INTRODUCTION

Getting communities to participate in actions that enhance preparedness and create resilience to disaster has proven to be a significant challenge to the civil defence emergency management sector. (John Hamilton, Director, Civil Defence and Emergency Management, MEMCD 2010).

Disasters cannot be prevented, but a great deal can be done to reduce harm to communities and citizens. Ideally, planning for disasters needs to be an on-going process of identifying, developing, and mobilising resources, rather than single event drills. The Director of Civil Defence and Emergency Management, John Hamilton, suggests it is difficult to get citizens to engage in preparation. Moreover, research consistently finds that residents who are at risk before disaster strikes, such as the elderly and the disenfranchised, suffer the effects of disasters more acutely because they lack social and economic resources. Thus, solutions to this problem of preparation need to be systemic, continuing, and resource enhancing. This is a tall order in prosperous times and a seemingly insurmountable call during economic downturns.

This report focuses on an unlikely player in emergency planning and response—a local time bank. Using modest economic resources, this local grassroots exchange system identified, developed, and activated community resources before a series of devastating earthquakes hit the town of Lyttelton and its residents. In the four years before the ground began to shake, the Lyttelton Time Bank (TB) enrolled over 10% of residents as members. These TB members used an online computer database to identify tradable skills. Moreover, thousands of trades over several years built a robust social network used to mobilise resources during the recent NZ earthquakes. This network of caring was not achieved by a top-down process, but instead emerged within the local community as a grassroots effort to build personal and community resources.

Long before the earthquakes struck, the Lyttelton Time Bank was identifying and developing resources to solve community problems and, indirectly, was getting the community prepared for the unimaginable disaster. When the first earthquake hit, the TB activated these resources to aid in the disaster relief and recovery period. This report explores the role played by the Lyttelton Time Bank in the immediate response to the Canterbury earthquakes and during the later recovery period. The report concludes with recommendations for unleashing the potential for the TB model of exchange to develop powerful local partners in emergency planning and management.

1.1 What is Time Banking?

Time banks are a form of community currency. Community currency is defined by Seyfang (2004a) as an alternative form of money. Often new currencies arise during economic crises when little confidence exists in the economy or currency, which is evidenced in the current growth of alternative currencies in Greece and Spain (Cha 2012).

Time banks are a relatively new form of community currency based on non-reciprocal trading of services (Collom 2005; North 2003; Seyfang 2002). The TB model of exchange is based on the assumption that every member's labour is equal in value. Regardless of the service provided, any hour

of labour provided by a TB member is rewarded with one hour of time credit. Participants can spend their earned hour of currency by requesting an hour of labour from another member in the TB system (Williams 2004). In most TBs, a broker is employed to manage the system, maintain a database of participants, and recruit new people and organisations as members (Seyfang 2004b). The TB system is growing in popularity, in part, because online systems help record, store, and reward transactions of neighbours helping neighbours (Williams 2004).

For example, within a hypothetical town, Tom looks at the online database to find out that Robert has experience building stone walls. Tom asks if Robert would spend four hours helping him build a stone wall and passing on these skills. Robert agrees and earns four hours. Robert spends these hours by asking David, another TB member, to spend the afternoon with his aging father providing companionship. Now David has earned hours for doing an important task of giving care, which is often not rewarded in the formal economy. Moreover, Tom has learned a new skill. Given that people voluntarily trade skills that they enjoy, this system encourages a virtuous cycle of giving and receiving that benefits all parties.

Limited research exists on participation in TBs; however, a few studies explore the benefits. For instance, Boyle, Clark, and Burns (2006) suggest that TBs help participants extend their social networks and the range of opportunities available to them. These researchers also found that TBs are an effective way of developing reciprocal relationships among users. Seyfang and Smith (2002) found that TBs were successful at attracting participants from socially excluded groups. TBs also interest people who do not normally volunteer. They also found that members' participation in a TB improved people's sense of well-being by increasing social interaction.

In a study of TB brokers in the United Kingdom, Seyfang (2001) found that participants exchange time at least once or twice a month. The most commonly exchanged services were gardening, transportation, companionship, household repairs, dog walking, and computer training. In addition, Seyfang (2003) conducted an in-depth investigation of a TB in an impoverished community in the United Kingdom. She found that the primary motivation for joining a TB was to help others, get involved in the local community, improve the neighbourhood, receive valuable services, and meet people.

In perhaps the most comprehensive study, Collom (2007) found that participants joined a TB in the United States to expand purchasing power and help other people. The values that the TB supports were cited as an important reason for joining. Although participants were highly motivated to join for needs-based reasons, participants did not always feel their needs were being sufficiently met by the TB. This finding was similar to the findings of Seyfang (2003), who found a 'skills gap' can sometimes prevent needed exchanges. This skills gap can be more pronounced in resource-constrained communities. Participants, however, still reported high levels of satisfaction and engagement with the TB.

1.2 The Lyttelton Community

Lyttelton is geographically separate from Christchurch, which is the largest city on the South Island of New Zealand. Located 13 kilometres from Christchurch, Lyttelton is accessed primarily through a road

tunnel. Access is also possible through winding and steep roads over Dyers or Evans Pass. This geographic separation makes Lyttelton potentially vulnerable during a disaster, particularly, in the event of an earthquake which could lead to the need to close the road tunnel.

This physical isolation contributes to the feelings of a close-knit community (Jefferies 2012). Everingham (2012) notes that, historically, Lyttelton has “a strong culture of self-sufficiency and a very strong culture of community building and community service.” A civic spirit continues today; in this town of a little over 3000 people, 76 civic organisations existed prior to the earthquakes, including 27 community organisations, 25 recreational groups, 4 religious organisations, 1 business association, 2 residents’ group, and 18 community meeting venues (Christchurch Council 2011).

According to the 2006 New Zealand Census and prior to the seismic events of 2010 and 2011, Lyttelton had 3,075 residents and 1350 households. In Lyttelton, 53.2% of people aged 15 years and over had a post-school qualification, compared with 38.5% of people in the wider Canterbury region. Lyttelton’s unemployment was 3.6% and the greater Canterbury region was 3.9%. The median income for people aged 15 years and over was \$28,400 for Lyttelton as compared to \$23,500 for the region. Also, 23.6% of residents had an annual income of more than \$50,000 as compared to only 15.8% for the region. Lyttelton had a higher percentage of Maori residents than Canterbury, 9.2% vs. 7.2%, and a substantially larger percentage of residents born overseas, 23.7% vs. 17.9%. Finally, 65.9% of individuals in private occupied dwellings owned the dwelling as compared to 59.8% for the region (New Zealand Census 2006).

1.3 The Lyttelton Time Bank

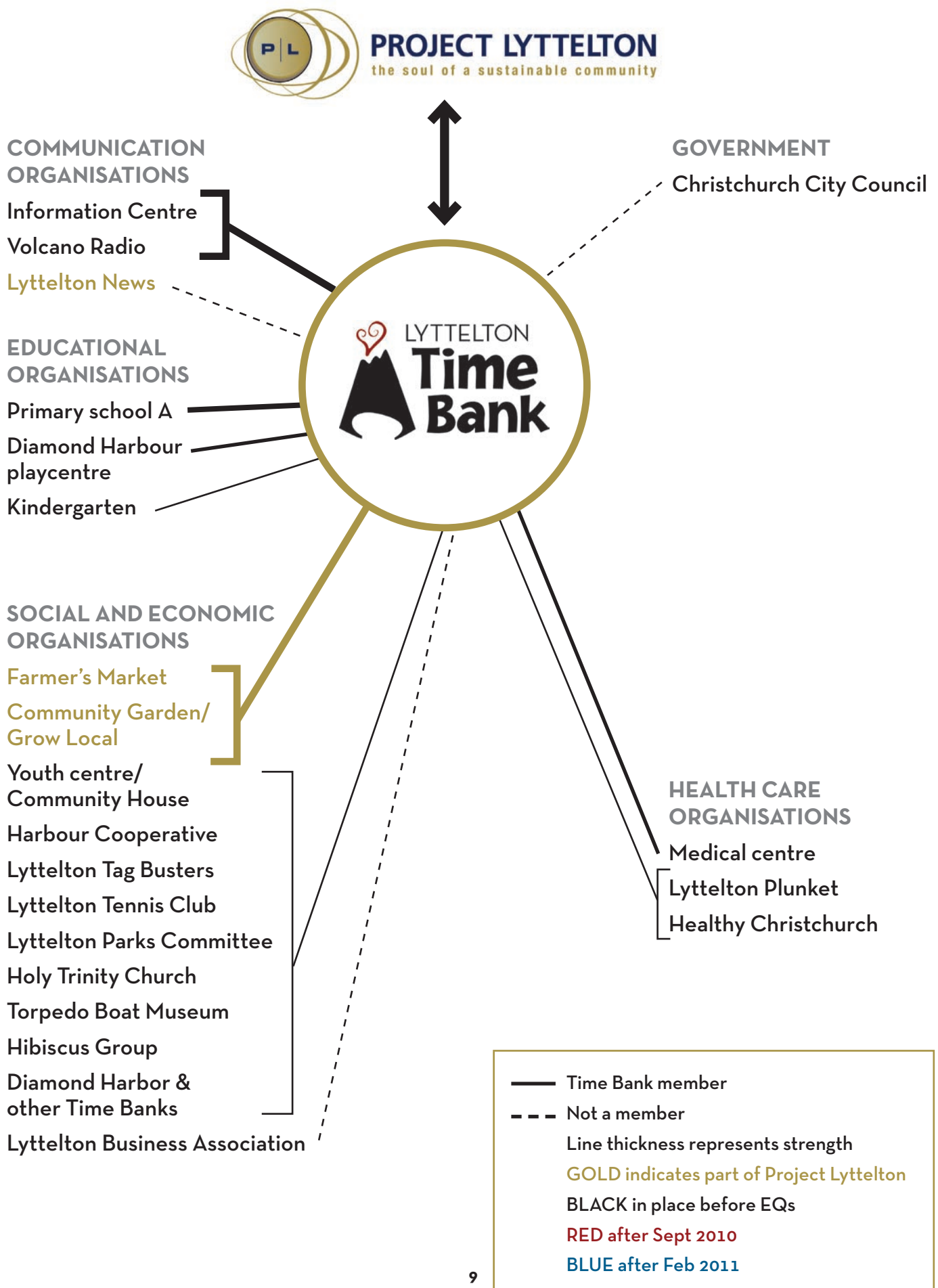
The TB was initiated by Project Lyttelton, a local organisation whose goal is to preserve the historical character of the town while encouraging a sustainable community. This umbrella organisation sought to develop creative local enterprises that fit broadly within the organisational vision (Jefferies and Everingham 2006). The core values of this organisation include respecting people and their unique contributions (Hall 2009). The TB promotes an egalitarian spirit that fitted well with the vision of Project Lyttelton.

The Lyttelton Time Bank was the first in New Zealand. After a slow initial start, the TB grew quickly aided by a part-time coordinator that was paid through a small three-year grant of \$15,000 per year. Other keys to the organisation’s growth included the development of a community website, adoption of software to manage trades, and the orchestration of publicity and educational events to explain and promote the concept of TBing in the town. A significant obstacle was surmounted when a tax-ruling made TB exchanges exempt as long as participants’ primary income-generating activities were not traded. At the time of the Canterbury earthquakes, the TB had approximately 330 members and 18 organisational members, including the Lyttelton Medical Centre, the police department, the Community House, and a local primary school (see Figure 1).

1.4 The Canterbury Earthquakes

In the early hours of Saturday, the 4th of September, 2010, the citizens of Lyttelton and the Canterbury region were jolted awake by a 7.1 magnitude earthquake (GNS Science 2012a). The epicentre of the quake

FIGURE 1 - TIME BANK ORGANISATIONAL NETWORK BEFORE EARTHQUAKES



was 40 kilometres west of Christchurch city near the town of Darfield at a relatively shallow depth of 10 kilometres (GNS Science 2012b). The earthquake produced the highest ground shaking ever recorded in New Zealand, at the time, up to 1.25 times the rate of acceleration due to gravity (GNS Science 2012b). The National Crisis Management Centre in Wellington was activated and Civil Defence declared a state of emergency for Christchurch (TVNZ 2012). Although the quake caused widespread physical damage, no fatalities occurred and only two people experienced serious injuries (TVNZ 2012).

Over the next 18 months, the region was hit by a sequence of earthquakes triggered by the initial quake. However, the most notable earthquake event happened on the 22nd February, 2011, which had a magnitude of 6.3 and was centred 10 kilometres south west of the Christchurch in the town of Lyttelton (GNS Science 2011). Due to the time of day at which it occurred, 4.35 in the morning, and the location, the initial September quake caused no loss of life (TVNZ 2012). However, given the February earthquake occurred close to the city at a shallow depth and in the middle of a working day, 185 people were killed, making it New Zealand's second-deadliest natural disaster (Geonet 2012). The deaths in the February quake occurred primarily as a result of building and masonry collapse. Widespread damage occurred to infrastructure, land, and buildings.

Unlike the September event where Lyttelton was minimally affected, in February, Lyttelton was close to the epicentre of the quake and experienced tremendous damage and two deaths. It was estimated at the time that every second building was damaged in Lyttelton and thus cordons were put in place to close the main business area (TVNZ 2011). The Lyttelton Tunnel was closed following the earthquake (New Zealand Transport Agency 2011) and only opened four days later for local and emergency traffic (Canterbury Earthquake 2011a). Like a large portion of Christchurch, Lyttelton lost power, water, and sewage. By the 5th of March, water was restored to 78% of Christchurch, residents were still advised to boil their drink-

ing water (Canterbury Earthquake 2011b).

Given the level of damage of the February earthquake, a massive emergency management response arose in Lyttelton. Volunteers and officials from Civil Defence, St. Johns Ambulance, the Police, the local volunteer Fire Brigade, and the New Zealand Defence Force were engaged in emergency



PHOTO 1. A RNZN Member serves food to the Lyttelton Community as part of the disaster recovery of the Christchurch Earthquake on 23 February, 2011.

operations (See Photo 1). Emergency workers responded to the tremendous damage in Christchurch. However, the closed Lyttelton tunnel left the town on its own (Interview Civil Defence 2012). The HMNZS Canterbury was in port at the time of the earthquake and 226 defence force personnel were committed to Lyttelton and the region providing security patrols, hot meals to the township, and accommodation to a small number of people (New Zealand Army 2011; New Zealand Navy 2011). “The ship’s fortuitous positioning allowed an immediate response with the unloading of personnel, vehicles and equipment into the Lyttelton CBD (New Zealand Navy 2011).” By 7 March, a Recovery Assistance Centre was established in Lyttelton giving residents a “one stop shop” to provide face-to-face welfare information and access to social services (Canterbury Earthquake 2011b).

1.5 Community Resiliency as a Conceptual Framework

The concept of resiliency originates from the field of material sciences where resiliency measures the ability of a material to bounce back after a disturbance. Within the social sciences, the concept of resilience is popular and is defined as the ability of a community to bounce back from crises (Baker 2009; Longstaff 2005). Currently, researchers are exploring how to increase community resiliency before a disaster and they are trying to understand why some communities are more resilient than others.

In this report, we examine how the TB was able to organise and develop significant resources, which they mobilised during the earthquakes. The ability to mobilise resources is an important part of building resilient communities that can recover following disasters. As such, we use a conceptual framework based on community resilience. We briefly review some of the key research.

Norris et al. (2008, 130) review past work on resiliency, which they define as “a process linking a set of adaptive capacities to a positive trajectory of functioning and adaptation after a disturbance.” They stress the importance of flexible and adaptive nature of resources, which includes the extent to which resources are robust (i.e., the resources work under a wide variety of circumstances), redundant (i.e., the resources are substitutable), and rapid (i.e., the resources can be mobilised quickly). Norris and colleagues’ framework provides a useful approach for understanding community resiliency. They argue that community resiliency involves economic resources, social resources, communication resources, and community competency.

Economic resources include the level, diversity, and equity of economic development (Norris et al. 2008). Overall, New Zealand rates high on its level of economic resources. Our findings are relevant to communities within countries of higher economic development and this is treated as a background context and thus it is not explored specifically in this report. Although the findings would likely hold throughout New Zealand, the findings might not be relevant to communities in countries that are less economically developed and are unable to mobilise physical and social resources during an emergency.

Communities are more resilient when they have greater social resources. This is the domain where the Lyttelton TB made a strong contribution directly developing and enhancing valuable social resources. Norris et al. (2008) define social resources as social networks of ties and support. We explore the nature of social ties in terms of citizens’ feelings of a shared connection with their neighbours, as well as the network

of weak and strong, and formal and informal social ties through which resources can flow.

Communities are more resilient when they have communication resources through which accurate and timely information can flow. TB activities are mediated by coordinators who use different communication modalities ranging from emails, educational seminars, publicity, social events, and internal communications. We explore the communications for their content and as a set of adaptive resources.

Finally, Norris et al. (2008) suggest that communities are resilient when they are able to solve problems. The TB is a practically-oriented community of exchange in which services are traded locally to solve individual problems. In addition, residents donate their labour to community projects in order to address common needs and interests. Thus, the adaptive competency of the TB community to solve problems is explored across both personal and collective needs.

1.6 Methodology

The study was conducted in Lyttelton, New Zealand between April 2009 and November 2012. The authors originally sought to examine how communities were solving problems using local exchange systems like time banks. The Lyttelton TB was an ideal research site given it was new and growing. However, when the earthquakes struck 18 months into the fieldwork, the focus of the research changed to explore the role of the TB in responding to the earthquakes and the recovery activities.

The authors conducted a qualitative study using focus groups, in-depth interviews, participant observations, content analysis of secondary data, and quantitative analysis of TB trading activity (see Figure 2). Two focus groups were conducted with ten members of varying experience with the TB. Twenty-one in-depth interviews were conducted with individual members of the Lyttelton TB both before and after the earthquakes. In addition, interviews were conducted with five key informants from the Lyttelton TB and several of these key informants were interviewed multiple times. Seven interviews were conducted with other organisations that were also involved in response efforts following the earthquakes (see Table 1). Secondary data included newspaper articles, TB email broadcasts, and first-hand reports of citizens' experiences.

FIGURE 2 - QUALITATIVE DATA SOURCES



TABLE 1 - INFORMATION AND DATA SOURCES

Type of Data	Details
Group interviews	-2 focus groups of TB members with different levels of experience
Individual interviews	-13 interviews with individual TB members who had varying levels of trading activity -5 post-earthquake interviews with advisory board members and coordinators -8 interviews with TB members following the earthquakes -7 interviews post-earthquake with high ranking organisational representatives (Medical Centre, Civil Defence (2), Lyttelton Police, Information Centre, and Christchurch City Council)
Participant observations and fieldwork	- Field notes from organisational meetings and community meetings, group activities from April 2009 until December 2012; correspondence among advisory members; minutes of advisory board meetings; correspondence to TB; photos
Email broadcasts	- Bi-weekly email broadcasts from 2009-2012
Trading data	- Quantitative counts of TB trading data from 2005-2012
First-hand accounts	- Jefferies and Everingham 2006; Hall 2009; <i>Shaken Heart</i> (Evans 2012); Everingham 2012; Jefferies 2012; <i>The Brigade</i> (Surren 2012)
Local publicity	- Lyttelton News since 2004 - 26 other news stories from regional press

Informants were chosen to provide a broad range of experiences with the TB. In particular, we chose members at different life stages since they may have different needs. The in-depth interviews were primarily conducted in the informants' homes. The interviews ranged from one to two hours in length and were audio-taped and transcribed. The transcripts were coded and analysed using a hermeneutical analysis of the data (for more details, see Thompson 1997). First, the transcribed interviews were coded based on a priori conceptual categories as well as unanticipated categories that emerged from a close reading of the text. To conduct the intra-textual analysis, the coded data for each informant was closely read to develop a unique written interpretation of each informant. To conduct the inter-textual analysis, themes across informants were compared to look for commonalities. Iterative tacking between intra- and inter-textual analyses continued until the tentative themes could be forged into a coherent interpretation. The inter-

view insights were supplemented with field observations by the lead author who participated in TB trades, working bees, and community events. Finally, email broadcasts and press reports were analysed to monitor the emergency crisis. TB trading activity was analysed to quantify the amount of hours traded that were dedicated to different community activities and the disaster response and recovery.

CHAPTER 2 - THE ROLE OF THE LYTTTELTON TIME BANK IN RESPONSE

Chapter 2 explores the role of the Lyttelton TB in developing communication and social resources before the earthquakes occurred. These resources were later activated in response to the earthquakes, which is also examined.

2.1 Developing Communication Resources

Before the earthquakes hit, the TB already had a well-practiced communication system in place. These communication resources included an extensive database of 330 local TB members, a list of volunteers willing to provide immediate assistance to other residents (who were named the “Knightingales”), regular email broadcasts to communicate with volunteers, and an inventory of TB members’ skills (Interview Time Bank Coordinator; Evans 2012). The TB also created new communication systems, as needed, to prioritise and record immediate requests for help and deploy members offering assistance.

In addition, eighteen organisations were also TB members and each had their own list of contacts. The Volcano radio station was launched in 2008 and became a TB member doing on-air interviews with TB members to discuss trades and broadcast trade requests and offers. The TB’s direct communication channels, as well as their relationships with the Volcano Radio and Lyttelton News, provided a local system for communicating. This communication system had redundancies and could be deployed rapidly.

TB coordinators were familiar and trusted sources for community information. For example, members reported enjoying the regular “chatty emails” that are easy-going, helpful, and communicate feelings of community and civic pride. Email broadcasts from 2009 until the earthquake in September 2010 were analysed. The tone was optimistic presenting a can-do attitude, as these examples of emails demonstrate:

Wow! Did we have a great time at the mid-winter Christmas on Friday night. Thanks everyone for coming and making it such a great success. Special thanks to Time Bank members Jane and Jen for all the hard work during the day and the clean up the next. Great to see some blokes in the kitchen doing the dishes too!

Sometimes when I orientate new members they can find it hard to identify their skills. One of our most recent members thought long and hard on this and finally, after going into in-depth conversation with his partner this is what he came up with: “I am tall so I can reach things, and thin so I can fit through things.” If you need any of these skills let me know!

A great big warm thank you to you and your team at [the local school] for working with us this year with time banking. Between our two organisations we have created a very successful model for time banking at schools, and I have two other time banks wanting full details on how we have achieved this. We are really looking forward to enhancing our model next year and creating some wonderful magic as we go. It was new ground for all and we thank you for your openness and understanding that we ‘did not have all the answer’ at the beginning.

Thus, this was a supportive and trusted forum that facilitated creating a sense of community where everyone was assumed to have tradable talents. Across radio, newspaper, and email broadcasts, a narrative was presented to both TB members and non-members that their community has diverse skills. Regular announcements highlighted that the TB community was working together to solve individual and community challenges.

2.2 Activating the Time Bank's Communication Resources

During crises, getting reliable information is critical (Guion, Scammon, and Borders 2007). However, people often have little time to verify information; thus, they tend to rely on trusted and familiar sources (Longstaff 2005).

2.2.1 September 2010 Earthquake

Even though Lyttelton was relatively undamaged by the September earthquake, some residents were in need of help and sought out immediate assistance from emergency services. For instance, several residents sought shelter at the Civil Defence Sector Post but found it closed (Anonymous 2010; Fieldnotes, 4 September, 2010). Local Civil Defence volunteers in Lyttelton, taking a directive from the city office, were deployed to the Addington welfare centre where need was deemed to be greater (Interview Civil Defence Volunteer). In addition, the ReadyNet system that was adopted by Christchurch did not activate to alert the network (Voxy 2010; Interview Information Centre Manager). The perceived lack of emergency services in Lyttelton created an opportunity for other groups to play a significant role in assisting the community (Anonymous 2010). Major roles were played by the Volunteer Fire Brigade, St. Johns Ambulance, Information Centre, and the TB.

At the time of the September earthquake, the TB was the local organisation with the most extensive communication system for organising local emergency response efforts (Everingham 2012). As explained by a member of the Information Centre, "The Timebank had the most comprehensive list so it also became the principal information source." Neither Project Lyttelton nor the Information Centre had robust systems that could be rapidly deployed to communicate with residents (Interview Information Centre Manager).

The TB's email system for regularly communicating with members was still working following the first earthquake. TB emails offered useful and timely information on safety precautions--such as the need to boil water, and practical updates--such as closures of roads, schools, and businesses. During the first week after the earthquake, ten informative email broadcasts were sent to all TB members. The first post-earthquake email asked members to assist in the TB response as well as to identify any neighbours who needed help from the TB. Because the TB had recently moved into the building where the Information Centre was located, these two organisations were able to work together sharing their resources. They were the key source for accurate information: "the [phone] number has been given out left, right, and centre as the place to call (Interview TB Coordinator)." TB members and Information Centre volunteers worked together to provide information and assistance (see photo 2). Basically, these two organisations satisfied the civil defence function follow-

ing the first earthquake (Interview Information Centre Manager).

... it was really supportive. It was great that there was a hub down at the Lyttelton Information Centre that anyone could go to at any time if they were feeling upset or needed some support and that there were continual call-outs for help to help take chimneys down. Really everyone was pulling out the stops to help everybody. (Interview TB member)

Following the first earthquake, the TB's important role was acknowledged by emergency response workers.

From a St John ambulance perspective, the way that you and your TEAM kicked in and started to get things sorted has been very much appreciated by our ambulance staff.... On behalf of St John, thank you for your excellent work. (Correspondence 14 September, 2010)



PHOTO 2. A sign signaling that help is available outside the Lyttelton Information Centre.

2.2.2 February 2011 Earthquake

Following the second major quake, Civil Defence had responsibility for disaster relief and recovery because a state of national emergency was declared (TVNZ 2011). Lyttelton was near the epicentre of the earthquake and many support personnel arrived causing coordination problems. TB personnel were not included in daily briefings with emergency responders nor were they given use of the emergency communication systems. Simply put, emergency responders failed to understand the help that the TB could provide. A City Council manager familiar with the TB requested that the TB Coordinator be invited to the daily briefings and given access to the internet (Interview City Council Manager). The TB Coordinator was not only a trusted source of information for the community, but also an invaluable resource about the community. Outside emergency personnel could not begin to understand a community into which they had only just arrived. To quote the TB Coordinator, the TB had the key to unlock valuable community resources:

...whereas with the Time Bank, we did have it, and once they saw that and then Kyle from the Navy, he gave me his mobile number. So suddenly I had everyone's emergency numbers in here and we were able to open all these doors to make things happen... we could unlock the community for them. (TB Coordinator Interview)

Like the first earthquake, the TB played a key role providing information to both its members and residents. Given problems with power and internet access, this communication was at first rudimentary. A community notice board was located outside the Recreation Centre and was updated after daily emergency briefings (see Photo 3). Later, email broadcasts informed residents of the danger from damaged buildings and the need to avoid the central township. Additional notifications told of the closure of the tunnel, the establishment of the Recreation Centre as the emergency centre, and the need for water and food donations at the emergency centre. Further broadcasts asked members to help provide accommodations and assist with clean-up activities, and the TB also offered assistance for those people in need.

Later in the week, email broadcasts reported on the availability of water, the need to boil water, free meals at the Recreation Centre, the status of critical services (e.g., sewage, rubbish), the opening of the tunnel, the need to evacuate dangerous areas of town, the status of EQC home safety inspections, and the opening of supermarkets, chemists, and the medical centre. When critical social service organisations were in town, such as WINZ and mental health counselling services, email broadcasts provided this information along with notices of public meetings. Email broadcasts also asked members to look out for their neighbours and identify anyone who was coping poorly or had special needs.

In addition to using email broadcasts, the TB also utilised the services of Volcano Radio to communicate information to the community and air urgent requests for assistance. They also posted information to the social networking site Facebook and the Project Lyttelton website.

Since many townspeople needed the assistance of trades people (e.g., plumbers, builders, electricians...), requests for help needed to be matched with offers of professional and volunteer assistance. In September, this service was done more informally given the small number of requests. In February, however, the TB set up and managed a job board matching requests and offers. Urgent requests, such as the need to have a dangerous chimney dismantled, were directed to the Fire Brigade. Less urgent requests were posted on the job board and matched with an available tradesperson. The TB Coordinator recruited a large number of TB volunteers to man the reception desk at the Recreation Centre and manage this process of getting services to residents.

The TB had a database inventorying community skills and resources long before the earthquakes struck. Thus, the TB was able to locate needed items and coordinate donated supplies. For instance, a large amount of food was donated and needed refrigeration. The TB located a member with a refrigerator/freezer and coordinated delivery by the Army. This example illustrates the important role that a local organisation with effective communication networks can play coordinating efforts to accomplish a shared goal--an effective emergency response.

As the TB Coordinator explained, once her role had been recognised and legitimised, only then was she given access to needed resources. Only then was she able to direct TB members' efforts more effectively and get necessary resources to assistance with the TB's effort (e.g., the Navy helped by entering the damaged Information Centre to retrieve needed supplies).



PHOTO 3. The community notice board providing community updates outside the Emergency Centre on 24 February 2011.

“So between *Fletchers*, the Fire Brigade, our team of volunteers and [name excluded], we had this one full system going on and the amount of jobs we were all doing, emergency, would have been too much for one group (*Interview Time Bank Coordinator*).”

Many people fled the community in the immediate aftermath of the earthquake and relatives were unable to locate them. The TB partnered with the Lyttelton Community House and developed a list of residents’ locations using their shared network of local knowledge. They provided this information to concerned loved ones. As a Lyttelton police officer stated, “I think that’s where the Time Bank came in. They were a local support agency on the side.” In both earthquake events, the TB mobilised its communicative

resources, which are critical during disasters relieving stress, facilitating social connections, and lessening feelings of social isolation (Shklovski, Burke, Kiesler, and Kraut 2010).

2.3 Developing Social Resources

Aldrich (2012a) argues that social networks enable communities to withstand disaster and rebuild. Research finds that individuals who participate in and develop deeper social ties to their local communities report higher levels of personal recovery following disasters (Tatsuki 2008). These social networks create “informal insurance” that individuals can draw upon to receive care from their family and friends, formal and informal organisations, and communities (Aldrich 2011; Aldrich 2012b). This support is captured through social embeddedness (i.e., informal social ties), citizen participation and leadership in organisations (i.e., formal social ties to organisations), and linkages between and among organisations [Norris et al. 2008].

Researchers who study disasters suggest that an important role is played by organisations that lie at the centre of social networks of individuals and organisations (Longstaff 2005). Like the centre of a wheel with many spokes, these “hub” organisations are most successful when their networks are large, when they have strong ties forged through regular association, and when dyads exchange reciprocal benefits (Goodman et al. 1998). Granovetter (1973) suggests that hub organisations benefit by having many weak ties that under certain conditions are more effective. Loosely coupled networks have many weak associations that can be activated in times of crisis to gain access to resources and fresh ideas (Longstaff 2005). Although tightly coupled networks of friends and family provide comfort, they may not cast a wide enough net of social ties to locate crucial resources.

Our findings support that the Lyttelton Time Bank functioned as an important hub organisation to the residents of Lyttelton. It provided a way to build and access a social network through individual and community exchanges. When the first earthquake occurred, 330 members made up the social network of the TB and 30,000 trades had been made. Through these trades, members reported that the TB provided an easy way to meet new people and create friendships. New residents described how the TB helped them to integrate into the community. Consider the following quotations from the focus group interviews:

I'm relatively new to Lyttelton and just to get to know neighbours was the main issue really [that attracted me to the Time Bank] (Focus Group Interview TB member).

I didn't know many people in this community – the Time Bank provided an easy transition into the community (Focus Group Interview TB member).

Also, many organisations joined the TB including social and economic organisations, as well as communication, government, educational, and medical organisations (see Figure 1).

2.4 Activating the Time Bank's Social Resources

2.4.1 September 2010 Earthquake

After the September earthquake, the social ties developed among the TB members were activated to provide social support. The Medical Centre, a TB organisational member, asked that TB volunteers call each of the 156 elderly residents to check on both basic and emotional needs; "...did they have water, did they have power, were they afraid, do they need someone to come around and talk to them?" (Interview TB Coordinator). A significant aftershock hit four days later, and TB members contacted these senior residents again often stopping by for a personal visit. The Knightingales, TB members who had agreed to help out on short notice, were mobilised through a cell phone text to make visits to several elderly residents. As explained by the community nurse, "Look, we need to check on the elderly, otherwise the GP will need to spend two hours with each patient, because people need to talk (Interview Medical Centre Nurse; Evans 2012)."

The TB social network was not limited to its members but extended to the wider Lyttelton community. As the Fire Brigade became flooded with requests to dismantle dangerous chimneys (see Photo 4), the TB was asked to assist with low-risk jobs (Interview Fire Chief; Evans 2012). Utilising their database, the TB Coordinator was able to determine members who might have the relevant skills and resources to assist with this task. "The process at the moment is if we get a call about a chimney or the Fire Brigade calls us in, I have a team of chaps that go around and assess the chimneys and basically where we can get those chimneys down absolutely safely, we will take them down (Interview TB Coordinator)." The TB also organised material support, such as locating tarps and water vessels and requesting boiled water and cooked meals.

Manned by TB volunteers, the Information Centre became a key social welfare and emergency management centre. The Information Centre was the central location where residents were able to drop in for information, support, companionship, and often a welcoming cup of tea. As the TB Coordinator explains:

Some people were coming in to help, but without realising it, they were coming in because they actually needed help themselves. Whatever they were coming into the information centre for they received it. There was a lot of talking and teas and coffees (Interview TB Coordinator; Evans 2012).



PHOTO 4. Lyttelton Fire Brigade dismantling a dangerous chimney.

For example, during the first week following the earthquake, a family was identified as in crisis. “We have a family in a little bit of stress. We need to get them out of their home environment and get their home sorted (TB broadcast, 8 September, 2010).” This family had two damaged chimneys that had collapsed into the house sending ash and dust over all of their possessions. In addition, their water cylinder had fallen over soaking large areas of the house. Their youngest child was very sick at the time. TB volunteers were recruited to wash wet linens, clean their house and possessions, provide food, and care for the children. These services helped the family stay in their home and community and feel like they were part of a caring community.

The TB also provided a conduit for those people who wanted to spontaneously volunteer. In the case of the TB members, these volunteers were already vetted by the TB system, which requires potential members to provide references. Since schools and most businesses were closed, residents had little to do. The majority of Lyttelton residents were only minimally affected by the September quake and wanted to assist those neighbours who were affected.

The efforts of the TB continued several weeks after the September earthquake. The local grocery store was closed due to structural problems. A bi-weekly transportation service was arranged to take residents shopping. This service was important for many of the elderly residents who lacked transportation and were reliant on the local shop. As people found out that their homes were “red stickered” as uninhabitable, the TB network located local accommodations.

HOME NEEDED FOR DISPLACED RESIDENTS – Unfortunately members XXXX and XXXX have to move out of their home, for up to six months, due to structural damage to their home. Do you know of a rental in the Lyttelton area? Please let me know ASAP (TB broadcast, 20 September, 2010).

Also, the Information Centre continued to be staffed by TB volunteers giving residents a place to socialise and congregate. Organisational members, such as the Timeball Station, sought TB help cleaning up the rubble. Finally, the TB helped organise a party to “celebrate the strong and resilient community that we are,” and to begin the process of returning to normalcy.

Approximately 183 hours were logged for the September earthquake work. However, this number grossly underestimates hours donated since most TB members gave of their time freely and chose not to bank hours earned during the disaster (correspondence TB Coordinator).

2.4.2 February 2011 Earthquake

As in September, the TB was part of a multi-agency response to the earthquake. The TB worked with the Lyttelton Police, Fire Brigade, St. Johns Ambulance, Civil Defence, Community House, Christchurch City Council, and Volcano Radio, as well as the New Zealand Army and Navy. Interviews with first responders suggested that the effectiveness of the response in Lyttelton was due in part to the coordination between the emergency responders and local volunteer sector; the successful response was due to “the excellent local team work.” As explained in an interview with a Lyttelton police officer who has policing responsibility for a number of communities:

It was just everyone working together and that's one thing I found was really great. That worked really well whereas other areas were ruled by this is my pile, this is my pile, no-one shared. At the end of the day, everyone pulled together and it didn't matter what level of society or where you were from. I would say 95% of the people actually pulled together and it was amazing.... It took Sumner, it took them longer in terms of getting their community together and they saw a lot of community support, they saw a lot of community leaders trying to do things but I don't think it worked as well as here [in Lyttelton].

For example, the TB Coordinator assisted a member of the local Coast Guard Unit in securing housing for tourists trapped in the Lyttelton by the closing of the tunnel. With an intimate knowledge of the community and its resources, accommodations were arranged with a TB member who ran a local Bed & Breakfast. In addition, the Lyttelton Civil Defence team decided that residents and others could not be accommodated at the Recreation Centre, as explained:

We didn't really have enough to do one shift let alone three. We talked obviously and said right, we'll find accommodation for those whose homes have gone or they're stuck in Lyttelton, can't get out etc, and so that's when the TB came in. I said to the [TB] Coordinator right, you should ring around and get accommodation as people come in and so on and that's what happened (Interview Civil Defence Volunteer).

In one case, a TB member stayed with an elderly couple who were afraid to be alone in their cold, dark house as the aftershocks continued overnight. In addition, over the coming days, accommodations were secured for both TB members and non-members, by matching those who needed accommodation with those who could provide it. In one case, an elderly couple was housed for over 6 weeks with a TB family.

The TB used their network of social ties in the community to provide leads for accommodations for the many months following the earthquakes.

Given the severity of the event and the loss of control experienced by many citizens in the community, it was unsurprising that many people were tired, stressed, and even angry. As the TB Coordinator explained, the TB volunteers manning the reception desk were able to bring a friendly and recognisable face to the relief effort. In several cases, this reduced anxiety and avoided conflicts. “The TB helped put a local face on the emergency effort. Many outsiders have no idea who the right contacts are,” an Information Centre volunteer stated. For instance, the TB Coordinator was able to diffuse three incidents between residents angry over the availability and distribution of resources. The TB Coordinator facilitated access for relief authorities to the local Maori Marae following cultural protocol and showing respect, which was important to avoid conflict (Interview TB Coordinator).

TB members used their informal social ties to identify residents in crisis even before help was requested. For instance, an at-risk family was identified after the September earthquake. Additional support was provided following the February quake. “We need people that are willing to go the extra mile to look after individuals that have come to our attention that need looking after. You would check on them every day (TB broadcast, 2 March, 2011).” Other families were offered a “Quake Break” to leave the community for a rest period, which was facilitated with the support of the TB. Also, TB members delivered meals to elderly and other vulnerable residents who were unable to come to the Recreation Centre for meals. This service, through the Community House, continues to operate. Finally, a member of the community who was experiencing tremendous anxiety from the earthquakes was helped to find a supportive work situation provided by a TB member.

The experience of one elderly couple in Lyttelton poignantly illustrates the power of the TB to assist the most vulnerable members of the community. Although not TB members and having no family in the area, this couple was initially housed for six weeks by TB members when their home was “red stickered.” When it became apparent that they would not be moving back into their home of thirty years, an appropriate rental property was sought for them in Lyttelton. The Fire Brigade was the only group authorised to enter the damaged house and they helped to remove the couple’s belongings assisted by a chain gang of TB volunteers.

Urgent call out! Are you around at half three today? Need help to form a chain gang with fire guys to get stuff out of a house on XX Rd. Will need about 8 capable folk and lots of boxes (TB Text, 2 April, 2011).

TB members also moved the current tenants from the house that they located for the elderly couple, cleaned the house, mowed the lawns, moved furniture in, arranged for services to be connected, completed rental documents, negotiated with insurers for rental accommodation support, provided home baked goods, and continued to check on them over the following weeks.

Both in September and February, the TB’s ability to mobilise a large number of volunteers proved invaluable. In an interview, a Lyttelton police officer says, “So it took away the responsibility, well not the re-

sponsibility actually, it took away the worry for us to try and find people (volunteers).” For instance, when water arrived to the township in large tankers, the TB was tasked with distributing and assisting residents to fill vessels. Since local schools were closed for approximately three weeks, TB members organised a children’s fun day approximately one week after the earthquake and invited the whole community to participate (TB broadcast, 28 February, 2011). Other efforts already mentioned, include staffing the reception desk at the Recreation Centre, assisting in repair work, participating in working bees, managing the job board, distributing tunnel passes, checking on vulnerable members, and delivering meals. During the February earthquake, TB members recorded 860 hours of labour. Much of this labour was servicing non-TB members (Correspondence TB Coordinator).

CHAPTER 3 - THE ROLE OF THE LYTTTELTON TIME BANK IN RECOVERY

According to a report prepared by the Christchurch City Council (2012), Lyttelton was severely impacted by the 2010 and 2011 earthquakes. The built environment sustained considerable damage to residential properties, retaining walls, and roads. The economic environment was significantly affected; the main retail district and hospitality sectors suffered significant damage (see Photo 5). The Lyttelton Port of Christchurch, a major driver of the local economy, suffered damage to 500 port assets and has an estimated \$500 million in total damage (Wood 2013). In terms of the natural environment, the nature reserves around Lyttelton remain closed for recreation. Important community assets, such as the recreation centre, swimming pool, and Council Service Centre, are closed because of damage.

Nevertheless, according to the Council's report (2012, p. 7), the one area that improved in Lyttelton is the social

environment. Services provided by community groups were maintained or strengthened, and "relationships amongst community groups and organisations have been enhanced with strengthened opportunities for collaboration." The number of community groups even grew from 50 to 52 (Ozanne and Ozanne 2013).

Against this backdrop, the TB continues to play an important role galvanising resources for community resiliency. Chapter 3 examines the Lyttelton TB's role during the recovery period. In particular, this chapter focuses on how the community practiced collective problem solving before, during, and after the earthquakes assisting in the recovery process.



PHOTO 5. Significant damage to local businesses was caused by the earthquake.

3.1 Developing Community Efficacy and Problem Solving

Community efficacy is the collective sense that people can work together to exert social control over their environment (Sampson 2002). The TB assists in identifying, developing, and organising community resources, which are deployed to solve problems in the local community. Thus, the TB works to enhance perceived collective efficacy. The TB regularly publicises successful projects using communications that are broadcast community wide. A virtuous cycle occurs in which success breeds success. Particularly fol-

lowing the earthquakes, the collective ownership of the TB grew beyond the boundaries of its members to the community at large. Both TB and community members identified new community problems and activated the TB to mobilise resources to solve local problems. These successes were publicised, leading to new opportunities being identified.

How was this virtuous cycle initiated? To join the TB, members must post their tradable skills online. It was common for people to struggle to identify skills. They could not use skills upon which they generated their primary income given the tax code. Often people did not believe their labour had value because so much labour upon which the traditional market depends is unpaid (e.g., the labour of caring for children and the elderly, neighbourly assistance, companionship, and so forth). The TB helped members recognise their skills and realise that they can provide services that their neighbours value (Ozanne 2010). As expressed by one focus group participant, “I have skills that people want.”

The TB creates a local marketplace of services that documents members’ talents. The specific services participants report receiving through TB trades include gardening, computer training and advice, working bees in individual’s homes and gardens, assistance with shifting, child minding, access to a trailer, support with fitness and well-being, and business services, to name but a few (Ozanne 2010).

Some trades are simple exchanges of time, such as getting a lift to the airport for one TB hour. But many of the trades leave behind practical, real-world skills. As described by one TB member in a focus group interview:

I’ve always been very busy, and then my husband died, and I thought, I’m gonna join the Time Bank because I need to know how to do things. I needed help with, how do you prune an apricot tree? I had no idea but someone in the Time Bank did and they came to my rescue.

This woman was taught to prune her trees and is now able to do this skill herself, which contributes to her personal sense of efficacy. In the early history of the TB, most exchanges were among individual traders and not all of the trades involved developing new skills. Yet, before the earthquakes hit, an average of 400 hours were traded monthly and over 30,000 total hours were traded. Many of these trades directly influenced individual’s skills and feelings of personal efficacy.

I think my teacher gene has come out. I come from a family where all the women are teachers and everyone’s always told me I’d be a great teacher. And I’ve always gone, ‘I’m not going to be a teacher.’ But I do actually really enjoy teaching people. I really, really enjoy showing people how to do stuff and seeing people get it. So I guess I’ve become more aware of that and just being aware that I can communicate well with people and with a wide range of people. [Interview TB member]

The TB also facilitates group initiatives to build the skills and capabilities of its membership. Participants reported that the training sessions that developed individual and community skills (e.g., book reading sessions, video nights) were particularly useful (Ozanne 2010).

I was thinking of the pot luck dinner, where we had the film, “The Story of Stuff,” and we had the trading swap. And I thought it was a nice community gathering around a topic. I loved the topic and then watching the film together and having a conversation about it (Interview TB member).

The TB develops new skills by regularly holding classes that it staffs with members to promote a range of skills (e.g., filleting a fish, sewing, storytelling, learning foreign languages) [see Figure 3].

In the two years prior to the earthquakes, surplus hours accumulated in a Community Chest that the TB used to invest hours back into projects that improved the community. For example, TB members who were not using their hours often donated them back to the community. Thus, a wide range of community projects were tackled including supporting Lyttelton's annual community events, such as the Festival of Lights, and supporting local initiatives, such as the community garden. Some of these initiatives were building local capacity such as investing TB hours to support the local Information Centre. Increasingly, members undertook collective tasks that required more people and time, and higher levels of creativity, coordination, and organisation. Consider the following TB email broadcast:

Last Monday evening some people gathered to talk about continuing education as provided/promoted by Project Lyttelton. With ACE funding cuts it forces us to think laterally. One line we would like to develop is providing education via the Time Bank. This is how it could work. On Wednesday evenings, starting in March (could expand out to other times as we develop) will be an opportunity for locals to share their skills and knowledge. So we need to establish what skills/knowledge people are willing to offer to share with others. They would get time credits for sharing these. People who attend would pay time credits. There would be a small charge for covering costs (heating, paper, tea/coffee etc.). An example: Rachel offers to teach how to make berry vinegars, the Time Bank organises which Wednesday she does this, and details are advertised. People turn up at the venue advertised. Course goes ahead. People enjoy devouring berry vinegar! The courses could be for one or several weeks. What would you like to share?

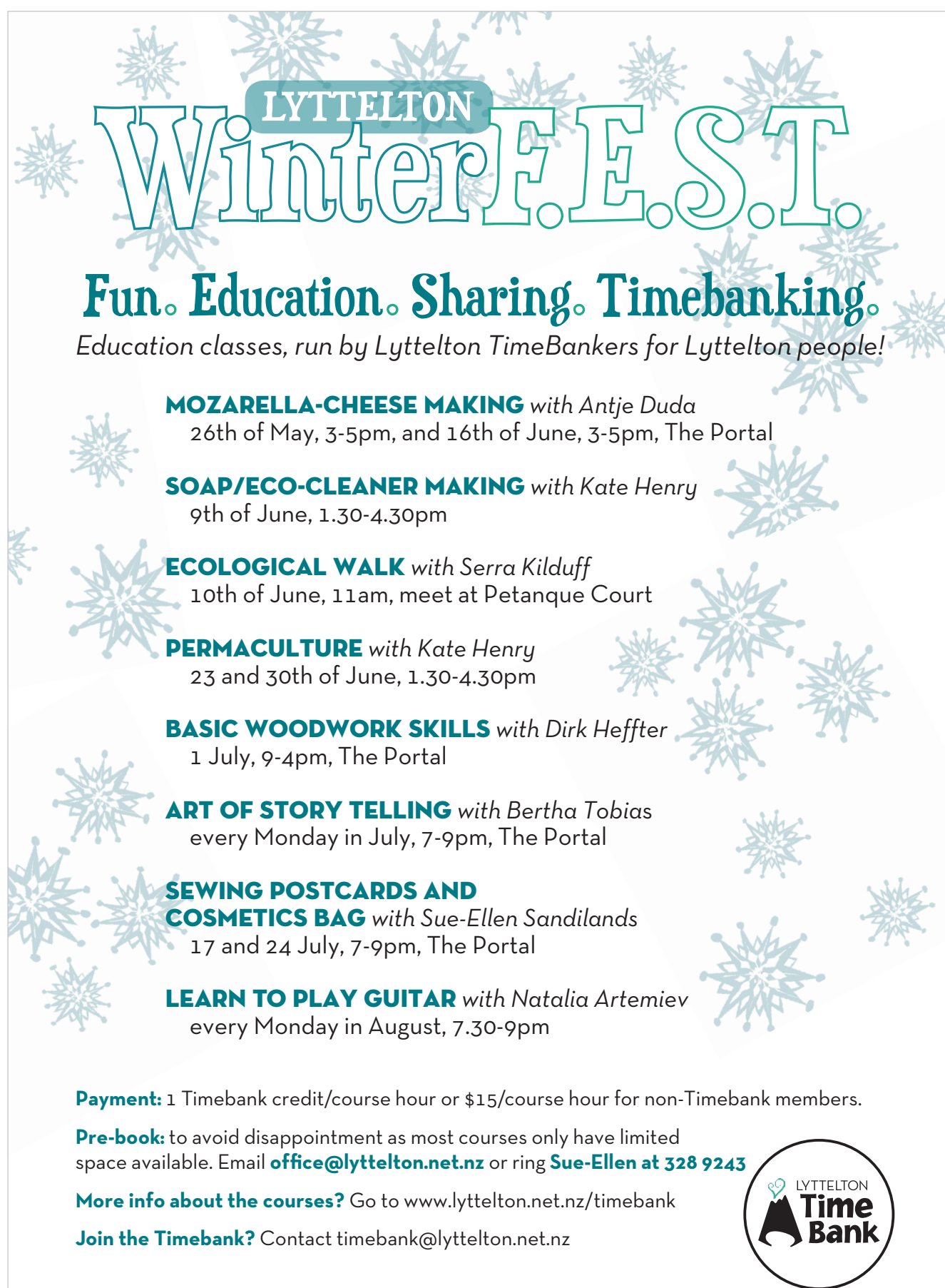
The Lyttelton TB was resolving local problems by using their members' diverse knowledge and skills, and the TB community was developing and practicing skills that were setting the stage to help them resolve unexpected problems.

3.2 Activating Community Efficacy and Problem Solving

Given the challenges facing the Lyttelton community following the earthquakes, many opportunities existed for the TB to support the efforts of the community during the recovery period. The Lyttelton TB was particularly effective providing social support by activating the skills and competencies of its members for community action. For instance, the weekday meal service for elderly residents who were vulnerable in the immediate aftermath of the earthquakes continues today. The TB organisers also worked to find new locations for Plunket and the toy library whose facilities were damaged (Fieldnotes 29 March, 2011).

Communities tend to be more resilient when they can return to a sense of normalcy by resuming their regular rituals and celebrations (Abramowitz 2005). TB members helped organise a party at one of the primary schools so the school children could regain a sense of normalcy during these trying times. The TB helped to facilitate with Project Lyttelton the Festival of Walking to give local residents a way to engage with other residents and increase their fitness:

FIGURE 3 - FLYER - TIME BANK WINTER EDUCATION CLASSES



LYTTELTON
Winter F.E.S.T.

Fun. Education. Sharing. Timebanking.
Education classes, run by Lyttelton TimeBankers for Lyttelton people!

MOZARELLA-CHEESE MAKING with Antje Duda
26th of May, 3-5pm, and 16th of June, 3-5pm, The Portal

SOAP/ECO-CLEANER MAKING with Kate Henry
9th of June, 1.30-4.30pm

ECOLOGICAL WALK with Serra Kilduff
10th of June, 11am, meet at Petanque Court

PERMACULTURE with Kate Henry
23 and 30th of June, 1.30-4.30pm

BASIC WOODWORK SKILLS with Dirk Heffter
1 July, 9-4pm, The Portal

ART OF STORY TELLING with Bertha Tobias
every Monday in July, 7-9pm, The Portal

SEWING POSTCARDS AND COSMETICS BAG with Sue-Ellen Sandilands
17 and 24 July, 7-9pm, The Portal

LEARN TO PLAY GUITAR with Natalia Artemiev
every Monday in August, 7.30-9pm

Payment: 1 Timebank credit/course hour or \$15/course hour for non-Timebank members.

Pre-book: to avoid disappointment as most courses only have limited space available. Email office@lyttelton.net.nz or ring **Sue-Ellen at 328 9243**

More info about the courses? Go to www.lyttelton.net.nz/timebank

Join the Timebank? Contact timebank@lyttelton.net.nz



...where a whopping 21 TB members were involved in organising and running the event, contributing to walks with themes as diverse as poetry, chickens, pushchairs, farms, trees, coastguard and ecology and more (TB email broadcast).

The TB actively promoted many opportunities for people to get out and socialise. The TB ran a series of swapping events at the Petanque Court on the main street to provide both members and residents with a chance to get out and interact with others. This exchange event expanded to include swapping events of books, toys, DVDs, seeds, clothes, and accessories (see Photo 6).

In the last two years, a large annual swapping event on “the grassy” occurs where TB members have shared their skills with the community for free. Activities included tie dying, tennis and juggling skills, yoga, games for kids, massage, mosaic, and many others (see Photo 7). “The idea is that as many of



PHOTO 6. Community members participating at a seed swap.

us Tbers as possible get together on the grassy flat during this time and have fun, while at the same time show-casing the variety of skills on offer at the TB (email broadcast).” The TB also created a winter series

of educational classes (e.g., cheesemaking, soap making, wood working skills, permaculture...).



PHOTO 7. Residents making juggling balls at the annual swapping event.

Given the TB’s extensive social network of formal and informal ties, they were particularly effective working on initiatives with different groups and organisations. Plenty to Share was a new local organisation that helped mem-

ber grow food for the Community House's meal program for the elderly. The TB helped organise its members to work with the local Community Garden group. Also, the Community Garden and the TB organised a gardening series and one project involved rebuilding the cob oven. The TB offered labour to help rebuild the tennis club rooms in partnership with the Tennis Club.

Given the shortage of community gathering spaces, the community was particularly interested in building the Petanque Court for recreation and as a gathering spot. Members organised the work using labour and resources provided by the TB, Gap Filler, Volcano Radio, and Project Lyttelton. Across several working sessions, the land was cleared, the court was built, the site was landscaped, and seating and performance areas were constructed. The Petanque



PHOTO 8. Community members participating at a working bee building the Petanque Court.

Court is currently a popular gathering spot that is enjoyed and preserved by the community (see Photos 8-9). The TB worked with Gap Filler to build a community sauna. Jefferies (2012) argues that a “culture of possibility” is developing in Lyttelton.



PHOTO 9. Children at a community party being held at the Petanque Court.

The Petanque Court site is the future site of the new Lyttelton Civic Square. The land was purchased by the Christchurch City Council for this purpose. In the interim, the Council funded a transitional project “as part of the Suburban Centres Programme to help provide facilities, promote activity and enhance the

look and feel of the most damaged suburban centres (Scoop 2013, p. 1).” Seven artworks were installed on the site and will remain there until the permanent construction of the civic square begins (Future Christchurch 2013). Labour and skills to construct three of these artworks was provided by TB members (see Photo 10).



PHOTO 10. Residents working on a transitional artwork project on the future site of Civic Square.

The TB organised a regular community garage sale, which was an important initiative to provide financial assistance to other local organisations (see Photo 11). Initially, the garage sales were envisioned by a TB member as a fund-raising mechanism for the TB. However, the garage sales are now a bi-weekly event run by TB volunteers with goods donated by the community. After the February earthquake, the TB sales generate funds for local groups, who also provide labour to work at the garage sales. These activities help strengthen organisational relationships with the Community House, Plunket, Volcano Radio, Sea Scouts, the Youth Centre, Lyttelton Harbour Civil Defence, the Primary Schools and many other organisations (Fieldnotes 28 March, 2011). In 2011, the TB invested 133 hours in this project, and over \$9000 and \$22,500 was generated in sales in 2011 and 2012, respectively, which was reinvested in the community.

The Lyttelton TB also promotes the development of TBs in the Canterbury region and New Zealand. They sought and received funding for a coordinator whose sole responsibility was facilitating the growth of the Timebank Aotearoa New Zealand (TBANZ) network. The TB coordinators regularly answer questions regarding how to start a TB, visit other TBs, and distribute a booklet they created on how to start a TB (Project Lyttelton 2013). The skills and capabilities of Lyttelton TB members were harnessed to host the first New Zealand TBing Hui in October 2011 just eight months after the February earthquake. An organisational member provided the venue and individual members organised and facilitated the conference providing food, lodging, and hospitality to visiting guests. In all, 277 hours of TB labour were dedicated to this event.

3.3 Leveraging the Time Bank’s Social Resources during Recovery

The Lyttelton TB continues to provide care and support to members and the wider community during the recovery period. As the number of social organisations in Lyttelton increased after the earthquakes



PHOTO 11. Saturday morning at the Time Bank community garage sale.

from 50 to 52, the TB increased its links, both formal and informal, with many organisations. It continues to act as a hub organisation within the community (see Figure 4). The garage sales are a particularly effective way for the TB to increase its formal links with other community groups and support their members.

TB members con-

tinue to provide care and support to vulnerable groups in the community. As discussed previously, the TB works with the Community House to provide nightly meal services to elderly residents through the “Grow A Little Extra” initiative (see Figure 5). The TB provides activities for children, such as the Gruffalo Party and a children’s activity day at the Petanque Court, which is particularly important given the loss of recreational facilities (see Photo 12).

TB members still need help relocating as their houses are deemed uninhabitable or repairs are made. The TB helps members find accommodation and helps facilitate with moving. The TB offers a number of activities to reengage members in the community and provide social opportunities to meet other residents, such as pot luck dinners, games evenings, social events, and the swapping events, as previously discussed. The TB Coordinator states, “we also felt very strongly after the earthquake the mood of people was really depressed and there wasn’t really that much for lots of people to look forward to.” In addition, the TB hands out welcome bags to new residents, which include bus and ferry information, a local map, information on community groups, home baking, and seeds from the community garden.

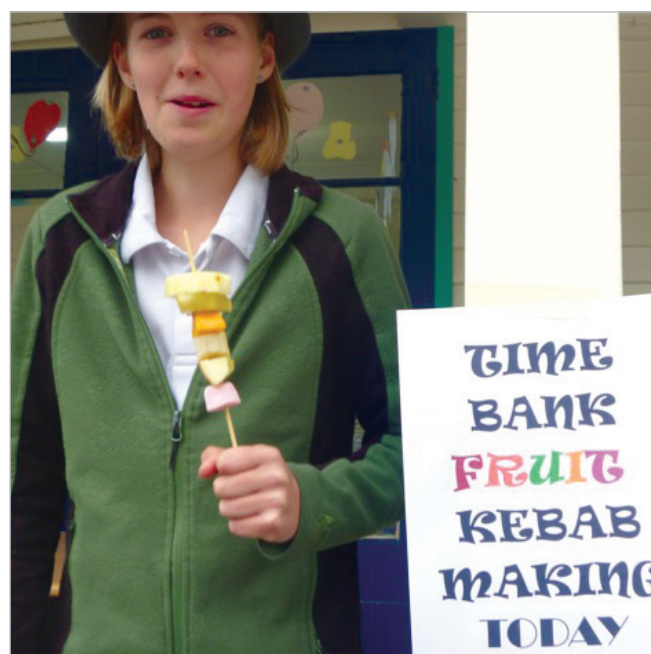


PHOTO 12. The Time Bank working at a local school to provide activities.

FIGURE 4 - TIME BANK ORGANISATIONAL NETWORK AFTER EARTHQUAKES

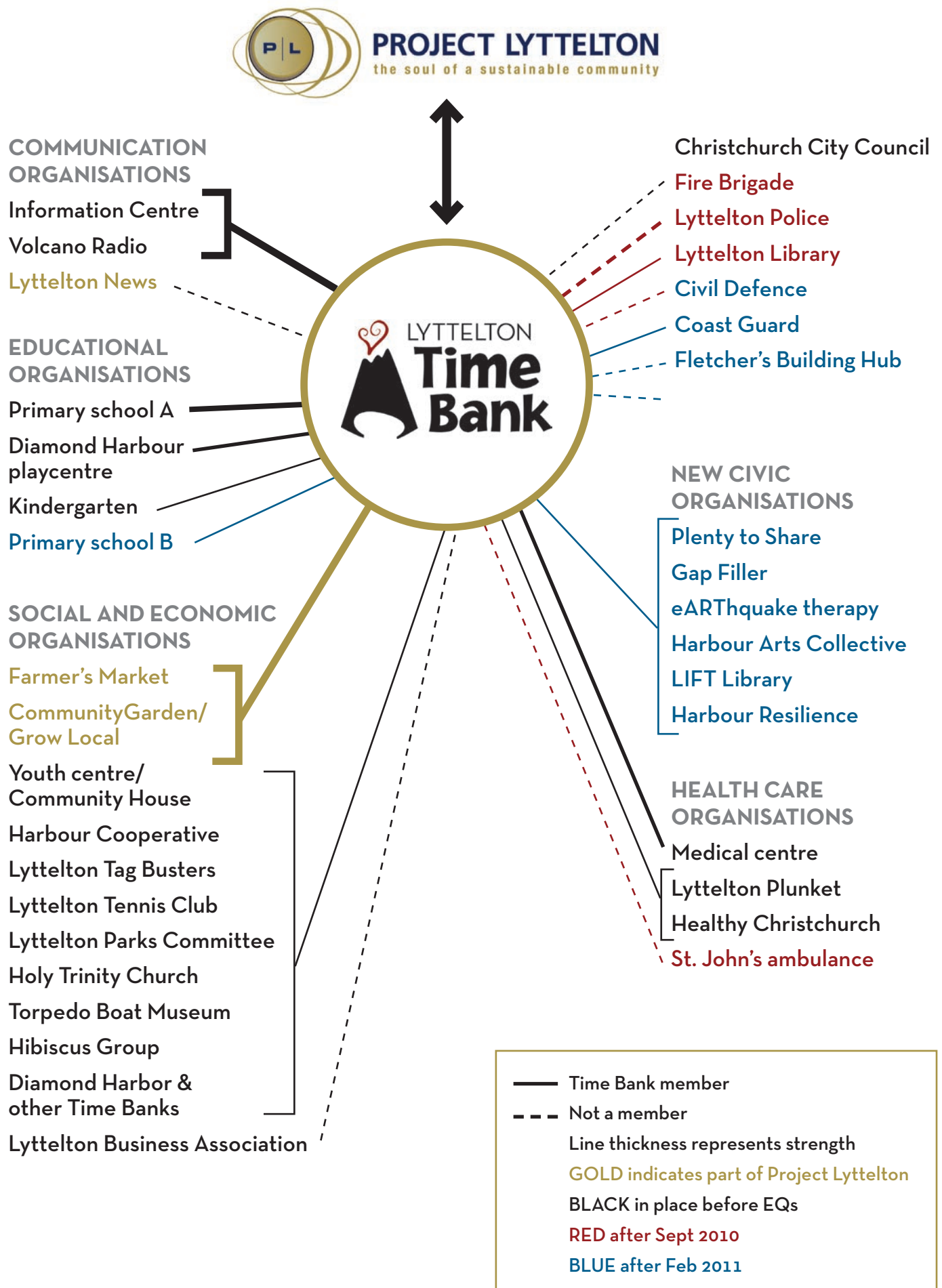
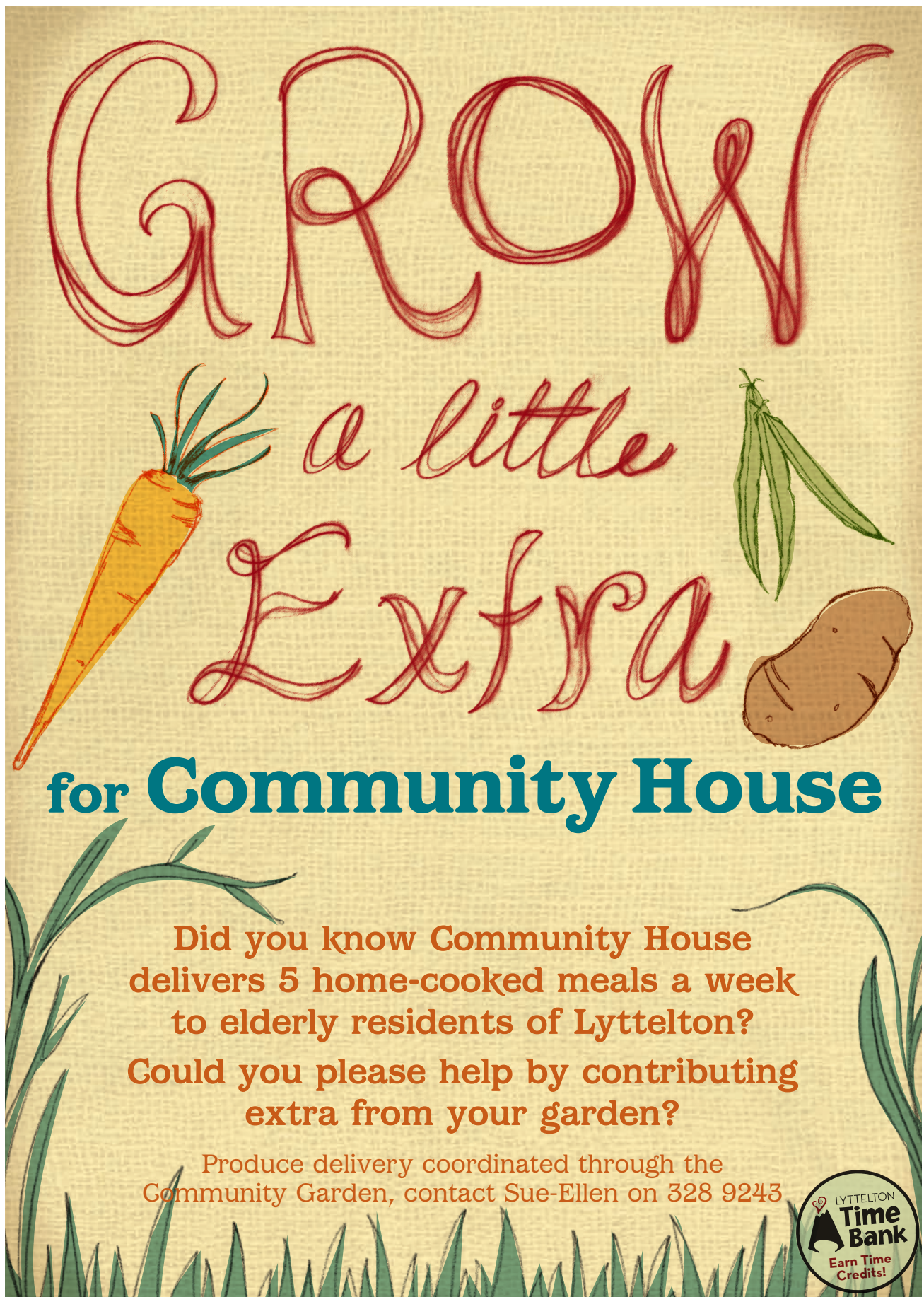


FIGURE 5 - FLYER - GROW A LITTLE EXTRA INITIATIVE



CHAPTER 4 – TIME BANKS AS CIVIL DEFENCE PARTNERS IN EMERGENCY PLANNING AND MANAGEMENT

Chapter 4 examines how the institution of TBing could be used in emergency planning and management. Ideally, public policy should seek to enhance local communities' resiliency—or the process of positive adaptation following a disturbance. Past research suggests that community resiliency occurs when communities are able to nimbly mobilise a range of resources (Norris et al. 2008). These resources are more adaptive when they can be quickly mobilised, when the resources work under a range of circumstance, and when there is substitutability among resources.

The TB model creates a marketplace of services by mapping its members' skills and assets. In normal times, members with needs are matched with members who can offer services. In extraordinary times, this system has the potential to galvanise resources to solve pressing individual and collective problems. We focus on the key strengths of the TB model, which is the ability to develop and mobilise communication and social resources to enhance collective efficacy and problem solving ability before, during, and after emergencies.

4.1 Before Disaster Strikes

4.1.1 Map the Community: Document Existing Assets and Vulnerabilities

Communities are not static but are constantly changing. New households arrive and old households depart. Couples expand into families and families contract into empty nesters. People enter the community through marriage and leave the community through divorce and death. Moreover, residents' economic circumstances change as prosperous households enhance their properties and invest in consumer durables. Other households face economic hardships and sell off valuable assets. Community members also change as they learn new skills, such as nursing, carpentry, or CPR, to name but a few.

The TB model provides a dynamic system for tracking members and their skills and assets. As previously discussed, the TB's marketplace of services is in effect a map of members' assets and skills. The current tracking system could be expanded and members could archive specific skills and assets that would be vital in an emergency. For example, currently TB members do not trade skills used in their primary employment. However, any community member with medical or emergency training could be listed in the online system providing quick access to skilled local personnel in the face of a crisis. Similarly, TB members often trade the use of possessions, such as trailers or equipment. The system could also map any consumer durables or resources vital in emergencies, such as generators, solar panels, mobile defibrillators, emergency medical kits, water storage, or rappelling equipment.

In this study, the Lyttelton TB also identified people who were willing to help on short notice. This idea of identifying local rapid response teams could be expanded to identify people who can provide a range of help in an emergency from caring and comfort to rescue and demolition. Although currently many communities have local trained personnel, such as the police or volunteer fire brigades, emergencies tax existing

systems. A TB can identify and train teams that can be rapidly deployed providing greater redundancy of emergency human capital.

The TB system does not map vulnerabilities or at-risk community members. However, in an emergency, lives can be saved if people with mobility or medical issues are known ahead of time. Again, this type of information can be dynamic. For example, a pregnant woman might be mobile until the last trimester of her pregnancy. Or a resident might be temporarily incapacitated due to a short-term injury. The online TB system can easily be used to update changes in individuals' circumstances since it is a locally based community system.

The labour of the TB members could be harnessed to map these assets and liabilities. TB members could interview community members to identify opportunities [e.g., doctors, generators, water storage,...] and threats (e.g., older homes, kindergartens, nursing homes,...] (Enarson 2012). For instance, TB "street ambassadors" could call on their neighbours to determine potentially at-risk residents, such as neighbours who need assistance during an evacuation, people who are under medical care or rely on electricity for medical needs, or individuals who are socially isolated lacking family and friends in the immediate area. TB street ambassadors could also map critical material resources such as generators, refrigeration, water and food supplies, and so forth. These data provide a more complete profile of the community, which could assist in preparing an emergency plan that takes into account local strengths and weaknesses (MCDEM 2010).

4.1.2 Practice Team Work: Engage in Community Enhancement Projects

Although regular emergency drills are valuable, it is challenging to motivate citizens to practice frequently unless they have prior experience of a large scale threat (Simpson 2001). However, one advantage of the TB model is that community members can practice working together on community enhancement projects, which both strengthens social ties and collective efficacy. Recall that unused TB hours can accrue within a community chest and these hours can be reinvested back into the local community. In this study, these community projects solved local problems ranging from cleaning up graffiti, improving the community garden, strengthening services at the local information centre, assisting with local town celebrations and festivals, helping the local school, and so forth.

But a number of unintended consequences resulted from these community enhancement projects. First, social ties were being strengthened. Often when people worked on a community project, such as helping in the community garden, they would meet other community members who shared their interests. Some of these contacts resulted in weak connections, such members recognising one another in town. Other times, friendships were formed. Thus, these community projects enhanced the social connectivity of the town. Second, as the number of these events expanded and they were publicised, collective efficacy increased. The community of Lyttelton was developing a culture of caring where people believed that collectively they could work together to get things done.

Third, as people gathered to solve community problems, they were forming impromptu work teams. These were temporary groups of people who worked together to complete a task. Thus, the temporary

team members had to be self-organising where leaders with expertise emerged to structure the work and assign roles to get a specific project completed. These community projects allow people to practice these skills, which are particularly valuable in times of unexpected emergency where bottom-up, flat leadership and nimble organisational skills are often more effective than top-down, bureaucratic approaches (Longstaff 2005).

Finally, these community enhancement projects can be strategically-focused on enhancing a communities' preparedness. For example, the Lyttelton TB community invested hours to enhance the Information Centre, which proved fortuitous given the events that unfolded. Community projects were also completed with organisations catering to the elderly and the young. In a crisis, these relationships can be, and were, leveraged to provide urgent assistance.

4.1.3 Shout it Out: Build Redundant Local Communication Systems

In this research, the Lyttelton TB developed several modes of communication including sending regular friendly emails, making announcement on the local radio, and posting regular news stories in the town's newspaper; the TB also had its members' phone numbers and addresses. During emergencies, people turn to trusted information sources. Thus, developing a well-known communication system with redundancies is important before catastrophe strikes.

Given the expansion of cell phones, and the robustness of the cell phone technology during a disaster, the TB might offer to send announcements to TB members and other local residents during emergencies. However, the cell phone network or the internet may be unavailable during a crisis. Thus, communities need to invest in communication systems with redundancies and sometimes simple low-tech solutions work well. For instance, physical copies of the community contact data should be kept in multiple locations in the community. Provisions should be made to create a community notice board for emergency information at a centralised location. A notice board might be created before a crisis hits to communicate community events and thereby create another practiced communication mode. Finally, TB organisational members, such as schools and healthcare providers, could be provided with radios and appropriate training to facilitate communication. Rather than waiting for a disaster, the use of radios could be practiced during non-emergency community events, such as festivals and celebrations. The central point here is to develop and build upon the local communication systems by practicing with them regularly during community events as an on-going process rather than a one-off emergency drill.

4.1.4: Plan Locally: Leverage Local Expertise to Organise Strategically

TB members could organise the preparation of an emergency management plan with community involvement and based on local expertise. The aforementioned mapping of resources and liabilities provides vital information needed in this planning process. For example, during the mapping of resources and liabilities, it may be apparent that the community lacks particular skills or lacks redundancy in a key capacity. TB members may be recruited and rewarded with TB hours to undertake specific training (e.g., logistics, first aid, foreign language training, running a welfare centre...).

Such an approach could empower the community to manage its own risks and capabilities and take ownership of the planning process (MCDEM 2010). For example, members of the TB community with medical skills, in consultation with local health organisations, could prepare a health and welfare plan. Other organisational members and stakeholders, such as emergency first responders, could prepare an evacuation plan. Local schools administrators could prepare specific evacuation plans for children in their care. The Information Centre could plan to aid tourists during a crisis, since visitors' unfamiliarity with the local area places them at-risk. Finally, the TB could clearly articulate specific roles for TB volunteers in the event of an emergency, such as running a welfare centre or doing search and rescue. Traditionally, people volunteer to engage in this type of emergency planning. But the TB model allows these important non-economic exchanges to be rewarded with TB hours during both simulated and real emergency situations.

In its position as a hub organisation, the TB model can facilitate innovations in educating residents to develop household emergency plans by leveraging the diverse expertise of its individual and organisational members. Research suggest that barriers prevent residents from preparing, such as risk perceptions, optimism bias, normalisation bias, and a transfer of responsibility to others (Finnis 2004). Novel approaches may be necessary to overcome these barriers. For instance, Healthy Christchurch and the Mental Health Foundation launched the Well Being Game after the Canterbury earthquakes to give Cantabrians a fun way to incorporate five simple actions into daily life to increase health and happiness (Scoop 2012). In 2013, the game was taken into local schools to encourage school children to play and increase their own mental and physical health. TBs are particularly well suited to developing and managing inter-organisational relationships. The TB also brings together diverse people with different skills, which may spur innovations. They could work to partner with local groups to enlist residents, or even children, in getting households prepared (e.g., storing food and water, purchasing batteries and torches, and developing a family plan), since research suggest that public awareness campaigns often have limited results in turning awareness into action (Paton 2000).

4.2 When Disaster Strikes

4.2.1 Celebrate Emotional Labour: Access the Caring Culture

Mitchell's (1983) Critical Incident Stress Debriefing (CISD) is the most widely used approach to psychological stress (Hutton 2001). This approach advocates that residents who are experiencing stress should have debriefings with health care professionals as a post-disaster intervention tool. However, research challenges the effectiveness of the CISD model (Kenardy and Carr 2000). Other researchers find informal approaches, such as talking to family and friends, equally effective for the vast majority of people who experience a disaster (Gist, Lubin, and Redburn 1999).

The TB system provides a valuable way to provide rich reserves of emotional labour often needed during and after disasters. TB members can call or visit vulnerable residents. TB members can staff welfare centres so people can talk about their experiences and fears. TB members are community members who have experienced the disaster and may know the people experiencing stress. Thus, they may be able to provide a more

nuanced and empathic approach than outside relief workers. When local residents provide this important emotional labour, emergency workers are also freed to manage the tasks for which they are trained.

Significant evidence suggests that helping other people can provide therapeutic benefits for the care giver. For instance, older women in a flood in Pennsylvania did as well and, in some case, even better than those who did not experience the flood. Similarly, following Katrina in New Orleans, older women found helping others enhanced their sense of independence (see Enarson 2012 for additional research on the evidence for the therapeutic effect of caring for others). Thus, the TB system can be activated to provide emotional labour to those in crises, which provides benefits for the TB helpers.

4.2.2 Expand Diversity: Appreciate the Range of Skills that Provide Flexibility

Communities in New Zealand are susceptible to a wide variety of potential hazards including earthquakes, landslides, flooding, high winds, drought, and tsunamis. Given the diversity of imagined and unimagined disasters, it is impossible to anticipate the resources that may be needed. The TB system, which documents a wide range of skills and resources in the community, can potentially create a more effective response. Disasters cannot be fully imagined but having a diverse range of practiced skills certainly helps.

4.3 Recovering From Disasters

4.3.1 Band Together: Leverage Social Capital

Aldrich (2011, 2012b) argues that social capital is the most robust predictor of population recovery after catastrophes. He explains that social ties act as ‘informal insurance’ allowing victims to draw on a ready-made support network (2011, p. 598). Well-connected communities are better able to mobilise and voice their concerns. Embedded networks benefit those individuals who are part of this network and raise the cost of leaving a community.

TBs help build trust. They increase interaction and participation among members linking individual members and organisations to broader social networks. Therefore, the TB model helps build stores of social capital in a community. During disaster and recovery, TB members can access these reserves of human capital to help them solve immediate personal problems. However, these stores can also be drawn upon to mobilise TB members to articulate broader community needs and lobby policy makers to provide resources to meet these needs. For instance, the community may identify community assets that require repair or replacement to protect the community from threats. By asserting a collective will, TB members are more likely to overcome structural obstacles to recovery (Aldrich 2011). In its role as a hub organisation, the TB effectively links the community to organisations, both horizontally and vertically, to provide resources critical to recovery.

4.3.2 Solve Problems Together: Leverage Community Efficacy

As was demonstrated in Lyttelton, TB's can enable communities to work together and thus increase community efficacy and problem solving ability. This community efficacy gives people the power to ex-

ert control over their environment (Sampson 2002). During the recovery period, the TB and community members can identify important community problems and then activate the TB to mobilise resources to solve those problems. TB members or organisations with specific skills or expertise can be galvanized to work on important projects. For instance, an ex-mining community in Wales created a Time Centre to deal with problems of unemployment, loneliness, and community breakdown after the closure of the local mines. Members work in the community, earning time credits that can be spent on a range of activities at the Centre or community hall; the labour of these individuals benefits the whole community. TB members also meet monthly with police and council workers to identify community problems and develop collective intelligence about how to address the problems (Kennedy, Lietaer, and Rogers 2012).

In conclusion, the TB model is a grassroots and economical model for mobilising communication and social resources to solve local community problems during normal times. Before disasters strike, a TB can map the communities' assets and liabilities, which can be used to improve emergency plans that leverage local resources and anticipate vulnerabilities. The TB organises members to trade skills and work on collective projects that enhances the collective store of community skills, strengthens social and communication infrastructure, and practices fluid problem solving within self-organising teams. During disaster and recovery, the TB provides a practiced mechanism to mobilise quickly communication and social resources to wrestle with unexpected problems. The TB is particularly successful at managing the emotional labour needed to provide care and comfort from those suffering from the inevitable stress of the immediate disaster and its aftermath. The TB builds and strengthens the formal and informal social network and this connectivity helps mobilise resources for recovery.

REFERENCES

- Abramowitz, Sharon A. (2005), "The Poor have Become Rich, and the Rich have Become Poor: Collective Trauma in the Guinean Languette," *Social Science and Medicine*, 61, 2106-18.
- Aldrich, Daniel P. (2011), "The Power of People: Social Capital's Role in Recovery for the 1995 Kobe Earthquake," *Natural Hazards*, 56(3): 595-611.
- ____ (2012a), "Social, not Physical, Infrastructure: The Critical Role of Civil Society after the 1923 Tokyo Earthquake," *Disasters*, 36(3): 398-419.
- ____ (2012b), *Building Resilience: Social Capital in Post-Disaster Recovery*, University of Chicago Press.
- Anonymous (2010), "No CD Presence in Lyttelton for the Shock," *The Akaroa Mail*, September 10, 11.
- Baker, Stacey Menzel (2009), "Vulnerability and Resilience in Natural Disasters: A Marketing and Public Policy Perspective," *Journal of Public Policy & Marketing*, 28 (Spring), 114-23.
- Boyle, D., Clark, S. and Burns, S. (2006), *Co-production by People Outside Paid Employment*, Joseph Rowntree Foundation and The New Economic Foundation.
- Canterbury Earthquake (2011a), "Lyttelton Tunnel to Open for Use by Local Residents," <http://canterburyearthquake.org.nz/2011/02/28/lyttelton-tunnel-to-open-for-use-by-local-residents/> retrieved 24 October, 2012.
- ____ (2011b), "Important Public Health Information from CDHB," <http://canterburyearthquake.org.nz/category/water/page/18/>, retrieved October 24, 2012.
- Cha, Arianna Eunjung (2012), "Spain's Crisis Spawns Alternative Economy that Doesn't Rely on the Euro," *Guardian Weekly*, September 4.
- Christchurch City Council (2011), "Community Profile Lyttelton," <http://resources.ccc.govt.nz/files/CityLeisure/statsfacts/statistics/CommunityProfiles/2011/BanksPeninsulaCommunityProfile-Lytteltonposter.pdf>, retrieved 5 November, 2012.
- ____ (2012), "Community Profile Lyttelton," <http://resources.ccc.govt.nz/files/CityLeisure/statsfacts/statistics/CommunityProfiles/2012/BanksPeninsulaCommunityProfile-Lytteltonposter.pdf>, retrieved 23 June, 2013.
- Collom, E. (2005), "Community Currency in the United States: The Social Environments in which it Emerges and Survives," *Environment and Planning A*, 37(9), 1565-87.
- ____ (2007), "The Motivations, Engagement, Satisfaction, Outcomes, and Demographics of Time Bank Participants: Survey Findings from a U.S. System," *International Journal of Community Currency Research*, 11, 36-83.
- Enarson, Elaine (2012), *Women Confronting Natural Disaster*, London: Lynne Rienner.
- Evans, Bettina (2012), *The Shaken Heart: Earthquake Stories from the Heart of Lyttelton*.
- Everingham, Wendy (2012), "Lyttelton's Grassroots Response," paper presented at the 11th Annual Emergency Management Conference, Wellington, New Zealand, February 28-29.
- Finnis, K. (2004), *Creating a Resilient New Zealand: Can Public Education and Community Development*

Campaigns Create Prepared Communities? An Examination of Preparedness Motivation Strategies, Ministry of Civil Defence and Emergency Management, Wellington, New Zealand.

Future Christchurch (2013), "Lyttelton's Civic Square is Evolving," <http://www.futurechristchurch.co.nz/suburban-centres/lyttelton%E2%80%99s-civic-square-is-evolving>, retrieved 5 July, 2012.

Geonet (2012), "Aftershocks," <http://info.geonet.org.nz/display/home/Aftershocks>, retrieved 18 October, 2012.

Gist, R., Lubin, B., and Redburn, B. (1999), "Psychological, Ecological, and Community Perspective on Disaster Response," In R. Gist and B. Lubin (Eds.), *Psychosocial Aspects of Disaster*, New York: John Wiley & Sons.

GNS Science (2011), "6.3 Magnitude Earthquake Part of the Aftershock Sequence," <http://www.gns.cri.nz/Home/News-and-Events/Media-Releases/earthquake-part-of-aftershock-sequence>, retrieved 20 October, 2012.

____ (2012a), "Canterbury Earthquake," <http://www.gns.cri.nz/Home/News-and-Events/Media-Releases/Most-damaging-quake-since-1931/Canterbury-quake>, retrieved 27 September, 2012.

____ (2012b), "2010 Darfield (Canterbury) Earthquake," <http://www.gns.cri.nz/Home/News-and-Events/Media-Releases/Most-damaging-quake-since-1931/Canterbury-quake/Darfield-Earthquake>, retrieved 27 September, 2012.

Goodman, R., Speers, M., McLeroy K., Fawcett, S., Kegler, M., Parker, E., et al. (1998), "Identifying and Defining the Dimensions of Community Capacity to Provide a Basis for Measurement," *Health Education & Behavior*, 25, 258-78.

Granovetter, M. (1973), "The Strength of Weak Ties," *American Journal of Sociology*, 78, 1360-79.

Guion, Deirdre T., Debra L. Scammon, and Aberdeen Leila Borders (2007), "Weathering the Storm: A Social Marketing Perspective on Disaster Preparedness and Response with Lessons from Hurricane Katrina," *Journal of Public Policy & Marketing*, 26 (1), 20-32.

Hall, Anneleise (2009), "PL Our Story," Project Lyttelton, <http://lyttelton.net.nz/index.php?start=90>, retrieved 12 November, 2012.

Hutton, David (2001), *Psychosocial Aspects of Disaster Recovery: Integrating Communities into Disaster Planning and Policy Making*, Institute for Catastrophic Loss Reduction, Toronto, Canada.

Jefferies, Margaret (2012), "Lyttelton: A Case Study," <http://fleeingvesuvius.org/2012/02/27/lyttelton-a-case-study/>, retrieved 9 November, 2010.

____ and Wendy Everingham (2006), "Sustainability Review: Lyttelton Working Towards Sustainability – A Case Study," Project Lyttelton, <http://lyttelton.net.nz/home-mainmenu-1/submissions>, retrieved 9 November, 2012.

Kenardy, J., and Carr, V. (2000), "Debriefing Post Disaster Follow-up After a Major Disaster," In B. Raphael and J. Wilson (ed.), *Psychological Debriefing: Theory, Practice and Evidence*, Cambridge: Cambridge University Press.

Kennedy, M., Lietaer, B. and Rogers, J. (2012), *People Money: The Promise of Regional Currencies*, Triarchy Press Limited.

Longstaff, Patricia H. (2005), *Security, Resilience, and Communication in Unpredictable Environments such as Terrorism, Natural Disasters, and Complex Technology*, Cambridge, MA: Program on Information Resources Policy.

MEMCD, (2010), *Community Engagement in the CDEM Context*, Ministry of Emergency Management and

Civil Defence, Wellington, New Zealand.

Mitchell, J. T. (1983), "When Disaster Strikes ... The Critical Incident Stress Debriefing Process," *Journal of Emergency Medical Services*, 13(11), 49-52.

New Zealand Census (2006), 2006 Census, <http://www.stats.govt.nz/Census/2006CensusHomePage.aspx>, retrieved 4 July, 2013.

New Zealand Army (2011), "Christchurch Earthquake: NZ Defence Force – Update 6," media release 25 February, <http://www.army.mil.nz/at-a-glance/news/media-releases/media-release.htm@guid=%7B220e2f50-f5e3-4782-8b7c-5e66eec3c571%7D.htm>, retrieved 24 October, 2012.

New Zealand Navy (2011), "24 February 2011 - Navy Support for Christchurch Earthquake," <http://web.archive.org/web/20110225184813/http://navy.mil.nz/Default.htm>, retrieved 24 October, 2012.

New Zealand Transport Authority (2011), Lyttelton tunnel closed following earthquake, <http://www.nzta.govt.nz/about/media/releases/1085/news.html>, retrieved 24, October, 2012.

Norris, Fran H., Susan P. Stevens, Betty Pfefferbaum, Karen F. Wyche, and Rose L. Pfefferbaum (2008), "Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness," *American Journal of Community Psychology*, 41 (1-2), 127-50.

North, P. (2003), "Time Banks – Learning the Lessons from LETS?" *Local Economy*, 18(3), 267-70.

Ozanne, Lucie K. (2010), "Learning to Exchange Time: Benefits and Obstacles to Timebanking," *International Journal of Community Currency Research*, 14, A1-16.

_____. and Julie L. Ozanne (2013), "Building Community Resilience," working paper, under review at the *Journal of Consumer Research*.

Paton, D. (2000), "Emergency Planning: Integrating Community Development, Community Resilience and Hazard Mitigation," *Journal of the American Society of Professional Emergency Managers*, 7, 109-18.

Project Lyttelton (2013), "How to Build a Time Bank," <http://issuu.com/lytteltontimebank/docs/howtobuildatimebank>, retrieved 9 July, 2013.

Sampson, Robert J. (2002), "Transcending Tradition: New Directions in Community Research, Chicago Style," *Criminology*, 40 (2), 213-30.

Scoop (2012), "Game puts Well Being in Christchurch to the Fore," <http://www.scoop.co.nz/stories/GE1209/S00109/game-puts-wellbeing-in-christchurch-to-the-fore.htm>, retrieved 4 July, 2013.

_____. (2013), "Transitional Works Selected for Lyttelton's Civic Square," <http://www.scoop.co.nz/stories/AK1303/S00066/transitional-works-selected-for-lyttelton-civic-square-site.htm>, retrieved 4 July, 2013.

Shklovski, Irena, Moira Burke, Sare Kiesler, and Robert Kraut (2010), "Technology Adoption and Use in the Aftermath of Hurricane Katrina in New Orleans," *American Behavioral Scientist*, 20 (10), 1-19.

Seyfang, Gill (2001), "Working for the Fenland Dollar: An Evaluation of Local Exchange Trading Schemes (lets), As an Informal Employment Strategy to Tackle Social Exclusion," *Work, Employment and Society*, 15(3), 581-93.

_____. (2002), "Tackling Social Exclusion with Community Currencies: Learning from LETS to Time Banks,"

International Journal of Community Currency Research, 6.

_____ (2003), "Growing Cohesive Communities one Favour at a Time: Social Exclusion, Active Citizenship and Time Banks," *International Journal of Urban and Regional Research*, 27(3), 699-706.

_____ (2004a), "Working Outside the Box: Community Currencies, Time Banks and Social Inclusion," *Journal of Social Policy*, 33, 49-71.

_____ (2004b), "Time Banks: Rewarding Community Self-help in the Inner City?" *Community Development Journal*, 39(1), 62-71.

_____ and Smith, K. (2002), *The Time of Our Lives*, New Economics Foundation and University of East Anglia.

Simpson D. (2001), "Community Emergency Response Training (CERTs): A Recent History and Review," *Natural Hazards Review*, 2(20): 54-63.

Surren, Alastair (2012), *The Brigade: Earthquake 2011, A Tribute to the Lyttelton Volunteer Fire Brigade*.

Tatsuki, S. (2008), "The Role of Civil Society in Long term Life Recovery from a Megadisaster," Paper prepared for the annual meeting of the American Political Science Association, 28-31 August.

Thompson, Craig J. (1997), "Interpreting Consumers: A Hermeneutical Framework for Deriving Marketing Insights from the Texts of Consumers' Consumption Stories," *Journal of Consumer Research*, 34 (November), 438-55.

TVNZ (2011), "National State of Emergency Extended," March 7, <http://tvnz.co.nz/national-news/national-state-emergency-extended-4047979>, retrieved 24 October, 2012.

_____ (2012), "Canterbury Quake Sat Sept 4: As it Happened," <http://tvnz.co.nz/national-news/latest-updates-canterbury-earthquake-3759958>, retrieved 27 September, 2012.

Voxy (2010), "Christchurch City First Metropolitan to Adopt Readynet," 16 February, <http://www.voxy.co.nz/national/christchurch-city-first-metropolitan-adopt-readynet/5/38606>, retrieved 28 November, 2012.

Williams, C.C. (2004), "Informal Volunteering: Some Lessons from the United Kingdom," *Journal of Policy and Analysis and Management*, 23(3), 613-16.

Wood, A. (2013), "Breakthrough in Insurance Claim," <http://www.stuff.co.nz/the-press/news/8743853/Breakthrough-in-insurance-claim>, retrieved 4 July, 2013.