



## **Livelihood preparedness: Lessons learned from the 2016 earthquake in Kaikōura, New Zealand**

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### **Abstract**

The rising number of disaster events and crises worldwide has alerted people to protect their livelihood – the very means of making a living and supporting families. However, limited research has been undertaken to showcase livelihood lessons learned by people recovering from a disaster within relatively isolated locations in New Zealand. This paper aims to present the lessons from those businesses and individuals that have been going through recovery following the 14<sup>th</sup> November 2016 Kaikōura earthquake in New Zealand. Case study, field observations as well as interviews with business owners and individuals recovering from the earthquake suggested physical and psychological preparedness, public enlightenment on insurance policies and obligations, external networks, livelihood diversification, cash and inventory management as well as the importance of self-efficacy as lessons learned for livelihood preparedness. Furthermore, research findings highlighted that a vision for Kaikōura town and a clear community identity were crucial for achieving long-term business viability and sustainable living. These Lessons could assist businesses, individuals and governments in hazard-prone and relatively isolated locations to better prepare livelihoods against disasters and potentially minimise the economic burden of recovery.

**Keywords:** Disaster preparedness, Livelihood, Kaikōura earthquake, New Zealand



## **1. Introduction**

Disasters cause severe disruptions to community or societal functionality resulting in widespread human, economic, environmental and material losses that exceed the ability of communities to cope with using their resources (ISDR, 2009). They manifest as stresses or shocks (Pain & Livine, 2012), propagated by hazards (natural or human-made) in the presence of vulnerability (Eshghi & Larson, 2008). According to the trends illustrated by (CRED, 2007), the total number of disasters propagated by natural hazards peaked globally in the year 2000 at 526 recorded events costing approximately 47 billion USD. However, as at the time of writing in 2019, it turned out that 2012 was the most expensive year in recorded history as natural hazards leading to disasters resulted in over 156 billion USD in damages globally (CRED, 2007).

Due to the geographic location of New Zealand, the country is exposed to frequent geological and metrological hazards (INZ, 2018; New Zealand Government, 2018a). This was further highlighted by (ICNZ, 2017) as the majority of insurance claims made between 1968 and 2018 were for mostly hydro metrological disasters (storms, floods, and cyclones) and earthquakes. Unlike most disasters, earthquakes are relatively unique due to the lack of a scientific means of predicting their occurrence (USGS, 2019). And large-scale earthquakes likely pose a significant threat to lives and the livelihood of people living in seismic active locations like New Zealand.

The impact of earthquakes on lives and the livelihood in New Zealand could be deduced from the most recent 2010/11 Canterbury earthquakes and the 2016 Kaikōura earthquake. The Canterbury earthquakes resulted in approximately 40 billion NZD in financial losses (Marquis, Kim, Elwood, & Chang, 2017) and a 1.5% decrease in the GDP growth rate of the region (Wilkinson et al., 2013) which ultimately led to an 8% decline in employment by the 4<sup>th</sup> quarter of 2011 (Doherty, 2011). Similarly, the 2016 Kaikōura earthquake caused significant damage to most transportation infrastructure and impacted the tourism industry; which is the primary source of livelihood in Kaikōura (Seipel, 2016). The total loss to infrastructure was estimated to be at least 1 billion NZD while the overall recovery cost could reach 8 billion NZD (McDonald, Smith, Ayres, Kim, & Harvey, 2017). A potential means of reducing the losses



from disaster may be enlightening individuals on ways of preparing their livelihoods from disaster. This study aims to present the livelihood lessons learned from those businesses and individuals that have been recovering from the 14<sup>th</sup> of November 2016 earthquake in Kaikōura.

### **1.1 Livelihood studies**

The origin of livelihood studies could be traced back to research works in agricultural economics and geography. Some of these publications include the work of Lipton and Moore (1972) that analysed livelihood situations in rural communities of less developed nations. This was followed by Bray (1979) who illustrated the diverse impact of industrialised agriculture through the implementation of technology (green revolution) in India. Studies on livelihood then proceeded to engulf the fields of households and farming systems in the 1980s as shown in the publication of Mook (1986) that analysed rural household and their farming systems in the African context. Scoones (2009) further highlighted the contributory role of studies in the field of livelihood and environmental studies as well as research in political ecology that focused on the intersections of social, political and ecological dynamics all of which influence livelihoods. Consequent to the publication of the Brundtland (1987), livelihood studies shifted to the field of sustainable livelihood as portrayed in the publication of Chambers and Conway (1992) which attempted to explore and elaborate the concepts of sustainable livelihood through the illustration of linkages between people, their capacities and the means of making a living.

By definition, livelihoods are means by which individuals earn a living (Chambers & Conway, 1992); It encompasses a combination of resources employed and activities engaged to make life meaningful (Scoones, 2009; UKAID, 2011) and enjoyable (Morse & McNamara, 2013). It is sustainable where individuals or a community meets their current living needs in a manner that does not compromise the ability of future generations to do so (Sanderson & sharma, 2016). Also, it ensures the long term survivability of an individual through the protection and provision of essential materials in a manner that will not negatively impact on the future generation (Attfield, Hattingh, & Matshabaphala, 2004). The sustainability of livelihoods entails the reduction of economic, environmental and social vulnerabilities through “strategies that equitably encourage exercising environmental concern” (Alexander, Chan-Halbrendt, & Salim, 2006, p. 44).



## **1.2 Livelihood in disaster settings**

Disasters often multiply the livelihood challenges of vulnerable and poor individuals (Oxfam, 2008). Certain hazards such as floods and cyclone impact negatively on individuals whose livelihoods are dependent on relatively sensitive sectors like agriculture; in the absence of government supports, affected livelihoods may find it challenging to recover from those disasters (FAO, 2015; Joakim & Wismer, 2015). The livelihood effects of some disasters could extend well beyond the initial disaster impact and be felt by individuals for a long time regardless of remediation efforts (Sato & Lyamzina, 2017). Past research showed that disasters might leave a long-term psychological imprint on the affected individuals, which further affects their ability to manage their livelihood (Maeda, Oe, & Suzuki, 2018).

However, the focus of livelihood support for individuals that are provided by the aid organisations and the governments may vary across different phases of a disaster. For instance, pre-disaster, governments and NGOs may focus mostly on mitigation efforts (Walsh & Fuentes-Nieva, 2014). In contrast, post-disaster periods are viewed as an opportunity to build back better (Joakim & Wismer, 2015) through the renewal and improvement of existing livelihood structures (Khasalamwa, 2009) and the reduction of vulnerability. Vulnerability reduction during post-disaster reconstruction was identified by (Birkmann, 2006; Pelling, 2003; Wisner, Blaikie, Cannon, & Davis, 2003) as essential to reducing the likelihood of future disaster. Additionally, the success of a livelihood recovery operation is dependent on whether it increased or reduced the vulnerability of affected individuals (Hewitt, 1998).

Consequently, Practical Action (2010) called for a livelihood centered approach to disaster risk reduction through preparedness and preventive actions to mitigate the losses from disaster. On the part of governments and NGOs, this could involve a holistic approach in livelihood intervention processes through early interventions focused on asset replacement, capital provision, market development and livelihood options malleable to different genders (Joakim & Wismer, 2015). Additionally, there is a need for long term commitment by government and other aid providers to better understand local and global factors that would affect the community (Oxfam, 2008).



Individuals could prepare their livelihoods for disasters by diversifying their livelihood options (Ning et al., 2014) and implement preparedness measures such as storing food and other essential materials, as well as taking structural preparedness measures like fastening moveable items to walls and securing house foundation (Spittal, McClure, Siegert, & Walkey, 2008). Business owners should endeavor to put in place preparedness practices that will ease the process of business recovery while meeting the needs of the employees and their families after a disaster (Morrison & Oladujoye, 2013). In summary, all the stakeholders of any community may need to take part in the preparation and protection of livelihood for a disaster. For this reason, this research aims to examine the livelihood lessons learned from those individuals and businesses who are recovering from the 14<sup>th</sup> of November 2016 Kaikōura earthquake in New Zealand. The perspectives of those who are going through disaster response and recovery stage will shed light on the possible measures that should have been in place before disaster strikes. Such lessons would add value for livelihood preparedness support practice initiated by agencies and the disaster risk reduction measures taken by communities and individuals themselves for better livelihood protection and business resilience.

## **2.0 Research methodology**

For this research work, a qualitative research approach was adopted. Qualitative research aims to ascertain the meaning or knowledge individuals attach to their experiences (Merriam, 1998). It seeks to accumulate a precise account of human behaviour and beliefs within a specific context (Rubin & Rubin, 2005). In all, qualitative research methodology are holistic, empirical, interpretive and emphatic (Stake, 1995). This research employed a semi-structured interview which is in line with (Rubin & Rubin, 2005) as it gave room for in-depth probing of the interviewee; while accruing answers to a standard list of questions as suggested by (Berg & Lune, 2014).

Furthermore, Eisenhardt & Graebner (2007) argued that interviews, in general, are well suited for gathering rich empirical data in a highly episodic and infrequent situation (Eisenhardt & Graebner, 2007). It provides an in-depth understanding of the topic under investigation (Kothari, 2004) by taking advantage of interviewee's perspectives (Schostak, 2005). It involves the presentation and response to oral, verbal stimuli (Kothari, 2004). Interviews are useful "for



exploring the construction and negotiation of meaning in a natural setting”(Cohen, Manion, & Morrison, 2007, p. 29) in other words; it makes allowance for the participant’s social life (Kothari, 2004).

A good interview must have established value, guarantee trust and be void of ambiguity (Barbour & Schostak, 2005). The answer people provided to an interview question was dependent on how it was shaped (Hammersley & Gomm, 2008). Therefore, before the field trip to Kaikōura, a meeting was held among researchers to agree upon the intended value of the interview. A thorough re-evaluation of questions was also conducted to eliminate any ambiguity while ensuring that the questions were worded in the most culturally appropriate and effective manner.

Furthermore, Hammersley and Gomm (2008) note the importance of timing in an interview as it could influence the answers obtained. To account for the potential effects of timing on our interview, on getting to Kaikōura, the first step was to investigate how the Kaikōura locals spent their day-time hours. We discovered that people were more willing to speak with us an hour just before lunch or two hours after lunch. For most establishments in Kaikōura, lunch is between 12 pm and 1 pm. We also endeavored to keep the core interview sections under 30 minutes, and by doing so, we combated the issue of boredom raised by (Berg & Lune, 2014). To establish trust with potential participants, we cultivated an informal relationship with the locals of Kaikōura which eased the process of securing interview appointments. The data collection was approved by the University of Auckland Human Participants Ethics Committee (reference number **014782**)

Kaikōura is a town of approximately 3700 residence and over 700 businesses majority of which are in tourism, primary industries and retail businesses (StatsNZ, 2013). Of this population, 16 residents were interviewed; 8 owned and manage their business, 4 are full-time workers, three work as Full-time managers and one government official. The persons interviewed either worked or owned businesses in tourism, retail or in the logistics sector. Most of the individuals interviewed resided or worked within the SH1 or on West End Road in Kaikōura. The SH1 leads into Kaikōura town and was badly damaged by the 2016 earthquake while the west end road runs through the town centre. Due to time constraints, we were unable to secure an official





interview with people working in the primary industry. Privacy of the interviewees was ensured by replacing the names on the interview transcripts with codes K1-K16 in table 1.

Table 1

Kaikoura Interview respondents and codes	
Equipment Store owner	K1
Eatery owner	K2
Electronics store sales officer 1	K3
Electronic store sales officer 2	K4
Hospitality business owner	K5
Grocery store manager	K6
Motel owner and manager	K7
Auto Mechanic shop owner	K8
Owner of real estate firm	K9
Fish and chips store manager	K10
Sales and Marketing Manager	K11
Souvenir store owner	K12
Artist and Arts store owner	K13
Book store salesperson	K14
Art gallery store owner	K15
Manager at Kaikoura district office	K16

Additionally, Alshenqeeti (2014) suggested that interviews should be used in conjunction with other methods of data collection; for this reason, we adopted observation as another means of collecting data to complement the results obtained from interviews.

Observation becomes a scientific tool “when it serves a formulated research purpose, is systematically planned, recorded and it is subjected to checks and controls on the validity and reliability” (Kothari, 2004, p. 96). For this research, we adopted a structured participatory and uncontrolled observation method. According to (ibid), an observation is structured where



advanced thought was given on who or what to observe, method of recording data, standard conditions for observation and necessary data to be collected. It is participatory when the researcher attempts to integrate into the study sample, and uncontrolled when the study is carried out in the sample population's natural environment (Kothari, 2004).

Prior to conducting the research in Kaikōura, previous studies were carried out at Christchurch, Kaiapoi, and Lyttleton. This assisted us in structuring our mode of observation, who to observe, what information we hoped to gather and how it would be recorded. We adopted a participatory mode of observation where an attempt was made to develop rapport with residents of Kaikōura to learn how they earn a living currently and to ascertain if they made any changes after the 2016 earthquake. The focus was on business owners or managers, but we also interacted with the average individuals in the town. Each researcher made notes of their observation after which the group met to highlight common and unique trends. To compensate for the limited number of interviews conducted, we observed and interacted with 470 residences of Kaikōura which composed of 15 government workers and 455 individuals of different age bracket and varied works of life

Kothari (2004) highlighted that a participatory uncontrolled observation gives the researcher an opportunity to record the natural behaviours of a group while gathering more data than would be possible in a non-participatory type of observation. However, (ibid) noted that this approach to research could lead to a loss of objectivity on the part of the researcher; additionally, the interpretation of data could be subjective. To mitigate against errors resulting from the observation method, the observation data was collected as a team and outcomes had to be agreed upon by all team members. Data collected by team members through interviews and observation were analysed using NVivo 11 to identify common patterns. The findings were later validated by an informal session with disaster recovery experts. Finally, a case study was also adopted to highlight these findings.

## **2.1 Case selection**

An extreme method of case selection was adopted for this work as (Kothari, 2004) notes that this approach should be adopted for exploratory and open-ended probes. As stated earlier, this study aims to highlight the livelihood lessons learned by the locals of Kaikōura recovering





from the 2016 earthquake. Prior to the research in Kaikoura, previous studies were carried out at Christchurch, Kaiapoi, and Lyttleton. Kaikōura was selected for this case study because it was the latest earthquake disaster that has occurred in New Zealand in recent times. Furthermore, compared to other locations visited (Christchurch, Kaiapoi, and Lyttleton), Kaikoura is relatively isolated from the rest of New Zealand; a challenge that was worsened by the 2016 earthquake as all land access to the community was destroyed by the earthquake.

Case studies are empirical inquiries that investigate contemporary phenomena in an in-depth manner within the real-world context especially in situations where the boundaries between phenomenon and context seem blurry (Yin, 2014). It is a detailed description and evaluation of a bounded unit (Merriam, 1998). It mostly entails a careful observation of social units (Kothari, 2004) in some regards, it could be regarded as a social microscope (Odum & Jocher, 1929). It can be applied as part of larger explanatory information, a primary evaluation method or part of a dual-level evaluation arrangement (Yin, 2014).

Owing to the multiplicity of perspectives which could guide the design of case studies (Stake, 1995) its quality hinges on the situation coupled with the researcher's skill and expertise (Yin, 2014). It is composed of a study question, propositions, units of analysis, the linking data and criteria for interpreting the findings (Yin, 2014). Case studies provide an insight into a people's behaviour and motivations in response to tension (Cooley, 1928) while easing the process of studying societal changes (Kothari, 2004).

As stated earlier, case situations play an important role in the quality and ultimately the application of findings highlighted in a case study. Kothari (2004) highlighted that case situations are unique in every regard, as such, findings from one case study may not be applicable in other situations. Nonetheless, case studies seem appropriate for this study as it would assist in the detailed evaluation of livelihood lessons learned from the 2016 earthquake by the locals in Kaikōura who lived through the earthquake. While the situation in Kaikōura may not necessarily be the same for other disaster-prone communities, the highlighted lessons can be modified for use in other situations.



### 3.0 Case study



Figure 1 Aerial view of Kaikoura (Google, 2019)

The town of Kaikōura is located about 180 km north of Christchurch on the east coast of the South Island in New Zealand. It is resident to about 3700 individuals (StatsNZ, 2017) with median age and income of 45.6 years and 26,400 NZD per annum respectively with a literacy level of over 72% (income and literacy figures for residents 15years and above) (StatsNZ, 2013). The tourism and primary industries are the largest industries in Kaikōura (Stevenson et al., 2016); as these combined with the retail sector employ over 50% of the working population (StatsNZ, 2013).

On the 14<sup>th</sup> of November 2016 by 12:02 NZDT the town of Kaikōura was affected by an M7.8 earthquake with an epicentre 15km north-east of Culverden (MCDEM, 2017). The impact of the earthquake and ensuing aftershocks as well as tsunami destroyed transport infrastructure (road and rail), utilities (potable water and sewage, power, optic fibre) and buildings within



Kaikōura (Hatton, Kipp, Brown, & Seville, 2017; MCDEM, 2017; Woods et al., 2017). It also impacted negatively on the aquatic habitat of Kaikōura (Stevenson et al., 2016).

There are at least 746 businesses in Kaikōura (StatsNZ, 2013); it will be challenging to quantify the impacts of the earthquake on job losses or organisation productivity however, (Stevenson et al., 2016) noted that Kaikōura and environs have experienced loss of productivity and jobs (in spite of government interventions by paying the wages of the workers for a while after the disaster). This could be attributed to several factors that affected the three main industries in Kaikōura; chief of those factors is transportation disruption. Sequel to the earthquake, Kaikōura was isolated from the rest of New Zealand by land due to uplifts, rock, and landslides (Woods et al., 2017). As at the time of conducting this research (July 2018), transport remained a major obstacle for businesses as each time it rained, roads leading to Kaikōura are either partially or completely closed leaving travelers stranded.

Managers and business owners in the tourism industry saw increased cancellations on booking whenever rains were forecasted for the community as visitors are afraid of being stranded in Kaikōura. Businesses in the retail sector highlighted an increase in the freighting costs as well as a disruption in their supply chain due to road works. Similarly, Stevenson et al. (2016) illustrated the impact of transportation disruption on primary industries as businesses were unable to get their products to market promptly. It may take some time for farmlands and aquatic habitat to recover from the level of obliteration dealt on them by the 2016 earthquake. The issue of damaged utilities (portable and wastewater facilities) would affect the wellbeing of residents of Kaikōura; locals and sojourns alike. Additionally, the psychological impacts of the incident on the locals may affect organisational productivity as several locals are disturbed by loud noises which force them to re-live past horrors of the earthquake.

From the information provided by Kaikōura district council (New Zealand Government, 2018b). It will take up to the year 2020 for things to normalise (construction wise) in Kaikōura. However, while individuals wait for this to happen, operating costs for businesses may increase and without a commensurate increase in revenue, organisations may result to laying off staff which will ultimately affect the livelihood condition in the community; where the construction works are completed, the destruction of natural resources, as well as public image, may take



longer to recover. Irrespective of disaster impacts on industries, businesses and potentially livelihoods, the locals of Kaikōura highlighted a few livelihood lessons learned from the event; chief of which is the need to diversify individual livelihoods as well as the economy of Kaikōura (New Zealand Government, 2018b).

Business owners and government official interviewed collectively agreed on the need to diversify the economy of Kaikōura however their approaches differed slightly. Business owners are trying to diversify their operations to take advantage of the market created by current recovery works. This will protect their businesses as well as the livelihood of their staff in the short term but may not necessarily account for the long-term changes in the economy of Kaikōura. On the other hand, interviewed government staff are focused on developing diversification strategies that are capable of sustaining livelihood in the short term as well as protecting and improving the economy of the town in the long term. According to city council staff, they are working to develop a vision for Kaikōura which will assist in attracting and retaining needed talents and investments in a sustainable manner.

The 2016 earthquake also taught individuals and business owners the need to understand the terms of their insurance policy as this led to lots of misunderstanding between the insurer and their clients. These misunderstanding has created a negative perception of insurance which is not good for both the insurers as well as in mitigating the effects of future disasters in the town. Other lessons highlighted include the importance of physical and psychological preparedness for people living in disaster situations as well as the need to develop external networks that could assist businesses and individuals in protecting their interests in the outside world in the event of a disaster.

These relationships could help them to source and send items where they are handicapped to do so by disaster disruptions. Additionally, the earthquake highlighted the importance of cash and inventory management as well as self-efficacy to sustain and protect lives and livelihoods after a disaster. Finally, the importance of technology, innovation, and flexibility to strengthen existing livelihoods options while fostering the development of new ones after a disaster were also emphasised.



In all, the earthquake not only resulted in hardship and pain for the locals of Kaikōura town it taught them valuable lessons that would enhance their livelihood preparedness for future events.

#### **4 Results and Discussion**

Table 1 illustrates livelihood lessons highlighted by the people of Kaikōura recovering from the 2016 earthquake.

**TABLE LIVELIHOOD LESSONS FROM THE 2016 KAIKŌURA**

**1 EARTHQUAKE**

<b>1</b>	Physical wellbeing and psychological preparedness are essential to livelihood preparedness
<b>2</b>	Understanding insurance policies, as well as accessibility of affordable insurance, are critical.
<b>3</b>	Government support in the form of business subsidies to pay employees living wages is essential for livelihood recovery
<b>4</b>	Livelihood diversification plays a significant role in livelihood preparedness
<b>5</b>	Societal networks external to the local community are instrumental in assisting individuals and businesses in coping with disasters
<b>6</b>	Cash reserve and/or capital inventory creates self-efficacy which is essential to sustain livelihood.

Each lesson emanated from the analysis of answers provided to a set of questions in an interview or observation. These lessons will be discussed under five sub-heading below.

##### **4.1 Physical and Psychological preparedness as well as the affordability and enlightenment on insurance policies**

At the initial stages of every interview, we sort to know how the interviewee was coping with the recovery process. Depending on the answers provided, we probed further to ascertain how they have been combining the recovery process with trying to earn a living. Finally, we asked if they had taken any step to protect their livelihoods from future hazards. These sets of





questions emphasised the relevance of psychological preparedness and physical wellbeing for livelihood preparedness in disaster situations. Response from K13 and K5 highlighted below exemplified these findings

“each time I hear a loud noise, I am forced to re-live the feelings of the last earthquake” K13

“I try to exercise and eat healthy as much as possible” K5

It is important to note that this view was shared by other individuals within Kaikōura. Furthermore, the opinions shared by K13 and K5 respectively re-echoed the views of Reser and Morrissey (2009) that psychological preparedness played an essential role in emergencies as well as in coping with associated stress while reducing post-incident distress. People living in hazard-prone areas may require constant pre-disaster counseling to prepare their minds on how to resume their livelihood endeavors after a disaster. Regarding physical wellbeing, Salmon (2001) highlighted the role of physical exercising as a tool for limiting the harmful effects of stress. In all, physical exercise, eating healthy and psychological preparedness would assist in livelihood preparedness for people living in hazardous situations.

Additionally, when asked about risk transfer mechanisms like insurance taken prior to the last earthquake to mitigate against disaster impacts, the majority of the response held a negative view of insurance. This included individuals that received their insurance claims in full as K1 notes

“I had a full business interruption insurance, so the insurance provider came through with payment. However, had part of the store not been damaged, the insurance company might not have paid”

In K1's situation, apart from the damages to his store building, the tsunami-damaged some goods in the store as well. The earthquake also destroyed access to K1's place of business. From the interviewee's point of view, had the store building remained intact, the insurance claims might not have come through. This view was in contrast with what was portrayed in Hamish Davies and French (2015) as full business insurance should cover any restriction to business continuity caused by any unforeseen circumstance. Unfortunately, many other business owners shared similar views as K1. A significant number of people we interacted with





believed insurance companies either could not pay or were unwilling to do so. This calls for an increased education of the public on insurance policies and obligations which may assist in choosing policies that suit their needs while managing expectations with regards to claims after a disaster. It may also reduce the current negative perception surrounding insurance following the last earthquake.

Similarly, several individuals (notably K8, K12, and K13) stressed the high cost of insurance premiums after the disaster thereby rendering it inaccessible to those willing to purchase a policy. To counter this challenge, Linnerooth-Bayer and Mechler (2007) proposed a public-private partnership to provide insurance for people living in hazard-prone areas. This partnership will involve private insurance companies that will manage the insuring process as well as the governments, NGOs and other support organisations that will contribute funds to reduce the cost of insurance premiums. To some extent, this is already employed in New Zealand through the Earthquake Commission (EQC).

The EQC is a crown establishment aimed at efficiently managing the pricing of risk and the settlement of claims while educating the public on insurance (EQC, 2018). From the insurance complains raised in Kaikōura, perhaps there is the need to further optimize the risk pricing mechanism to reduce or subsidize the cost of insurance premiums especially for those recovering from disasters. On the other hand, (ICNZ, 2017) believes insurance costs will become more affordable when risk-reducing measures are put in place. Nonetheless, it remains to be seen how this can be applied to hazard-prone towns like Kaikōura and more specifically how risk reduction and transfer measures can be adapted to limit the impacts of disasters on livelihoods.

#### **4.2 Relevance of government support**

During our studies, we sort to ascertain how much help the people of Kaikōura received directly from the government with regards to their livelihoods; majority of the respondents praised the decision of government to support businesses by paying their staff for the first few weeks after the disaster thereby reducing the stress on livelihood caused by the disaster. A full-time staff of businesses within Kaikōura were paid 500 NZD per week while a part-time staff was paid 200 NZD per week. However, few part-time workers noted that the stipend they received was



not enough for their survival. A case of note was that of an individual that lived through the 2011 Christchurch earthquake which was just beginning to recover from the shock; the individual moved to Kaikōura to start anew just before the disaster and had to take up a part-time job for the short term. When the earthquake struck, the individual lost all for the second term and having to survive on 200 NZD was challenging. In all, the government played a key role in reducing the stress on livelihood from the 2016 earthquake in Kaikōura. However, there may be cause to re-evaluate stipends paid to part-time workers most especially those that are re-entering the workforce due to conditions that are beyond their control.

#### **4.3 Livelihood diversification for livelihood preparedness**

Individuals and council officials in Kaikōura emphasised the importance of livelihood diversification as a tool for livelihood preparedness. Prior to the earthquake some individuals already adopted a diverse livelihood strategy which eased their recovery. This was most evident in the answer provided by K5;

*“.. for the first few weeks after the disaster, business in our restaurant and holiday parking was quite slow. However, on the motel side, things remained profitable. ... my husband’s day job also helped. The diverse nature of our income stream aided our recovery process.”*

K5’s sentiments were also shared by K7 and K 8 both of whom adopted a diversified livelihood strategy before the disaster. More so, K2 and K13 hoped to utilize the opportunities created by the 2016 earthquake to diversify their livelihood endeavors to increase their short-term cash flow while creating an alternative means of livelihood that could mitigate the livelihood impacts of future disasters. In line with the views of (Newport, Möller, Newport, Godfrey, & Jawahar, 2016) on the role of technology for livelihood diversification, K12 plans to diversify her business using social media and other opportunities created by the internet. Consequently, a manager at Kaikōura city council stressed the importance of a vision and sustainability in the efforts to diversify livelihoods and ultimately the Kaikōura Economy.

*“... we must first decide if we are tourist community or a community of tourist...then find a way to diversify our economy in a manner that protects the environment, embodies our ideals and assists us in mitigating against the impacts of future disasters”.*



In all, livelihood diversification is both a hedging tool (Ning et al., 2014) and a means of adaptation (Motsholapheko, Kgathi, & Vanderpost, 2011); it may not guaranty an increased income in the long term but could prepare livelihoods for an unforeseen circumstance.

#### **4.4 Societal networks external to the local community are instrumental in assisting individuals and businesses in coping with disasters**

In consonant with numerous literature on disaster survival and recovery Aldrich and Meyer (2015), Kaikōura locals (K1-K16) echoed the importance of social relationships for survival and recovery from disasters. They noted that after the 2016 earthquake, community members assisted one another in any way possible. Nonetheless, business owners and managers emphasised the significance of external networks; other businesses or personal relationships in a different geographic location. This was depicted in the following response;

*“... we also had the right networks that looked out for us after the disaster. Our Networks assisted us in getting things to Kaikōura and looked out for our interest when we could not access the outside world” K6.*

Response from K6 represented the opinions of other business owners we contacted during the research. Additionally, most business owners or managers emphasised that for these relationships to deliver value immediately after a disaster, those connections need to be in place well in advance of any disruptive event. In all, external relationships are vital in disaster survivals and recovery more so for business owners and managers as external partners not affected by the disaster could protect the interests of incapacitated counterpart undergoing recovery.

#### **4.5 Cash and inventory management, as well as self-efficacy are vital to sustaining livelihood after a disaster**

Businesses recovering from the 2016 earthquake stressed the importance of cash and inventory management to ensure business continuity after a disaster. This was depicted in the response obtained from K1;

*“I had to properly manage my inventory and capacity to ensure that I was not cash trapped; I mostly sold my stocks and only replaced items in high demand.”*



While cash flow and supply chain interruption are established impacts of most disasters on businesses (Benyoucef & Forzley, 2007; Runyan, 2006) local businesses in Kaikōura re-echoed these phenomena and attempted to combat it by managing their cash and inventory accordingly. Some business owners (K11, K13, K15) re-invented their business strategy to take advantage of new opportunities created by the disaster while attempting to increase cash flow.

After the 2016 Kaikōura earthquake, our fieldwork indicated that a higher number of individuals living in Kaikōura increased efforts to implement risk-reducing measures. Actions are taken ranged from re-evaluating building foundation K13 to storing food, water, medicine and first aid items (K3, K4, K5, K14) as well as devising and pasting evacuations plans at strategic locations (K1, K2, K6, K7, K10, K16). In line with Paton, Anderson, Becker, and Petersen (2015) hypothesis on self-efficacy, a significant number of Kaikōura locals believed that an increased level of self-efficacy could mitigate the effects of future disasters. In contrast to the finding of (Morrison & Oladujoye, 2013) about CEOs, business owners, as well as government officials in Kaikōura, took self-efficacy more seriously compared to other members of the community. This may be attributed to either a potentially higher exposure to information on disasters or a greater sense of responsibility not just for themselves and their immediate family members but for their employees and clients. While the increased level of self-efficacy was recorded following the last earthquake, its true measure may lie in the future when the impacts of the last disaster have faded in people's minds.

## **5 Conclusion**

Disasters have almost always impacted negatively on people's livelihood – the very means of earning a living. This may be particularly true for those living in relatively isolated and hazard-prone areas. This work aimed to contribute to works on the livelihood of people living in hazard-prone areas by highlighting the livelihood lessons learned by the people of Kaikōura recovering from the 2016 M7.8 earthquake. The fieldwork was conducted by interviewing and observing individuals, business owners, and policymakers in Kaikōura that lived through the last disaster.

These individuals stressed the importance of physical and psychological preparedness in overcoming the impacts of disaster while continuing to earn a living. They also highlighted



issues surrounding insurance obligations as well as the increased cost of insurance premiums for people living in Kaikōura. Business owners and individuals in the community were relatively satisfied with government assistance at the recovery phase of the disaster but noted the need to re-evaluate government assistance rendered to people working part-time (prior to a disaster) due to conditions beyond their control. Stakeholders in Kaikōura collectively emphasised the need to diversify the economy of Kaikōura in line with their ideals as a people. Individuals but more so business owners and managers stressed the importance of establishing external relationships with entities in different geolocation as these relationships could prove valuable in surviving and recovering from disasters. After the last earthquake, self-efficacy increased within Kaikōura particularly among business owners and government officials. Businesses in Kaikōura learned the importance of cash and inventory management after the 2016 earthquake.

While the lessons learned may be unique to Kaikōura, other communities in New Zealand and other countries could adjust these lessons in a manner that suits their situation. This research adds to the increased call for physical and psychological wellbeing as well as self-efficacy most especially for individuals living in isolated hazard-prone areas. Additionally, for insurance to remain an effective risk transfer tool, an increased effort is required to educate individuals on insurance policies and obligations while ensuring the affordability of insurance premiums. The 2016 Kaikōura earthquake further illustrated the importance of government support in disaster recovery as it reduced the stresses associated with recovery endeavors.

Further research is required on ways to translate these lessons to action plans while ensuring that the documented lessons remain in the minds of residents of Kaikōura. In all, in applying the lessons learned from the 2016 earthquake, residents of Kaikōura have an opportunity to build back a better life and livelihood for present and future generations.



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Gerald is a Ph.D. candidate with the Department of Civil and Environmental Engineering at the University of Auckland. His main research interest is on livelihood preparedness for disasters. Gerald has a background in economics, engineering and business management. He is currently working with communities that have lived through disasters to formulate a framework for protecting individual livelihoods from disasters.



Alice is a Senior Lecturer with the Department of Civil and Environmental Engineering at the University of Auckland. Her main research interests include disaster risk reduction, climate change adaption, construction technology, construction automation, smart cities, and smart housing. Alice has a background in civil engineering and disaster risk reduction - extensive disaster field experience and knowledge in Indonesia, China, Australia, New Zealand, Japan, and the USA.



Suzanne is a Professor at the School of Built Environment at Massey University. Her main research interests are disaster resilience, disaster recovery, climate change and the role of the construction sector in disaster management. Before moved to Massey University, Suzanne was Professor at the University of Auckland where she founded the Centre for Disaster Resilience, Recovery and Reconstruction and established the Masters Programme in Disaster Management.

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