

## **Sustainable Post-Disaster Recovery Plan for Flood Victims in Gua Musang and Kuala Krai, Kelantan**

**Rohani Mohd<sup>1\*</sup>, Nordin Abu Bakar<sup>2</sup>, Salwana Hassan<sup>1</sup> and Afifuddin Husairi Hussain<sup>3</sup>**

<sup>1</sup>*Faculty of Business and Management, Universiti Teknologi MARA, 42300 Puncak Alam, Selangor, Malaysia*

<sup>2</sup>*Faculty of Computer Science, Universiti Teknologi MARA, 40450 Shah Alam, Selangor, Malaysia*

<sup>3</sup>*Faculty of Engineering, Universiti Teknologi Malaysia, 81310 Johor Bahru, Johor, Malaysia*

### **ABSTRACT**

The massive flood in Kelantan in 2014 had a devastating effect on the rural community in particular, their quality of life. In order to assist the community recover from the disaster quickly and effectively, a comprehensive relief plan is vital. This recovery plan would also benefit the local authority as well as government agencies. This article discusses a framework that has been developed for sustainable post-disaster recovery plan through income generating activities.

*Keywords:* Economic recovery plan, flood victims, income generating activities, socio-economic well-being

### **INTRODUCTION**

The massive flood in Kelantan in 2014 was had severely affected the quality of life of the rural community. It is important to analyse and evaluate their losses to come up with a long term and effective relief plan.

The aid provided by relief organisations may only be useful for short period. Therefore, the purpose of this research is to develop a framework for an economic recovery plan through income generating activities. The research questions are: (1) What is the quality of life of the flood victims?; and 2) How does a socio-economic recovery plan can best be executed?.

Earlier studies have focused on short term recovery plan by government and non-profit organisations. This study offers a framework for long term recovery plan which includes the relevant economic activities.

#### **ARTICLE INFO**

##### *Article history:*

Received: 15 September 2016

Accepted: 30 December 2016

##### *E-mail addresses:*

Rohani191@salam.uitm.edu.my (Rohani Mohd),

dmordin@salam.uitm.my (Nordin Abu Bakar),

salwana@salam.uitm.edu.my (Salwana Hassan),

afifuddinhusairi@gmail.com (Afifuddin Husairi)

\* Corresponding author

## LITERATURE REVIEW

There are two categories of studies on this topic: 1) The type of disasters and its impact on the quality of life of the victims; 2) The recovery strategies which can be further divided into temporary strategies, sustainable livelihood strategies and success strategies. This study has focused on a long-term disaster recovery plan.

Lindell (2013) defines disaster recovery as per below:

First, it is a goal that involves the restoration of normal community activities that were disrupted by disaster impacts – in most people’s minds, exactly as they were before the disaster struck. Second, it is a phase in the emergency management cycle that begins with stabilization of the disaster conditions (the end of the emergency response phase) and ends when the community has returned to its normal routines. Third, it is a process by which the community achieves the goal of returning to normal routines. The recovery process involves both activities that were planned before disaster impact and those that were improvised after disaster impact. (p. 812)

Based on the above, recovery plan can be described as a process of managing and stabilising the disaster situation. Literature has suggested that disaster recovery plans consists of few phases starting with the

emergency management although there has been little agreement on the number and definitions of recovery stages (Alexander, 1993; Kates & Pijawka, 1977; Sullivan, 2003; UNDRO, 1984; Schwab, Topping, Eadie, Deyle & Smith, 1998). It is now generally accepted that disaster recovery plan encompasses an array of activities, some implemented sequentially and others implemented simultaneously.

At any one time, some households and businesses may be engaged in one set of recovery activities while others are engaged in other recovery activities. Indeed, some households and businesses may be fully recovered months or years after others and there might be others that never recover at all. For this reason, Lindell (2013) classified disaster recovery into four functions/process: disaster assessment, short-term recovery, long-term reconstruction, and recovery management. Lindell believed that the recovery phase’s disaster assessment should be integrated with the emergency assessment function in identifying the physical impacts of the disaster. This is because the emergency response phase’s assessment function is part of the recovery phase’s disaster assessment which is short term in nature. Short-term recovery focuses on the immediate tasks of securing the impact area, housing victims, and establishing conditions under which households and businesses can begin the process of recovery. Long-term reconstruction relates to rebuilding of the disaster impact area and manages the disaster’s psychological, demographic,

economic, and political impacts. Finally, recovery management monitors disaster assessment, short-term recovery, and long-term reconstruction functions. It also ensures they are coordinated and provides the resources needed to accomplish them. This paper focuses on the assessment of the need-aid provided and reconstruction of the disaster economic impacts. The following is findings of literature on economic recovery.

If a disaster stricken community does not have assets, they can invest in four fundamental components of economic development – locality development, business development, human resources development, and community development. Locality development enhances a community's existing physical assets by improving roads or establishing parks and lakefronts. Business development involves efforts to retain existing businesses or attract new ones. Although it is not easy, this can be accomplished by working with businesses to identify their critical needs. In some cases, this might involve establishing a business incubator that allows start-up companies to obtain low cost space and share meetings rooms. Human resources development aims at expanding skilled workforce, possibly through customised worker training. Finally, community development utilises NGOs, CBOs, and local firms that will hire current residents of the community whose household incomes are below the poverty level. For example, a comprehensive programme for developing small businesses, affordable housing, community health clinics, and inexpensive child care can help to eliminate

some of what new businesses might consider to be one of the risks of relocating.

## **RESEARCH METHODOLOGY**

This research is qualitative in nature, assessing the needs and aid provided. Data was collected from 180 flood victims, 150 from Kuala Krai and 30 from Gua Musang, using convenient sampling methods.

The victims were asked 17 questions on their perception of the types of aid that were impactful and still needed after the flood. Rasch analysis was employed because the different levels of perceptions on the impact of aid provided can be plotted to determine which aid was more impactful. The normal inferential statistical test used for analysing effectiveness of a programme or aid were independent t-test, where the means of quality of life before and after the aid were identified and compared. However, since the samples were conveniently selected, it fails to meet certain assumptions. This limitation was resolved using Rasch analysis as normality is never an issue because it simulates at least 100 datasets using the measures estimated from data. The distributions of the crucial statistics in the 100 datasets can be retrieved. In addition, it employs the properties of test items which enabled the placing of respondents and test items on a common scale. Thus, a comparison can be made between respondents and items (questions) before and after the provision of aid.

Apart from needs assessment, analysis on the Strength Weaknesses Opportunity and Threat (SWOT) of the place was also

conducted to develop relevant economic recovery coping strategies.

**DATA ANALYSIS AND RESULTS**

Since the purpose of this paper is to provide a comprehensive recovery plan for flood victims, two questions needed to be answered: a) What type of aid the flood victims require from the Malaysian government and NGOs b) how to improve the quality of life of flood victims in the short

term? There are two stages of data analysis. The first stage involves ascertaining quality of data (see Table 1) while the second stage is data analysis.

**The First Phase of Analysis: Reliability Item and Person Test**

The first phase of analysis was conducted mainly to determine the quality of data. This involved the test of item and person reliability and uni-dimensionality test.

Table 1  
*The summary statistics of data for Kuala Krai and Gua Musang*

	Kuala Krai		Gua Musang	
	Person	Item	Person	Item
Reliability	0.83	0.97	0.84	0.75
Separation	2.19	5.42	0.27	1.75
Mean	0.35	0.00	0.28	0.00
Standard Deviation	0.26	0.46	0.33	0.26
Max	1.29	1.32	0.89	0.37
Min	-0.32	-0.67	-0.20	-0.73
Standard Error		0.20		0.06
Cronbach $\alpha$		0.99		0.86

Table 1 shows the summary statistics for data gathered in Kuala Krai and Gua Musang. For both places, person reliability score was above 0.8 indicating that there were enough items to measure different levels of a person’s ability (perceptions). The item reliability score for two places were above 0.7 indicating there were enough persons (respondents) to measure the different levels of item difficulty (impact). The item reliability score for Kuala Krai was

higher which indicate a good sample size. The Cronbach Alpha score for both places were more than .8 indicating high inter item consistency. In addition, the small value of standard error indicates precision of data.

**Unidimensionality Test**

For this test, Rasch analysis applies the principal component analysis (PCA) of the residuals; i.e. how much variance is the instrument in measuring the items. The raw

variance explained by measure was 40.3%. It met the unidimensionality requirement of 40% (Conrad, Conrad, Dennis, Riley, & Funk, 2011).

Nevertheless, the unexplained variance in the first contrast of 9% as tabulated in Table 3 showed that the instrument was considered to be very good (Bond & Fox, 2015). This indicated that the 17 item-instrument used for the study met

the unidimensionality trait and was able to measure what it intended to measure (effectiveness of the aid). It also indicated that data for all 17 items had a very good fit to the Rasch Measurement Model. Thus, it can be concluded this were good quality data based on the test scores of reliability and unidimensionality (within acceptable range).

Table 2  
*The determination of unidimensionality of the items*

	Empirical	Modelled
Total raw variance in observations	62.0 (100%)	100.0%
Raw variance explained by measures	21.0 (40.3%)	40.0%
Unexplained variance in 1st contrast	6.1 (9.9%)	14.9%

**Second Phase of Analysis: Rasch Ruler**

In order to answer the first research question, the needs-aid assessment was conducted, so that area of improvement can be identified and strategies can be developed. For this reason, the main output of Rasch analysis i.e., a ruler measuring the need-aids impact level, was produced. Figure 1 shows the impact of each aid provided to the victims and its importance. The ruler is meant to identify the importance of each aid provided and its impact on the victim’s quality of life. The need-aid analysis shown in Figure 1 was summarised in Table 3. This is to show a miss-match between what was needed with what was provided.

With reference to Figure 1, a ruler divides persons and items side by side. On

the left side, the persons (respondents) refers to the symbol of #, while items (needs and aid) were placed on the right side. Items located above persons (#) were those they found to be disagreeable. The higher the item located against person(s), the higher the disagreement. On the opposite, items located below # were agreed or accepted by persons (respondents). Therefore, the lower the items located below #, the higher the level of agreement or acceptance. Items located at par with # indicating the decision was indecisive. The B4 refers to the respondents’ need for the aid, while B2 refers to the type of aid provided to them. The B3 refers to the victims’ perception on the impact of each aid. The interpretation of the results is tabulated in Table 3.

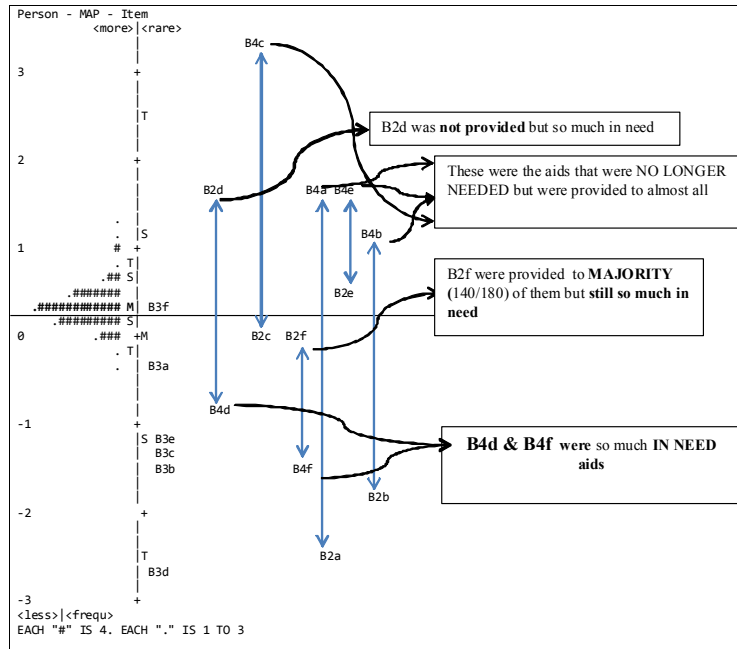


Figure 1. Person item map (a ruler of effective distribution of aids)

Table 3  
Item/need-aids analysis: Types of aids provided, its impact and its degree of importance

Types of aids	Impact perceived	Degree of importance	The coverage of aid provided
<i>a</i> refers to basic needs & <i>f</i> refers to financial aids	Perceived short term impact	<i>a</i> was Not more needed but <i>f</i> is still needed	Given to all
<i>e</i> refers to school aids, <i>c</i> refers to temporary homes <i>b</i> refers to kitchen utensils and stove	Perceived moderate impact	not more needed	<i>b</i> was given to all but <i>c</i> & <i>e</i> to some of them depending on their requirement
<i>d</i> refers to permanent home	Perceived long term impact	So much in need	Was not given to all of them

**DISCUSSION AND IMPLICATION**

From the need-aid analysis shown in Table 3, their quality of life was perceived to be improved temporarily mainly due to educational aid, temporary housing, and provision of kitchen utensils. These items

were perceived as having a moderate impact, and were provided to all but they were no longer needed. Thus, these items were important and effective but they were poorly allocated and distributed, thus requiring a good coordination between the

head of villagers who monitor the villagers and the agencies that were involved in providing and distributing the aid.

Item *f* refers to financial aid and it will always be perceived as important though it was less effective because it was used unwisely to satisfy their short term needs. This aid was much needed after the disaster to help the victims to start a new life. Since the impact of this aid is short term in nature, the government should provide financial aids with some conditions so they create a long term impact. For this reason, the money should be provided for a small start-up business. To whom and how much the aid is to be provided should depend on types of available resources (their skills, knowledge and property).

In general, the aid provided is considered effective as it improved the quality of life all victims post disaster. For educational aid and temporary housing, the aid was given to those who suffered total loss. These types of assistance were given only to some families who have: 1) no school going children; 2) homes which were still in good condition (not badly damaged).

However, the distribution of aid is not efficient. From the observation and interview, more aid was given some families due to poor system of distribution (no coordination). Kitchen utensils for example were distributed randomly with no supervision. Because of poor coordination, a family received more than what they needed. Thus, it is important to identify the number of families in a village, and the list of names together with the names

of the family head should be given to the distributor and coordinator.

The SWOT and TOWs analysis were conducted to identify types of sustainable business activities that could generate income within a short period. The below attempts to answer the following research question:

**RQ: How can the quality of life of flood victims be improved?**

Previous studies (DFID, 1999; Twigg, 2001) suggested few strategies to improve quality of life of disaster victims such as impact minimising strategies and sustainable livelihood framework. The sustainable livelihood (SL) approach appeared to be the most useful among the options for disaster risk reduction. The SL approach centres on ways of understanding the practical realities and priorities of poor men and women – what they actually do to make a living, the assets that they are able to draw on and the problems that they face in doing this and various strategies they employ to recover or keep themselves away from shocks and stresses (Farrington, Ramasut & Walker, 2002). The success of strategies employed by households manifested in more income, reduction in vulnerability, improved food security and sustainable use of resources. However, the impact is short term in nature. Research in the past discussed more on how to cope with the disaster rather than how to improve quality of life after the disaster in the long run. Thus, the strategies are more on the technical aspects of improving food security, and



Table 4  
*SWOT Analysis for a proposed closely-monitored business*

Strength	Weakness
<ul style="list-style-type: none"> <li>• Strategic location – Gua Musang is located between Kota Bharu and Kuala Lumpur</li> <li>• There is only one R&amp;R for travellers to stop and rest in GM. Therefore, it is the best place for travellers to stop and rest.</li> <li>• It has natural attractions and is rich with historical values.</li> </ul>	<ul style="list-style-type: none"> <li>• Majority of the victims are considered poor even before the flood.</li> <li>• There are victims who expect donations even after a year has passed since the disaster.</li> <li>• Majority of these victims are still depending on external fund/aids (i.e.: no house and depend on the aid provided at PLKN camp)</li> <li>• They have no capital to start a business</li> <li>• They have no idea where and how to start a business</li> </ul>
Opportunity	Threat
<ul style="list-style-type: none"> <li>• There is a new housing development in the town of Gua Musang which may accommodate about 100 families. This can be a target market for any business, especially food stall, car workshops, restaurant, cleaner (monthly, weekly or daily services),</li> <li>• Based on the strategic location of Gua Musang, the business opportunity is not restricted to locals, but also toe travellers.</li> <li>• With the natural beauty and the historical values, Gua Musang has the potential to be commercialised</li> </ul>	<ul style="list-style-type: none"> <li>• The place may be exposed to flood if there is no step taken to solve the problem of illegal logging</li> <li>• Illegal immigrants are more hard working and opportunist</li> <li>• The victims have no direction to start a new life</li> <li>• They don't foresee any business opportunity</li> <li>• Poor attitude of the locals. Always expect aid without putting any effort to improve.</li> <li>• No entrepreneurial orientation</li> </ul>
Weakness / threat	Strategy
<ul style="list-style-type: none"> <li>• Majority of the victims are considered poor.</li> <li>• There are victims who have no idea how to survive.</li> <li>• No direction to start new life</li> <li>• Poor attitude. Always expect aid without putting any effort to improve</li> <li>• These victims depend on external fund/aids (i.e.: no house and depend on the aids at PLKN camp)</li> <li>• Many illegal immigrants.</li> <li>• The illegal and poor system of logging, exposed to flooding</li> </ul>	<p>Inspirational Strategy</p> <ul style="list-style-type: none"> <li>• Providing them awareness to start a business</li> <li>• Expose them to business opportunities by sharing ideas from those who are successful in business after the training provided by government agencies such as KESEDAR, MARA, TEKUN and TERAJU or AIMS</li> </ul> <p>Transformational Strategy</p> <ul style="list-style-type: none"> <li>• To provide a place for the victims to start their business</li> <li>• To provide business training</li> <li>• To provide capital to start a business</li> <li>• Introducing an umbrella business so that those with negative attitude would have no opportunity to resell what has already been provided to them for a business start-up.</li> </ul>



sustainable use of resources. These are also done by Malaysian government and NGOs to improve their quality life. However, the analyses show the impact to be low and short term.

Thus, the plan involves getting them to venture into small businesses. However, in order to know the type of business and where the business should be located, the SWOT and TOWS analysis were conducted. Below is the SWOT and TOWS analysis.

**RECOMMENDATION: STRATEGIC RECOVERY PLAN**

Based on these analyses, an *umbrella business concept* is proposed based on the SWOT analysis taking into consideration

the negative attitudes of the villagers, the commitment required to run the businesses and the coordination activity. This is called an umbrella business because of its protective nature: protecting the villagers from business failure and protecting the fund provider from lazy attitude of the villagers.

Gua Musang is known for its strategic location along the main road that connects Kota Bharu and Kuala Lumpur and thus its commercial opportunities are good. The new housing areas in the town is also good market opportunity.

As shown in Figure 2, the type of business can be gauged from community interest during the first meeting with them at the first Phase (*inspirational strategy*).

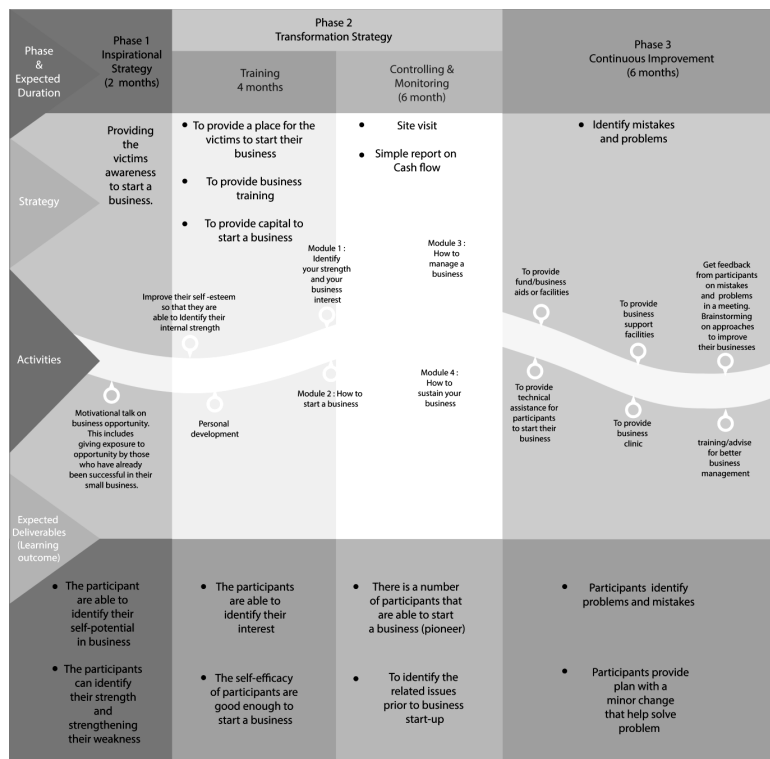


Figure 2. A framework for economic recovery plan through income generating activities

A business with the start-up capital of between RM2000 to RM4000 depending on type of business (following the scale of loans provided by Amanah Ikhtiar Malaysia (AIM)) would have the potential to be approved. In phase 2, those selected will be trained accordingly by a specially appointed tasks team (from government agencies such KESEDAR and MARA and NGOs). In the third phase, problems and solutions are identified.

### **The Umbrella Business Concept**

All micro businesses will be registered under Gua Musang/Kuala Krai Cooperation and Each family members of the cooperation. They must manage a micro business funded by the Malaysian government and NGOs. Deserving families are identified through an interview after an inspirational program. The business will be monitored by special task teams from government agencies such as KESEDAR, TERAJU, PUNB and MARA.

### **CONCLUSION**

The victims came from poor socio-economic backgrounds and the disaster had worsened their quality of life even worst. Therefore, these victims needed assistance to rebuild their lives. Though they depended on government for their shelter and basic needs, it did not improve their lot and thus, a good strategic planning is vital to ensure their quick recovery. Hence, this study proposed a framework to develop their internal capabilities and ensure their survival.

Long term reconstruction plan is vital to achieve this goal namely via business and community development activity.

Therefore, needs assessments of the victims was conducted while SWOT analysis helped identify the nature of business suitable to be initiated and developed. The analysis aid in planning for recovery before disaster strikes and thus, resources can be allocated more effectively and efficiently, increasing the probability of a rapid and full recovery. This framework would also help the local authority as well as the government agencies to execute their disaster recovery plan effectively.

### **ACKNOWLEDGEMENT**

The authors are grateful to Ministry of Education for their research grant that enabled this study to be undertaken. They acknowledge the assistance rendered by camp officers and JKK who provided them with useful information. Last but not least, the authors also record their appreciation to the Research Management Institute and the Business and Management faculty for their assistance.

### **REFERENCE**

- Alexander, D. (1993). *Natural Disasters*. New York: Chapman and Hall.
- Bolin, R., and Trainer, P. A., (1978), Modes of family recovery following disaster: a cross-national study. In Quarantelli, E. L. (ed.), *Disasters: Theory and Research*. Beverly Hills, CA: Sage, pp. 233–247.
- Bond, T., & Fox, C. M. (2015). *Applying the Rasch model: Fundamental measurement in the human sciences*. Routledge.

- Conrad, K. J., Conrad, K. M., Dennis, M. L., Riley, B. B., & Funk, R. (2011). Validation of the Crime and Violence Scale (CVS) to the Rasch Measurement Model, *GAIN Methods Report*, 1(2) Chicago, IL.
- Department for International Development, U. K. (1999). Sustainable livelihoods guidance sheets. *London: DFID*.
- Farrington, J., T. Ramasut and J. Walker. (2002). Sustainable livelihoods approaches in urban areas: general lessons, with illustrations from Indian examples. *ODI working paper*, 162. London: ODI.
- Kates, R. W., and Pijawka, D. (1977). From rubble to monument: the pace of reconstruction, In Haas, J. E., Kates, R. W., and Bowden, M. J. (eds.), *Reconstruction Following Disaster*. Cambridge, MA: MIT Press, pp. 1–23.
- Lindell, M. K. (2013). Recovery and reconstruction after disaster, *Encyclopedia of Natural Hazards*, Bobrowsky, P.T. (Ed.).
- Morrow, B. H. (1997). Stretching the bonds: the families of Andrew. In Peacock, W. G., Morrow, B. H., and Gladwin, H. (eds.), *Hurricane Andrew: Ethnicity, Gender and the Sociology of Disaster*. London: Routledge, pp. 141–170.
- Schwab, J., Topping, K. C., Eadie, C. C., Deyle, R. E., and Smith, R. A. (1998). Planning for Post-disaster Recovery and Reconstruction, *PAS Report 483/484*. Chicago, IL: American Planning Association.
- Sullivan, M. (2003). Integrated emergency management: a new way of looking at a delicate process, *Australian Journal of Emergency Management*, 18, 4–27.
- UNDRO-United Nations Disaster Relief Organization. (1984). *Disaster Prevention and Mitigation: A Compendium of Current Knowledge*. 11, Preparedness Aspects. Geneva: Office of the United Nations Disaster Relief Coordinator.
- Twigg, J. (2001). *Sustainable Livelihoods and Vulnerability to Disasters*, London: Benfield Greig Hazard Research Centre.

