

**Resilient Organisations Research Report – 2008/02**

# **SUMMARY OF LEARNINGS FROM THE 4TH INTERNATIONAL i-REC CONFERENCE**

*'Building Resilience - Achieving effective post-disaster reconstruction'*

*Christchurch, New Zealand.*

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## **Resilient Organisations**

The Resilient Organisations Research Programme ([www.resorgs.org.nz](http://www.resorgs.org.nz)) aims to improve the resilience of New Zealand organisations to major hazard events. Organisations manage, maintain and operate our infrastructure, create our economy and contribute to our society. The ability of organisations to respond effectively following a hazard event will have a large influence on the length of time that essential services are unavailable, and ultimately how well our communities cope with major disaster.

Particular aspects of organisational response and recovery focused on by the research team include: how organisations plan for hazard events, their ability to direct resources effectively during crises, and the challenges presented by a post-disaster reconstruction effort.

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## **Acknowledgements**

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We would also like to thank our three Cornerstone Sponsors for the conference, AMI, EQC and Building Research. Through their sponsorship we were able to keep registration fees low for the conference, to offer discount registration fees for students and attendees from developing countries, and to sponsor attendance at the conference for one delegate who otherwise would not have been able to attend. We are also grateful to CIB, who supported the conference by advertising it to all of their members.

Most of all we would like to express our thanks to all of the attendees and presenters at the conference who made it such a success. In this brief report we have provided just a snapshot of some of the topics that were discussed at the conference, for a more complete summary of the results we encourage readers to take a look at the presentations and papers available on-line at [http://www.resorgs.org.nz/irec2008/i-rec2008\\_papers.shtml](http://www.resorgs.org.nz/irec2008/i-rec2008_papers.shtml).

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# 1. INTRODUCTION

In April 2008, the Resilient Organisations Research Programme hosted the 4<sup>th</sup> International i-Rec conference on post-disaster reconstruction in Christchurch, New Zealand. Papers presented at the Conference were wide-ranging, covering a number of topical issues for post-disaster reconstruction from around the world. Copies of papers and presentations given at the conference can be found at: [http://www.resorgs.org.nz/irec2008/i-rec2008\\_papers.shtml](http://www.resorgs.org.nz/irec2008/i-rec2008_papers.shtml)

This report provides a high level summary of some of the learning's that emerged during the conference, and the lessons that may be taken from the experience of those who work at the forefront of post-disaster recovery and reconstruction efforts, as well as those who have researched relevant post-disaster reconstruction issues.

Key themes discussed in this report include:

1. The importance of proactive planning for post-disaster reconstruction and recovery;
2. focusing on 'Building Back Better' and community recovery;
3. enablers and barriers for reconstruction programmes; and
4. reducing vulnerability through better design.

## 2. MAIN THEMES AND LEARNINGS

### 2.1 The Importance of Pro-active Planning for Post-disaster Reconstruction and Recovery

The need for an overarching recovery framework to help coordinated post-disaster reconstruction was emphasised throughout the conference. This includes the development of comprehensive pre-event plans; scoping and pre-assessing the magnitude of the emergency before arriving in remote locations; using a structured approach for contractors to develop effective emergency preparedness and Disaster Response Plans; pre-planning for recovery to reduce the level of impact of a hazard event; improving recovery processes and planning for sustainability; considering waterfront areas as risk-prone areas and developing guidelines for post-disaster waterfront planning to mitigate future economic and other impacts. Some examples of papers presented at the conference that focused on the need for prior planning to support an effective recovery and reconstruction effort are included in the boxed text below.

**Middleton:** Research clearly shows that long term planning is crucial for acquiring reliable solutions to post disaster housing. In the aftermath of the disaster (first 6 months), the community is ready for new challenges. As time passes (one year or beyond) it becomes relatively more difficult to find solutions and get results.

**Bosher, Dainty, Carrillo, Glass and Price:** Taking more responsibility for the causes of disasters involves establishing a resilient built environment that is designed, located, built, operated and maintained in a way that maximises the ability of built assets, associated support systems (physical and institutional) and the people that reside or work within the built assets, to withstand, recover from, and mitigate for, the impacts of extreme natural and human-induced hazards.

**Becker, Saunders, Hopkins and Wright:** Pre-event recovery planning for land-use can assist in sustainable recovery because it allows sustainable concepts to be thought through before an event occurs. Provision can then be made to implement those ideas either before an event (reduction / readiness) or post-event (recovery). Pre-planning for recovery involves short and long-term aspects that should involve improved participatory emergency management and land-use planning processes prior to a disaster event.

**Kestle and Potangaroa:** Experience suggests that using a project planning framework and a design management model is effective in facilitating the understanding of issues related to post-disaster reconstruction efforts. Agreeing rehabilitation objectives (through effective facilitation) and effective coordination of (short, medium and long-term action plans) are key.

**Lodi:** Project-specific emergency preparedness plans are required to facilitate contractors' effectiveness during emergencies.

**Johnston, Dolan, Saunders and Glavovic:** The role of effective project management is critical in a post-disaster environment. Issues, such as what to do with debris in the aftermath of a disaster can and should be considered in advance. An inefficient or poorly planned response can impose significant additional social, economic and environmental burden on an already impacted community.

## 2.2 Focusing on ‘Building Back Better’ and Community Recovery

The concept of ‘building back better’ was another common theme addressed regularly throughout the conference. Consideration was given to the processes involved in consultation with affected communities to facilitate a more comprehensive approach to physical, economic and social reconstruction and recovery. Other related issues included modelling as an appropriate way to assess the effects of damage caused by natural disasters; and the use of urban change models to facilitate planned approaches that consider the likely responses of communities affected by disasters.

**Potangaroa and Ghosh:** The use of surveys to collect information related to health, livelihoods, demographics, assets, food security, nutritional status and education (and many others) has been used to inform the “Build Back Better” approach. It also highlights the need for recovery organisations to plan their efforts with holistic goals in mind, taking the specific needs of different communities and livelihood into consideration.

**Giovinnazzi and Giovinnazzi:** Significant opportunities exist for transforming risk-prone areas, such as waterfront developments, but further research is needed into best-practices and guidelines for the pre-disaster planning of risk-prone areas and for their resilient reconstruction in the occurrence of a hazardous event.

**Middleton:** An overall organisational arrangement is needed to plan, implement and marshal available resources locally, regionally, nationally and internationally. During the first 72 hours, 60 days and the first 12 months, politicians and/or local governments play an important role in the recovery and reconstruction process. The physical and social reconstruction of the affected region can be accelerated if short and long term targets are clearly defined and the resources are adjusted accordingly. Local government needs to play a pivotal role in accelerating collaborative recovery projects with NGO’s.

**Feng, Russell and Potangaroa:** Shelter programs using a “core” house approach need to understand the future expectations and plans of beneficiaries for how they might modify their ‘house’ to make it a ‘home’.

**Margetts and Barnett:** Resilience of settlements is not a function of architecture or layout, but is embodied in the landscape systems to which the settlements are connected. These observations may be useful in addressing future approaches to recovery and reconstruction.

**Hewitt, Potangaroa & Wilkinson:** Within the built environment, change universally occurs within clearly defined levels. These levels will parallel a given environment's hierarchy of control, presenting a real and observable structure within which change occurs predictably.

**Neyazi:** Simple abstracted figures can be used to show the morphology and structure of spaces in each stage of transformation and to propose an initiative for future neighbourhoods. Culture is reflected in the morphology of spaces in dwellings, the open spaces and the networks between them.

## 2.3 Enablers and Barriers for Reconstruction Programmes

The third key theme to emerge from the conference was the influence of enablers and barriers for reconstruction programmes. Potential obstacles and delays that may be caused by legislative constraints were highlighted, together with:

- the need to simplify and / or use special legislative provisions to facilitate smooth and effective reconstruction and recovery;
- the role of legislation in designing and implementing NGO and community based solutions for post-disaster housing;
- habitability of homes after a disaster and relocation to / use of alternative, temporary housing during reconstruction.

A number of issues relating to the role of long term planning to achieve appropriate solutions to post-disaster housing were highlighted; these included:

- the role of legislation in designing and implementing NGO and community based solutions for post-disaster housing;
- the importance of more detailed pre-disaster housing recovery planning, informed by better assessments (including Social Impact Assessments);
- the environmental sustainability of permanent housing constructed in post-disaster areas;
- the need for flexibility and a diversified strategy for the procurement of construction materials;
- prefabrication as a reasonable approach to enhancing the participation of affected communities and the establishment of small prefabrication enterprises as part of a community-based resilience policy.

**Rotimi, Wilkinson and Myburgh:** The process of post-disaster reconstruction may be negatively impacted if interpretation and implementation of legislative provisions does not permit flexibility. There may be several implications for smooth reconstruction and recovery, including:

- (1) a loss of vital momentum of action,
- (2) a loss of commitment to the reconstruction process,
- (3) difficulties in achieving reconstruction deliverables and
- (4) impairment of overall community recovery and quality of life.

**Middleton:** In the event of a major disaster, insurers need to factor into their planning the huge demand on public housing, vacant houses and caravans (including owner-occupied tents and caravans for temporary accommodation as well as additional portacabins and caravans, etc., sourced from overseas). Following a large-scale disaster, there will be a huge focus on supporting residents in place (if possible) while getting homes back to a habitable condition, to the satisfaction of building inspectors as soon as possible. Compensation for temporary accommodation expenses in excess of those provided by insurance companies and temporary repairs to uninsured properties needs to be given priority attention.

**Easthope:** The 2007 floods in the UK presented a major challenge for providing alternative “temporary” accommodation (mainly caravans) for displaced communities. Getting displaced communities back into their own homes or permanent accommodation remains a challenge one-year later; this involved a huge cost to the community and insurers. Psycho-social elements of recovery are hugely important; there is a need to:

- manage expectations, and
- involve affected communities and communicate effectively.

**Giovinazzi, Ferreira, Dantas and Seville:** Technology can play a key role in emergency management, supporting decision making through the use of databases, satellite images, geospatial data, pre-designed GIS applications, scenarios, simulations and Decision Support Systems.

**Lizarralde, Davidson and Johnson:** Research related to the use of potential prefabrication in the post-disaster reconstruction process has highlighted that:

- (1) prefabrication ‘normally’ involves up-front investment in technical innovation, accompanied by organisational design, and it benefits from a relatively stable market environment,



- (2) reconstruction 'normally' does not benefit from the full potential of local actors to participate in rebuilding their homes,
- (3) grass-roots, low-tech and decentralised prefabrication provides the survivors with a tool to enhance their participation, and
- (4) encouraging the establishment of small prefabrication enterprises should be part of a community-based resilience policy.

**McIntosh and Fraser:** In the aftermath of Hurricane Katrina, short-term recovery efforts were challenged by:

- (1) capacity of the construction sector,
- (2) availability of funding, and
- (3) providing an adequate supply of housing for those displaced.

High demand for construction materials inflated prices leaving many home owners with a gap between insurance payouts and the cost of repairs. The situation worsened further for those under or un-insured. It is important to consider the entire package of disaster recovery solutions (initial capital, interim housing costs, e.g. temporary trailers and broader benefits such as life cycle costs of maintenance) when costing alternative solutions.

## 2.4 Reducing Vulnerability through Better Design

Ways of reducing vulnerability through better design focus on the fundamental principle for safety in the built environment and ensuring that the occupants in a building are safe during emergency events as well as during normal conditions.

The mitigation of the impacts of emergency events and disasters on people and the environment requires a collaborative process and is not limited to response or recovery activities. Resilient approaches to reinstating flood-damaged areas using planned and timely information and financial assistance were highlighted; a recurring theme revolved around the issues of managing the expectations of displaced communities and pro-active planning of the logistics (for both short- and longer-term accommodation).

**McIntosh:** Leadership in post-disaster recovery building innovation may need to come from government rather than the market because the market is driven by capital and will only seek innovation or take risk when profit is assured.

**Warren and Matthews:** Property and construction professionals have a major role to play, through the identification, funding and management of construction projects that focus on resilience in disaster-prone areas or 'building back better' following disasters. Initiatives such as 'BuildAction', working with international firms to provide volunteer staff based close to disaster-hit areas, provide a key mechanism for fostering the involvement and training of these professionals.

**Sagun, Bouchlaghem and Anumba:** There is a lack of a specific standards, guidelines or codes of practice for designing buildings to improve safety of people during disasters and emergencies. Guidelines need to be developed that specify improved designs that ensure better safety of users during emergency events within large public spaces such as airports and railway stations.

**Proverbs and Lamond:** Resistant measures are more attractive than resilient measures (e.g. mitigation through effective preventative design) to individuals at risk from flooding; however, resilient measures are less sensitive to failure of information or individual elements.

**Bosher, Dainty, Carrillo, Price and Glass:** Resilient engineering demands a more resilient infrastructural context with regards to the professions and the structures and processes which govern construction activity. If built assets are repeatedly affected by particular hazards, lessons can be learned to replace the original structure(s) with an improved version that is more resilient (in social, physical and economic terms). It is important that 'resilience' is not viewed as a polar opposite to 'sustainability'; 'resilience' is an important component of sustainability.

**Roseberry:** The environmental sustainability of permanent housing constructed by the international community in post-disaster Aceh highlights the need for:

- (1) greater project collaboration within NGOs,
- (2) a review of required raw materials and manufacturing processes,
- (3) built-in flexibility for long-term projects and
- (4) a diversified strategy for the procurement of construction materials.

### **3. CONCLUSIONS**

Post-disaster recovery and reconstruction in the 21<sup>st</sup> century demands pro-active planning that recognises legislative constraints and lobbies for change and increasing flexibility. It recognises the important role that affected communities play in designing and implementing effective reconstruction programmes.

Achieving a “Build back Better Approach” involves utilising teams of multi-disciplinary professionals. Conceptual and other types of models clearly play an important role in better understanding post-disaster reconstruction and recovery approaches.

Enablers and barriers for reconstruction programmes need to be considered holistically, with due consideration of facilitating enabling legislation, environmental sustainability, flexible procurement strategies, consultation of affected communities and the form and function of both temporary and permanent housing.

Housing rehabilitation issues need to be approached from several perspectives with regard to physical form, psycho-social considerations, the environment and sustainability. Building resilience is best addressed during the design phase when vulnerability can be reduced through better design. With the impacts of frequent flooding due to global warming and climate change, special consideration needs to be given to recovery and reconstruction in flood-affected areas.

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