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Regulatory Frameworks for Post-Disaster Reconstruction: Improving Resilience in the Process

Jason Le Masurier
James Olabode Rotimi
Suzanne Wilkinson

ABSTRACT

Legislation that applies to routine construction provides for the safe development of infrastructure, capital improvements and land use, ensuring preservation and environmental protection, however there is often little provision in legislation to facilitate reconstruction projects.

The research on which this paper is based has examined how reconstruction in New Zealand and other countries differ from routine construction, focussing on the interrelated reconstruction challenges of the allocation of responsibility for coordination, scarcity of resources and the application of legislation and regulations that were written for routine construction rather than post-disaster reconstruction.

Case studies of reconstruction project management following recent small-scale disasters in New Zealand are presented to support the points raised. Extrapolation of the main issues to larger scale disasters identifies the need for improving resilience in the reconstruction process; as it is indicative that existing regulatory provisions may constrain reconstruction efforts; cause multi-agency responsibility and coordination issues; and result in a general loss of pragmatism by disaster practitioners.

Well articulated and implemented regulations should provide effective means of reducing and containing vulnerabilities, and also facilitate post-disaster reconstruction for sustainable developments.

Keywords: Reconstruction; Coordination; Legislation; Resilience.

1.1 INTRODUCTION

The need to develop a resilient community capable of recovering from disasters is of increasing concern in many countries. New Zealand for example is vulnerable to most forms of disaster, though the characters of recent disaster events have been rural-based, of low-magnitude and with relatively low scope of impacts in terms of societal dislocations. It has not experienced a major natural disaster since the Napier 1931 earthquake¹.

Rolfe and Britton, (1995) suggest that the relatively limited experience from these local events reflects on New Zealand's state of preparedness; major disasters could therefore pose considerable economic, physical and social challenge that will make the task of recovery and reconstruction extensive (Hopkins *et al.* 1999). Proactive engagement in management programmes that will not only reduce these impacts but also increase its resilience to future large-scale events cannot be overstated.

In preparing for disasters there is often an emphasis on readiness and response, with poor understanding and little consideration given to the implications of recovery (Angus (2005). Experience has shown that (Le Masurier *et al.* 2006) recovery is often carried out by modifying routine construction processes on an ad hoc basis following a disaster. Whilst this can work reasonably well for small-scale disasters, the effectiveness of reconstruction could be improved by modifying the legislative and regulatory framework in advance of a disaster. For larger scale disasters there is a greater imperative to have appropriate systems in place in advance, so as to accelerate the process of reinstatements through effective coordination and reconstruction delivery.

This paper presents New Zealand's post-disaster reconstruction arrangements alongside its legislative framework to show that more robustness will be required in the reconstruction process to cope with the demands of a large-scale reconstruction programme. Two recent local incidents are presented to buttress the points being made.

The study posits that the achievement of reconstruction objectives will be positively influenced by planned and implemented viable policies (this is in the form of enabling legislative and regulatory frameworks). Whilst influence on reconstruction progress is not restricted to the provisions of legislation and regulations, the focus of the present study is limited to this factor. Other factors that may exert influence on overall disaster management objectives include pre-disaster trends and levels of preparedness (in other words community vulnerabilities); the magnitude of damage resulting from the disaster; availability and accessibility to the required resources; and the prevailing political will and government interests in disaster management activities.

¹ Regarded as New Zealand's worst natural disaster with at least 256 recorded deaths and thousands more injured. The magnitude of the earthquake was 7.8.

1.2 POST-DISASTER RECONSTRUCTION PROCESS

Conceptually, reconstruction after disasters pass through five stages of development (Rotimi *et al.* 2006) from damage/impact assessments through to actual reconstruction implementation (Figure 1.1).

The first set of activities after the initial emergency phase when search and rescue operations and evacuation operations have been completed is the damage and impact assessment. This is the stage when information is collated on the magnitude of the disaster event on individuals, community and the environment; and to commence planning on the recovery operations. The result of the exercise becomes the bases for future reconstruction works, and it lends itself to reviews and updating to take account of new information at later stages, hence its elongated timeframe depicted in the diagram. Every stakeholder in the reconstruction process is enlisted so that a comprehensive needs assessment report is prepared through inspection and surveys of the damages. Information dissemination and collation; and the level of interaction and planning arrangements that exists between all stakeholders will enhance the result of this exercise.

After the needs assessment, decisions are taken on whether to repair, replace or demolish affected properties. The restoration proposal outlines the anticipated reconstruction needs and is a pre-requirement by funding organisations and or compliance agencies. The level of detail included in the proposals will facilitate approvals for funding etc. At the local council levels the restoration proposal may be in the form of Hazard and Risk reports which may in addition state the mitigation programme against future recurrence. Funds may be raised privately; through Insurance companies; and from external donor agencies or charities. In New Zealand, residential property owners are insured by the Earthquake Commission (EQC), which is the primary provider of natural disaster insurance. The EQC insurance covers damages caused by earthquake, natural landslips, volcanic eruption, hydrothermal activity, and tsunami. The outcome of funding and statutory compliances may necessitate adjustments to the restoration plans hence the feedback arrows shown on the diagram. Factors that may influence repair/replace decisions may include structural integrity, economy, safety, function or significance to the owner(s), history or cultural significance etc.

When funding arrangements are ongoing or concluded, the next stage involves the application for resource consents and building approval. This phase is usually painstaking because approving authorities need to ensure that safety provisions are not compromised and that considerable level of resilience is incorporated in all development proposals. The new knowledge gained from the disaster event will assist in adjusting former design concepts and to mitigate future disaster risk. This phase is strategic both in terms of setting the stage for actual reconstruction work implementation and the time frame of the reconstruction process. Statutory application and documentation procedures have been known to drag

reconstruction programmes (Burby *et al.* 2006) and may be worsened by the absence of skilled designers and processing officials. This period is usually characterised by the onset of disillusionment (Scurfield, 2006) due to delays, failures and unfulfilled hopes from inefficient disaster support systems.

The final phase is the actual implementation of the reconstruction works. This is the regeneration stage in the recovery process where efforts are made to return every aspect of the community and its environment (natural, built, social and economic environments) to normalcy.

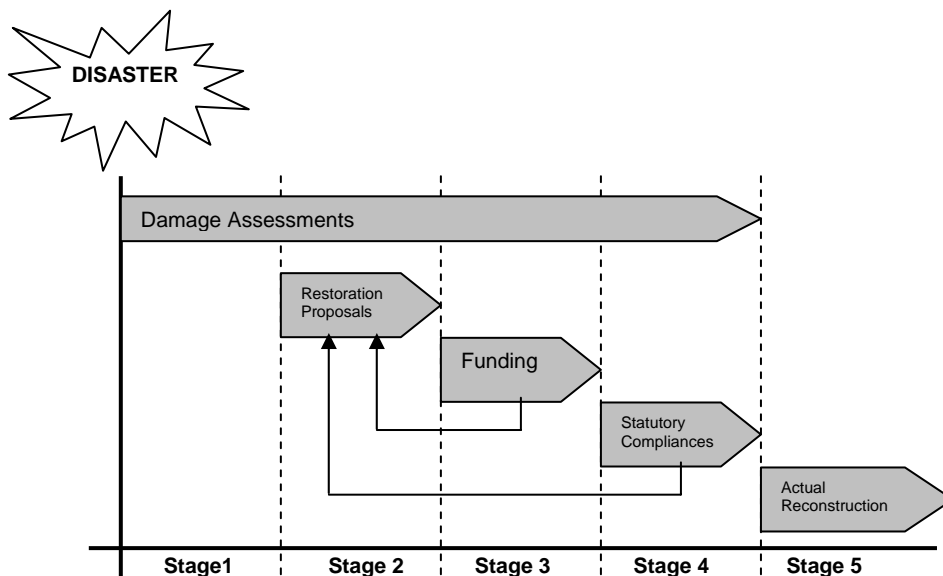


Figure 1.1 – Post-Disaster Reconstruction Process

The point being made is that the period from the damage assessments to the implementation of reconstruction programmes is crucial. The most urgent problems need to be solved within this period because complete recovery could take years to achieve. Prevailing legislative framework and regulatory provisions could either facilitate or hinder rebuilding efforts.

Changes in legislation (Phillips, 2005) positively influenced the rebuilding of damaged highways and other civil works after the Northridge earthquake in the U.S.A.; and there have been calls for similar or even more proactive changes (either through legislative repeals or waivers) during recovery at New Orleans (Marano and Fraser, 2006; Meese III *et al.* 2005). Meese III *et al.* posit that some environmental regulations have become too restrictive and burdensome.

Statutory resource application procedures may frustrate genuine reconstruction needs (AELG, 2005; WRLAWG, 2004) and with a corresponding loss of innovative solution to real time problems. Residential property owners are particularly vulnerable to some of these over-regulations and they may have to bear the burden of remaining in temporary shelter for longer periods than otherwise necessary.

In New Zealand, several pieces of legislation make reference to emergency work procedures; emergency powers, responsibilities and control mechanisms; building and alteration work requirements; hazard identification; land use control and management etc. Some of these are listed below. The list is not exhaustive as other local statutes and legal instruments exist that are either specific to regional/local districts; or give interpretation to the listed ones.

- Civil Defence and Emergency Management Act (CDEMA) 2002
- Resource Management Act (RMA) 1991
- Building Act (BA) 2004
- Local Government Act 2002
- Earthquake Commission Act 1993
- Housing Improvement Regulations 1947
- Historic Places Act 1993
- Soil Conservation and Rivers Control Act 1941

There are jurisdictional differences between those that apply nationally with those that are administered at local levels; hence their interpretation may become sources of friction between the different tiers of government. Several reports (highlighted later) have indicated a review and realignment of some of these Acts to allow for more efficient and result-driven reconstruction programmes.

The provisions of some of these legislation demand compliance except in rare circumstances like during the declaration of a state of emergency. At the expiration of a state of emergency, all routine processes are normally reverted to and it is business as usual. Considering that the declared state of emergencies do not last longer than the emergency period, it is apparent that the reconstruction period is not catered for in terms of a relaxation of these regimes of strict compliances.

1.2.1 The Recovery Management Structure

The Civil Defence and Emergency Management Act (CDEMA) 2002 provides the legislation and the foundations for the New Zealand Civil Defence and Emergency Management (CDEM) environment. The Act coupled with other guideline documents propose generic structures for the management of recovery activities (see Figure 1.2). The structure provides for the formation of parallel task groups at each level of government (local,

regional and national) in line with the four environments that recovery activities have to cater for i.e. the social, built, economic and natural environments. This generic structure may be expanded through the creation of subtask groups depending on the magnitude or geographical spread of a disaster event.

Depending on the national significance of the emergency a DESC and or ODESC committee (see diagram) may be set up for a whole of government response and to provide strategic oversight. The lead agency at all government tiers, for operational planning is the MCDEM together with a cluster group of agencies. Some of these cluster groups include: lifelines, health, research, welfare/recovery, agriculture and rural, emergency services etc. In the event of a regional or national scale disaster and where CDEM groups are unable to perform recovery functions in the affected areas, a Recovery Coordinator is appointed to act as a liaison.

Essentially the disaster management system in New Zealand is devolved and decentralised so that initial response and subsequent recovery initiatives are based at the local levels. This system of disaster management responsibilities takes the view that communities are the ones affected and should act reasonably in disaster risk reduction and management. This is encapsulated in the CDEM vision (Angus, 2005) that expects New Zealanders to understand and routinely act to reduce and avoid the adverse effects of hazards because they value the enduring social, economic, cultural and environmental benefits of doing so.

As there are no specific stand-alone organisations (Angus, 2005) that manage disasters in New Zealand; it is thus critical to the success of disaster management activities that there exist integrated planning and coordination arrangements between all the stakeholder agencies. It behoves respective organisations to plan together on how they will coordinate a multi-agency approach to disasters as part of their day-to-day operations. The regulatory framework should promote these interactions and interrelationships, because it is often the case that stakeholders find it difficult to work together (Quarantelli, 2006). Priorities differ and recovery participants may struggle to re-establish or maintain recognised roles, responsibilities and boundaries after a disaster event.

Statutory reconstruction regulations have to take account of private individuals and residential owners that have to bear the task of recovery on their own. The paper believes that statutory requirements must facilitate the reconstruction process for this category of owners too. There has to be a trade off between a strict regime of compliances and the consequences in terms of delayed recovery. Regulations are desirable (or sometimes necessary evils) during normal times but may become unbearable burdens during rebuilding programmes for this category of owners.

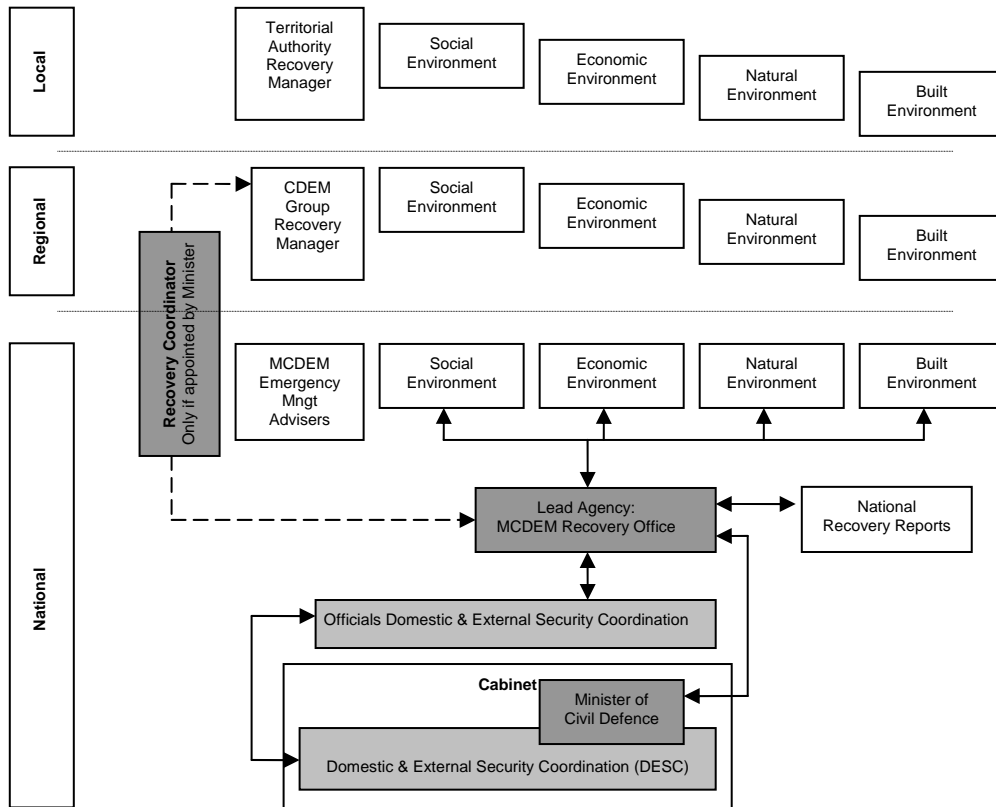


Figure 1.2 – Generic national recovery management structure (MCDEM, 2005)

1.2.2 The Reconstruction Challenges

From the forgone, it is clear that some resilience needs to be introduced into the regulatory framework in New Zealand. This is intended to meet the needs of larger scale programmes of reconstruction and the needs of residential redevelopments.

This section reviews some of the challenges on the regulatory environment and other salient issues that will need to be addressed to improve resilience in the process.

Review and realignment of legislation

Some provisions of existing legislation need to be reviewed to allow for better interpretation and control on reconstruction works. In a study by MWH, (2004), certain gaps and inconsistencies were highlighted on the

provisions of the RMA and the BA in New Zealand. These were grouped into conflicts that may result from the consent/compliance process; and conflicts arising from the substantive contents of the two documents.

Generally the BA adopts a 'top down' system of control because it is derived nationally, while the RMA has a 'bottom up' system of control because it is administered at the local council levels. The administration of these two Acts (MWH, 2004) is likely to continue to result in challenges over the pre-eminence of authority where buildings are concerned; and would have wider implications during the chaos and desperation that follows after disasters too.

Conflicts of interpretation and implementation have also been identified between the provisions of the BA and the Earthquake Commission Act. This concerns compensation for buildings exposed to hazards and the possibility (Page, 2005) that property owners may not secure reconstruction funds from the Earthquake Commission. The BA requires that notices be placed on the titles of properties with identified risks to natural hazards. The Earthquake Commission Act on the other hand is discharged from paying compensation on the principle that "if there is a large identified risk the owner cannot as a matter of course pass it onto the Earthquake Commission..." (Page, 2005). These provisions are likely to generate tension especially with current reviews to the New Zealand hazardscape, because more properties will fall into the category with BA notices. Clearly these provisions have to be re-aligned so that property owners are not disadvantaged in any way.

Procedural constraints may slow down the reconstruction phases in New Zealand. The key issues of concern are:

- How to process the increased volume of applications that will be many times above the base workload?
- The ability/inability to meet the statutory timeframe (10 days or 20 days if value of work is greater than \$500,000) required of all consent applications.
- Design uncertainty on repairs/alterations to partially damaged buildings and whether the scope of work will require a building consent.

The emphasis placed by the RMA on a consultative process could cause further delays and resentment to the entire recovery process. Thus a fast track approach will need to be devised for the consent procedure. Repair of buildings in a controlled manner can be achieved (WRLAWG, 2004) through; collaboration with other local councils for the redeployment of additional consent personnel; and to work up processes for quick access to property records. Controlled relaxation of building permit requirements may be necessary. For example reconstruction works on buildings with no significant health or safety risks may be permitted as early as possible without having to go through the entire consent process.

Lastly but critical to recovery after a major disaster event, is the need to statutorily empower local councils and other disaster agencies beyond

the expiration of the civil emergency period. There is no specific power to direct emergency activities by lifeline utilities (AELG, 2005); and the duties and obligations of governmental bodies, especially local and regional councils, have not been clearly expressed in legislation (Messrs Anthony Harper, 2006).

Coordination of Reconstruction Projects

As expressed earlier, CDEM agencies are provided with powers under the CDEMA to direct reconstruction activities, assets and services to other organisations. However from experience (AELG, 2005) there is a preference to coordinate and work with lifelines to set priorities instead. This is because the agencies do not generally have the resources and skills for these tasks. For example the duties of the 'Residential Housing Subtask Group' required to be set up for the purposes of recovery is to '*repair, reconstruct or relocate buildings – obtaining fast-track building and other consents, sufficient builders and materials, coordinating skilled trades and their work standards.*' This will be a challenging responsibility for the task force to take on and does not appear to concur with what has happened in practice.

The coordination and management of private reconstruction projects by insurance companies and individual owners is clearly inefficient for a large-scale disaster and may not yield expected results. Though the CDEM principle is based on high levels of self-reliance, where property owners are expected to take responsibility for their reconstruction works; some level of assistance may not be out of place. Page (2005) suggests that bulk reconstruction contracts could be awarded by the EQC so as to relieve property owners from sourcing and managing the process themselves. This form of coordinated response, with a single large contractor, was trialled by the EQC after the Te Anau earthquake of 2003.

Reconstruction Resources

In terms of overall human resources capacities, Page (2004) suggests that an additional 180,000 construction industry workers would be required during a large scale disaster, particularly if reconstruction demand coincides with periods of high base workloads. The construction industry could cope effectively with a medium sized disaster if the base workload was at an average level. In a similar study by Hopkins, (1995), combined resource requirement for reinstatement is estimated to be about \$7.73 billion following an earthquake in the Wellington region alone.

Resource issues are a source of concern in consent processing also. The spike of increased consent applications could only be tackled through redeployments from other councils (if these donor councils have not

sustained minor damages themselves). It is acknowledged that New Zealand may need to mobilise all nationally available resources for a large-scale reconstruction programme.

1.3 THE NEW ZEALAND CASES

1.3.1 The Manawatu and Matata Floods

These locally significant flooding incidents are briefly described and a summary of reconstruction work procedures undertaken is presented. The extent of damages and the risks to life and property prompted the declaration of civil emergencies in both situations.

Flooding in Manawatu was caused by heavy rain and gale force winds from the 14th to 23rd of February 2004. A Regional State of Civil Emergency was declared on 17th February. Over 2,000 persons had to be evacuated from their homes at the height of the event. Many rivers breached their banks and considerable areas of farmland were inundated by silt and floodwaters. Damage to infrastructure was significant with damages to roads, bridges, and railways. There were telecommunication, power, gas and water supply outages but remarkably no lives were lost as a direct result of the event. Recovery costs were estimated at \$160-180million for the rural sector and \$120million for roads and council infrastructure. In addition an estimate of \$29.5 million and \$3.5 million was required to stop future flooding of the lower Manawatu and Rangitikei rivers respectively.

Flooding and debris flow occurred on the 18th of May 2005 in Matata when a band of intense rain fell in the catchments around the locality. The highly erosive debris flows cleaned out the valley bottoms and destabilised the slopes along the channel, causing secondary landslides. The debris flows were structurally damaging to all buildings and bridges in their paths. Civil defence emergency was declared same day and this remained in place until the end of May. Total government valuation including land value and capital value of properties affected along the flood path hazard was estimated to be \$9,740,000 for unsafe buildings and \$2,937,000 for buildings subject to restricted use.

1.3.2 Reconstruction Work Procedures

Reconstruction was managed through collaboration between CDEM agencies, local authorities, utility companies and insurance companies during recovery in both cases. Collaboration meant that the legal powers available under the CDEMA to direct lifelines were not exercised (AELG, 2005), even during the state of emergencies. Utilities (with their respective

contractors) were allowed to determine their own reconstruction priorities without specific directives from the CDEM agencies.

Generally fast track approaches were used for initial debris clearance by road contractors. This was possible because there were already established relationships with these contracting organisations. Roading authorities did not diverge from normal regulatory routines and consent application procedures. These were sought and granted as usual. The pooling of resources to meet emergency works however meant that on-going road maintenance and safety contracts had to be put on hold.

Notably, considerable loss of time was experienced during the processing of resource consents. Application for the disposal of slip materials locally, instead of to a more distant designated landfills site, became an issue and took time before it was granted. It took time to develop an understanding with the Regional Councils about emergency actions that would cover all situations under the Resource Management Act, rather than to require a formal process for each activity (AELG, 2005). In Manawatu, the Recovery Task Group leader and the Regional Councils had to prepare guidance notes outlining the procedures to be followed.

Physical works prioritisation process could have been enhanced also if there was more certainty over funding in the early stages of recovery at Manawatu. The road funding authority, 'Transfund', which had direct access to government funds, did not become involved early enough after the event. Recovery at Matata was slowed down for similar funding reasons. In this case, there was a heavy reliance on the central government since the local council funds was insufficient to cover the recovery costs. Funding took some time to come through with a lot of time wasted when preparing the recovery cost requirements.

Insurance companies and the property owners largely coordinated reconstruction work on damaged residential properties. The Earthquake Commission (EQC), which is the government agency that provides cover for losses incurred as a result of natural disaster, provided the statutory funds to complement whatever private insurance cover held by the owners. However, the coordination and project management role of the private insurance companies may not have completely served the needs of affected property owners. This is evidenced (Rowan, 2005) by the disaffection of the Matata community with the pace of recovery five months after the incident, when 50 families were still in temporary accommodation. A review of the recovery reports (Dixon, 2005) on the Matata incident also show that there were misunderstanding on compensation claims and settlement. Compromises had to be made by the EQC to enable residents to receive compensation for their flooded properties.

Duplication of resource was common to both incidents. Damage assessments were required by different agencies like the EQC, private insurers and the local councils and it was not uncommon for assessment exercises to be repeated on the same properties by these agencies. This

situation had a ‘knock-on’ effect, thus delaying the actual implementation of the various reconstruction projects.

1.4 CONCLUSION

The paper has reviewed some of the challenges in the implementation of existing guidelines and provisions for reconstructing the built environment after disasters. It is clear that more resilience (in the form of adaptability and appropriateness) is required in the regulatory framework in New Zealand so as to facilitate complex post-disaster management programmes.

Specific needs of affected individuals and overall community can be met through reviews and realignment of regulations that will clarify the duties and obligations of disaster managers in the prevention, mitigation and remediation of disaster events. These policies have to be well articulated and implemented so as to make the reconstruction process flexible enough for sustainable developments.

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