

PLANNING FOR COMMUNITY RECOVERY AND RESTORATION BEFORE DISASTER STRIKES

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ABSTRACT: Communities can be severely disrupted by disasters, physically, socially and economically. After disaster strikes, communities face a period of immediate response to the disaster, followed by a phase of recovery.

Recovering from the impacts of a disaster is a complex process and involves communication and co-ordination with many different agencies and individuals in order to achieve the holistic and sustainable regeneration of a community. Recovery considerations should encompass all aspects of life including the social, economic, natural and built environments.

Because the recovery process is complex, issues around recovery should be considered before a disaster actually occurs. By considering the issues that may arise before an event actually happens, recovery can be better targeted, more efficient and more effective in the long-term. Tangible recovery planning can then be completed which makes provisions for the issues considered.

To date, there has been only a limited focus on the recovery of land-use from hazard events. Therefore, our research to date has focused on the concept of 'pre-event recovery planning for land-use'. We provide a methodology for how land-use may be 'recovered' or used after a disaster in the New Zealand context.

Although aimed primarily at local authority land-use planners who deal with land-use issues on a daily basis, the methodology will also be useful for a range of professionals who may be involved with recovery, including emergency management (e.g. recovery managers); resource, insurance and risk managers; land owners; developers; and the construction industry.

Keywords: Disaster, recovery, pre-planning, land-use, methodology

1. Introduction

When disasters strike, they impact upon communities in many ways. Physically, damage may occur to building structures or services. Socially, communities can be disrupted and dislocated, and trauma may be experienced by community members. Economically, there can be negative impacts (e.g. costs incurred by damage) and positive impacts (e.g. more work for the construction industry).

Following the immediate response to a disaster itself, there comes a period where recovery begins. Recovery can be broken down into several phases. The most obvious are: a short-term phase, where recovery is focussed on restoring services; and

a long-term phase which is concerned with returning the community to conditions that existed prior to the event, while taking into account any improvements (Schwab et al., 1998).

Recovery from the impacts of a disaster is complex. Ideally, recovery should be holistic and should encompass all aspects of life including the social, economic, natural and built environments. For an effective recovery to occur there should also be communication between the many affected agencies and individuals, so that efforts are co-ordinated to achieve the best possible outcomes.

It is also important to consider sustainability in all recovery decisions, as this will help ensure recovery is effective and long-lived. Ideally, when planning for recovery, a community should attempt to incorporate the principles of sustainability in every reconstruction and re-development decision (Natural Hazards Centre, 2001; Monday, 2002). Undertaking pre-planning can assist in sustainable recovery because it allows sustainable concepts and ideas to be thought through before a hazard event occurs. Provision can then be made to allow for implementation of those ideas following an event (Becker et al., 2008).

2. Pre-planning for recovery

Because the recovery process is complex, issues around recovery should be considered and planned for before a disaster actually occurs. Pre-event recovery considerations should encompass all aspects of the environment (i.e. social, economic, natural and built), and planning should be undertaken to reflect this diversity.

To date, there has been limited focus on recovery of land-use from hazard events. Therefore our research to date (described in this paper) focuses on how land or land-use may be affected by a hazard event, and how it may be 'recovered' or used after an event. Pre-planning for land-use recovery and the associated reduction of risk is important because it means that (Becker et al., 2008; Berke et al., 1993):

- Ideas, options and plans can be developed and discussed by communities before an event;
- Recovery is proactive, rather than reactive which can lead to poor decision making;
- Recovery can incorporate principles of sustainability;
- Recovery can begin without the need to think about and/or plan for land-use changes;
- Future hazard risks can be reduced during recovery;
- Enhancement projects (e.g. urban renewal/intensification, economic centre planning, heritage restoration) can be integrated with pre-event recovery planning to allow for improved land-use post-event;
- Landowners are provided with options for reducing hazard impacts;
- Consents can be gained in advance for spoil disposal sites, including those for contaminated materials i.e. road slip material, building debris, volcanic ash disposal;
- Plans are developed pro-actively to reduce or avoid the level of impact of a hazard event;
- The community can assume the role of active participants in recovery planning, rather than be victims who have recovery decisions imposed on them from top-down.

Methods of pre-planning for land-use recovery can vary. Pre-event planning may address issues related to short or longer term recovery. Pre-event planning might include making provisions to change activities before an event, and carrying out those activities beforehand as well, e.g. relocating existing buildings away from an area of known risk before an event occurs. Or it may mean making provisions to change an activity before an event, but carrying out the activity only after the disaster has occurred, e.g. making plans to relocate a building after the building has been damaged by the disaster.

Pre-event planning for land-use should primarily be undertaken by land-use planners. However, it is essential that during the recovery process planners link with other sectors to ensure a co-ordinated approach to recovery (e.g. communities, land owners, resource management agencies, emergency management agencies, lifeline utility companies, the health sector, insurance sector, and developers) (Saunders et al., 2007).

3. Examples of pre-planning for land-use recovery

A number of international examples exist where pre-event planning has supported a community's recovery from a hazard event. In some cases pre-planning has occurred before an event itself. An example of this type of pre-planning can be found in Los Angeles, where the city had prepared a recovery and reconstruction plan for a destructive earthquake before the Northridge earthquake occurred in 1994. Even though a plan had been prepared, however, studies after the earthquake showed that no-one referred to the plan for guidance after the earthquake. Despite this, staff performed most actions that they were assigned to in the plan. This implies that the value of the plan lay in the pre-planning aspect, where contacts were made between organisations beforehand and tasks agreed upon (Spangle Associates and Robert Olson Associates, 1997).

In other cases pre-planning has occurred immediately after an event, but before major reconstruction has begun, for example the Tangshan earthquake (Mitchell, 2004); Kobe earthquake (City of Kobe, 2005); Alaskan earthquake (Valdez convention and Visitors Bureau, 2006); Stockton Missouri tornado (Schwab, 2005; Trahant, 2005). After both the Tangshan and Kobe earthquakes, 'master plans' were created that guided rebuilding and new development in the cities, to create places that were safer and more resilient. After the Alaskan Earthquake in 1964, the ground under Valdez was determined to be unstable and it was decided to move the location of Valdez to a new, more stable town site. While no land-use recovery plan was in place before the earthquake, careful planning after the event ensured that the new town site was more sustainable and that the community was more resilient to future events (Valdez Convention and Visitors Bureau, 2006). There are other examples of the relocation of towns and villages after disastrous events including the Fijian village of the Biausevu. In this example, people were relocated from high ground to a frequently flooded riverside location during early colonial times. The village subsequently relocated several times along the river to avoid flooding (unsuccessfully), and has now relocated back to higher ground above the flood plain (Campbell et al., 2006).

In New Zealand a recent example of pre-event recovery planning is the Waitakere Twin Streams Project. This project has been developed through the joint cooperation of the community, the city council and the regional council. The project is primarily about changing land-use for multiple benefits, including reducing the risk to the community from flood events. Waitakere City Council's Project Twin Streams focuses on integrated catchment management of two local water catchments. The project's main aim is to improve the streams and waterways within these catchments, and part of the project involves the council purchasing properties at risk of flooding. The property purchase option was chosen rather than stopbank construction (or other 'hard engineering' solutions) because the project aims to restore streams to their natural state, without modification of channels. The houses on these properties are relocated and the land retired and replanted for riparian reserves, walkways and cycleways. This project reduces risk to the community while simultaneously meeting environmental and community objectives (Becker et al., 2008; Waitakere City Council, 2007).

4. Development of a methodology

In New Zealand, a methodology for pre-event land-use recovery planning has been developed based on the Australian/New Zealand Risk Management Standard 4360:2004. The Standard has been used as the conceptual basis for this methodology as it provides a generic and flexible model that allows ideas about recovery to be thought through and planned for at a practical level.

The methodology is presented in the form of a flow chart (Figure 1) allowing users to follow a comprehensive set of steps in completing the process of planning for land-use recovery (Becker et al., 2008). The suggestions shown in the methodology are prompts only, and are not an exhaustive list of information sources, options or considerations. They are presented to encourage the reader to think about the land-use recovery process within their local context. The steps for the methodology include:-

- Establishing the context for land-use recovery and identifying risks
- Identifying gaps
- Analysing risks and developing options for land-use recovery
- Evaluating risks and prioritising options for land-use recovery
- Treating risks (implementation) (Becker et al., 2008).

Once a number of options have been identified to treat the risk, treatment needs to actually occur. So for example, if it is decided that a number of buildings need to be relocated so that they are not impacted upon in a disaster, how should this occur? A specific pre-event recovery plan could be developed to deal with relocation both before and after a disaster. However this would require a significant amount of extra work and could be time-consuming to create a new plan. Additionally implementation may not be successful if there is no legislation to support carrying out the plan. Rather than create a specific pre-event recovery plan for land use, existing frameworks (e.g. current land-use or emergency management plans) could be used to accommodate this planning. This would bring pre-event recovery planning into everyday routine, rather than making it a specialised activity.

As an example, in New Zealand, a number of frameworks and plans already exist that pre-event recovery planning could be incorporated into. These include:-

- Regional Plans and District Plans (under the Resource Management Act),
- Civil Defence Emergency Management (CDEM) Group Plans and Recovery Plans (under the Civil Defence Emergency Management Act),
- Long Term Community Council Plans (under the Local Government Act),
- Asset management plans, growth strategies, and other non-regulatory documents e.g. business continuity plans, risk management plans (Becker et al., 2008).

Tables 1 and 2 outline specific measures that can be used to help with land-use recovery after an event. Alongside each measure is listed the New Zealand planning frameworks in which these measures can be incorporated. Giving consideration to these measures prior to an event, will allow more efficient implementation after an event has occurred, leading to a more effective recovery (Becker et al, 2008).

Planning documents should be linked to ensure that all issues are covered. There should be communication and agreement between different departments (e.g. land-use planning, emergency management, etc) over responsibility. Each planning document should outline its definition of land-use recovery, whose responsibility it is, what other document(s) address it, and what issues the document(s) cover (Becker et al., 2008).

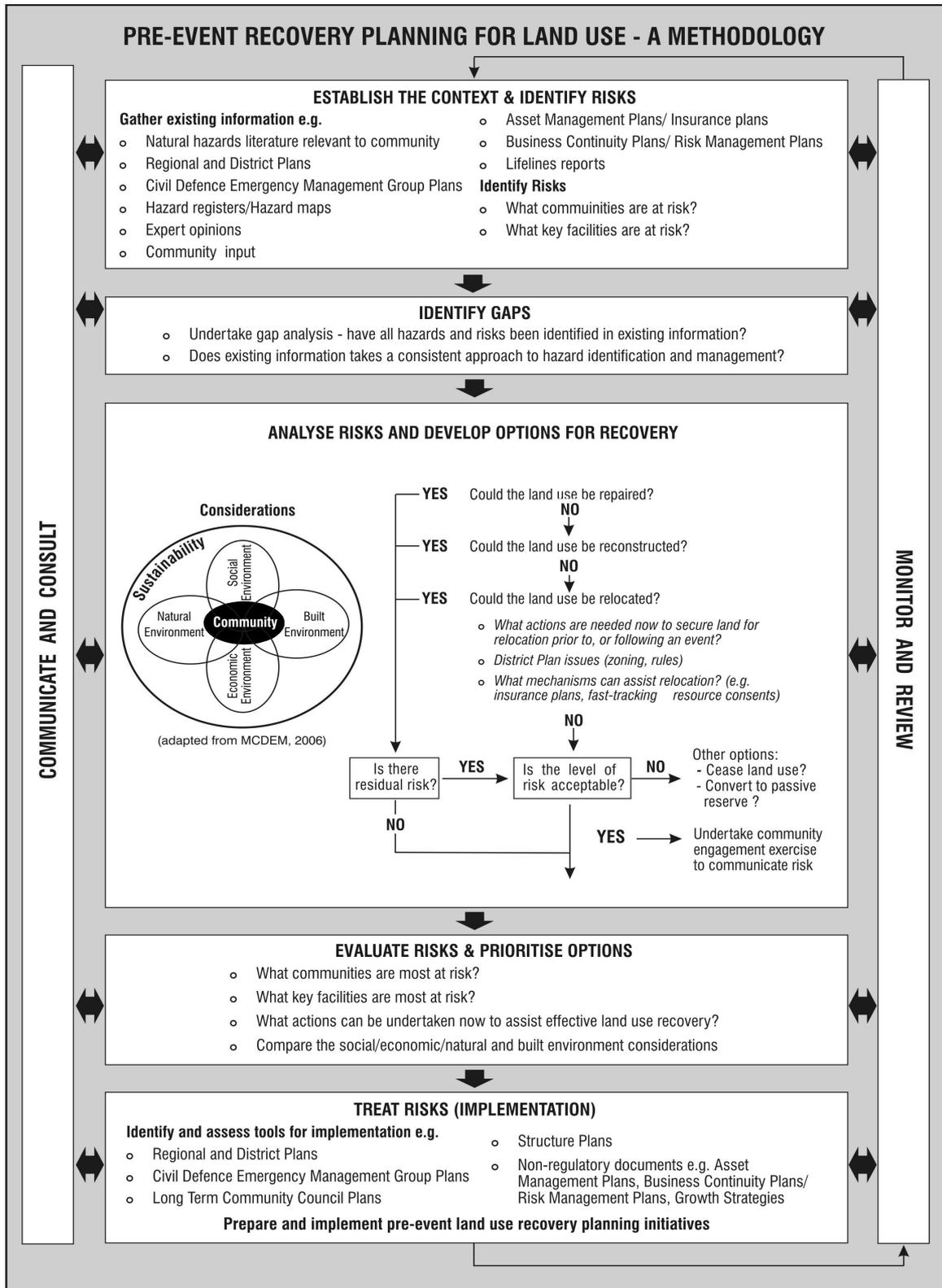


Figure 1 Pre-event recovery methodology (Becker et al., 2008)

Table 1 General planning measures which can be of use for immediate land-use recovery purposes after an event (after Schwab et al., 1998, Becker et al., 2008)

Measures	Framework for incorporation
Damage assessments after an event (which can be integrated with Global Positioning Systems (GPS) and Geographical Information Systems (GIS))	CDEM (damage assessments)
Identify new lessons discovered during response and initial recovery after the event	CDEM (damage assessments), RES
Development moratorium, whereby development decisions are halted for a period of time after an event.	DP, RP
Emergency consents (e.g. for removal of debris)	DP, CDEM Act, RP
Regulations which deal with demolition issues	DP, BA
Zoning for temporary housing	DP
Setting priorities for infrastructure repairs before an event.	ASSET, LTCCP
Identify sites for emergency operations	CDEM, DP, BUS
Feasibility of emergency evacuation	CDEM
Historic preservation (e.g. What to do with a historic building that has been damaged?)	DP, LTCCP

Key: DP – District Plan, RP - Regional Plan, RPS – Regional Policy Statement, CDEM – CDEM Group Plan, BA - Building Act, LTCCP – Long Term Council Community Plan, HAZ – Hazard Mitigation Plans, ASSET – Asset Management Plans, RES – general research, BUS – Business continuity plans, OTHER – Other non-statutory plans.

Table 2 Longer term planning measures which can be used as part of pre-event preparation (Schwab et al., 1998, Becker et al., 2008)

Measures	Framework for incorporation
Acquisition of property in hazardous zones.	DP, LTCCP, growth strategies, LGA
Use of easements.	DP
Infrastructure development policies, which restrict the development or replacement of infrastructure in hazardous areas.	ASSET, LTCCP, HAZ, RP, DP
Floodplain management plans (and flood insurance regulations).	HAZ, ASSET

Assessment of Environmental Effects (AEE)	DP, RP
Stormwater management plans	ASSET, HAZ, OTHER
Zoning tools (for example, zoning can be used to prevent new development in hazardous areas or minimise densities)	DP
Subdivision control and design. Requirements may be placed on an approved development only allowing particular design features, etc, in order to mitigate the risk to hazards.	DP
Design controls may also be placed on the landscape (e.g. retaining a coastal dune) in order to mitigate a hazard.	DP
Re-planning of areas which may be stricken by an event	DP, RP
Examination of street patterns for access	DP
Financial tools, such as allocating funds for recovery, ensuring relocation assistance is available, implementing taxation or fee-based systems to collect revenue for the upgrade of facilities or recovery purposes, etc.	LTCCP, ASSET,
Ensuring there is co-ordination between organisations and agencies that may be involved in emergency management.	CDEM
Training programmes for those involved with emergency management	CDEM
Identification of hazards, and use of that information in planning	RPS, RP, DP, CDEM, RES, OTHER
Use of GIS and GPS	DP, HAZ, RP
Community participation and public education	LTCCP, CDEM
Re-evaluation and update of plans	All plans
Compliance of rebuilding with new regulations formulated from lessons learned (e.g. account for any new regulations added to the Building Act, Building Standards, etc., after the event, or any completely new Acts/standards created).	When rebuilding, account for any new regulations, as part of the consent process.

Key: DP – District Plan, RP - Regional Plan, RPS – Regional Policy Statement, CDEM – CDEM Group Plan, BA- Building Act, LGA – Local Government Act, LTCCP – Long Term Council Community Plan, HAZ – Hazard Mitigation Plans, ASSET – Asset Management Plans, RES – general research, BUS – Business continuity plans, OTHER – Other non-statutory plans.

5. Conclusion

Recovery planning and the reduction of risk should begin before a natural hazard event occurs. This will ensure that the need for recovery following an event is either eliminated or reduced, and that any recovery effort occurs efficiently and effectively. Pre-event recovery planning in general, and specifically for land-use, is currently very limited. Some pre-planning is done before an event, while other planning only takes place once a disaster has occurred, but before major reconstruction has started. Overall, however, there seems to be very little strategic planning for recovery, with most recovery being reactive.

One way of planning for recovery would be to make a specific pre-event recovery plan to deal with recovery issues both before and after a disaster. However, a more time and cost effective option would be to try and integrate elements of recovery planning into existing frameworks, so that recovery planning becomes part of everyday activities.

It is advocated that those who deal with land-use or recovery issues (including land-use planners; civil defence emergency management officers; resource managers; insurance and risk managers; land owners; developers; and the construction industry) work together now to begin planning for recovery and risk reduction.

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