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Hazard Note

Natural Hazards Research Australia

Topics in this edition | flood

Resilient housing programs: A framework for evaluation

About this project

Co-funded by the Queensland Reconstruction Authority and Natural Hazards Research Australia, this project examines the delivery of resilient housing programs in different local contexts, gathering lessons learned and developing them into a set of considerations for future policy and practice. The design and delivery of seven resilient housing programs to address flood, tropical storm and earthquake were analysed. This analysis was developed into a framework explaining the key enablers and trade-offs involved in implementing government-sponsored resilience programs. Understanding global experience in implementing resilient housing programs provides valuable practical learnings and insights for Australian local, state and federal governments.

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Learn more about this project online

naturalhazards.com.au/research/research-projects/evaluating-resilient-homes-fund

Summary

This first part of the *Evaluating the Resilient Homes Fund* project reviewed government-sponsored resilient housing programs from around the world. The seven programs were selected for their relevance to key issues for Australian housing resilience programs, as each was intended to increase homeowner resilience to flood or other disasters through a complex array of buy-back, retrofit and home-raising sub-programs.

The programs were analysed from the perspective of policy design and delivery rather than housing structure or hazard features. Drawing from a combination of academic and grey literature, variations in the design and delivery of each program were identified that facilitated or constrained its implementation. The analysis demonstrates that, as all homes and communities are different, there is no 'one-size-fits-all' approach to resilient housing programs, leading to a set of trade-offs in program implementation.

These analyses are developed into a framework and set of key considerations for implementing and evaluating resilient housing programs:

- Continuing a resilience policy beyond the current recovery program is important to support a timely response to a new disaster
- ensuring access to knowledge, data and procedures for identifying the target population and maintaining these at the completion of any program
- understanding the trade-offs between adopting a collective versus an individual approach to working with the target population
- ensuring eligibility and equity of access to the program
- incentivising and supporting the target population to overcome social, emotional and financial constraints that impact uptake of the program.

These considerations provide nuanced guidance on how specific resilience programs play out within their own physical, financial, social and emotional contexts. These nuances are important in evaluating the progress and outcomes of any resilience program, going beyond identifying the number of houses completed. The framework and considerations developed can be used to expand the body of knowledge around post-disaster resilience in the context of government-sponsored resilient housing programs.

Above: Flooded homes in Queensland. Photo: Queensland Reconstruction Authority

Background

The purpose of this research is to understand how resilient housing programs unfold within their own physical, financial, social and emotional constraints, gather lessons learned and expand the body of knowledge around how such programs support post-disaster resilience.

Many government-sponsored resilience programs are implemented in the aftermath of a devastating disaster. During this period, homeowners are traumatised because homes have strong financial, social and emotional meaning in people's lives. Implementing a program during this time of intense distress is challenging. Hence, there is no 'one-size-fits-all' program for relocation or housing adaptation.

Instead, every program should be considered within the context in which it is developed and implemented and that multiple, complex outcomes are likely rather than a singular view of success. These more nuanced outcomes, beyond the number of houses targeted by a program, provide valuable guidance in developing and implementing future programs.

The learnings from seven resilient housing programs across different contexts and hazards were then used to develop a framework for evaluating programs with the Australian context.

Research methodology

Seven programs were chosen for their relevance to key issues for disaster resilience in Australia. That is, they address the impact of flood or other disasters, typically on a sizeable population, through a complex array of buy-back, retrofit and home-raising sub-programs. For example, the report examines programs in the United States, New Zealand and the United Kingdom.

Two programs with relevance to policy issues facing Australia were also included: a smaller-scale relocation program in Grantham, a rural Queensland town that was partially relocated following a devastating flooding in 2011 and the Brisbane Flood Resilient Homes Program, which was a selective program to retrofit flood-exposed houses. While participation in all these programs was voluntary, they differ in several ways including:

a. diversity of population
b. housing stock
c. presenting conditions of hazard
d. scale and complexity.

Most of the selected programs were implemented during post-disaster recovery. However, two programs, Brisbane's Flood Resilient Homes Program and Flood Re's Build Back Better program, while targeted at houses with prior flood exposure, were initiated in the pre-disaster mitigation phase in anticipation of future flood events.

Drawing on a combination of academic and grey literature, analysed the selected programs from the perspective of policy design and delivery, identifying variations that facilitate or constrain the implementation of each program. Table 1 details the seven programs selected for analysis.

Research findings

A Framework for Evaluation

Drawing from these seven programs, a framework (Figure 1) for evaluating the key enablers and trade-offs involved in implementing government-sponsored resilience programs was developed. Such programs typically seek to improve homeowner resilience to disaster through relocation or buy-back, or reconstructing existing homes to be more disaster resilient. Key components of the evaluative framework are:

Enabling policies

Implementing resilience programs requires:

i. extensive knowledge of housing stock and its exposure to specified hazards
ii. access to data on affected individuals
iii. clear procedures for identifying and mobilising the target population for the program.

These requirements are exacerbated when a program is large-scale, complex, has significant diversity in housing stock and population and/or is rolled out at-speed to cope with post-disaster recovery.

Compared with starting anew, a program can be quickly established when an existing policy enables access to knowledge, data and procedures for identifying the target population.

In analysing the programs, two key types of enabling policies were identified:

i. a continuing disaster resilience program that can be easily activated
ii. a government-based insurance program.

Table 1: Resilient housing policies by country

PROGRAM	YEAR	STATUS	WEATHER EVENT	PROGRAM TYPE	SCALE
Grantham Relocation Policy (Australia)	2011	Completed	Flood	Relocation	72 relocations completed
Brisbane: Flood Resilient Homes Program (Australia)	2018	Completed	Flood	Retrofit	199 homes participated in this small selective pilot program.
Christchurch Residential Red Zone (New Zealand)	2011	Completed	Earthquake	Buy-back	7,900 buy-backs completed (98% of 8060 eligible homes).
Flood Re's Build Back Better (UK)	2022	Ongoing	Flood	Retrofit	No data available.
The State of North Carolina: 1990s hurricane and storm response (USA)	1999	Completed	Flood	Buy-back and raising	Purchased or relocated more than 5,000 homes. Raised 1,000 homes.
The State of New Jersey: Superstorm Sandy (USA)	2012	Some streams are ongoing	Flood	Buy-back, retrofit and raising	Data on the number of retrofit homes is unclear. Incentive to stay for 18,500 homes. Purchased 770 properties. Repaired 5,299 multi-family homes.
Restore Louisiana Homeowner Assistance Program (USA)	2023	Ongoing	Flood	Buy-back, retrofit and raising	39,100 applicants. 23,700 eligible homes. $380 million delivered to 4,846 homes.

Christchurch Residential Red Zone (New Zealand)

During 2010 and 2011, Christchurch and the Canterbury Plains in New Zealand were affected by a series of earthquakes. The New Zealand government initiated a voluntary buy-back program and by April 2016, had spent NZD $1.5 billion acquiring 7,900 properties in the worst affected areas, known as the Red Zone. Authorities adopted a collective approach where whole suburbs or tracts of land were red-zoned for buy-back.

Having a current earthquake insurance policy facilitated eligibility and program delivery for buy-back; earthquake insurance is provided through the government and hence authorities hold household-level data to identify properties and the effects of hazards and insurance payouts to homeowners formed part of the buy-back funding package.

Residents dispersed to new locations, with some reporting negative outcomes, including feelings of grief and loss for the prior community and negative employment consequences for vulnerable groups, notably women and young people. However, other reports showed positive emotional responses some years after the buy back.

Left: Christchurch Earthquake – House On A Lean. Photo: Niel Spiers, Adobe Educational License.

Trade-offs

No resilience program is optimal for all of the multiple stakeholders involved.

People's homes are a key physical and financial asset and an emotional and social investment. Therefore, the implementation of resilience programs can be overshadowed by the very real consequences of disaster and negative effects on property owners, communities and the authorities implementing them.

As such, the implementation of resilience programs involves a series of trade-offs. These trade-offs mean that any resilience program will never be considered universally successful but will bring variable benefits and detriments to stakeholders.

Two key trade-offs were identified between:

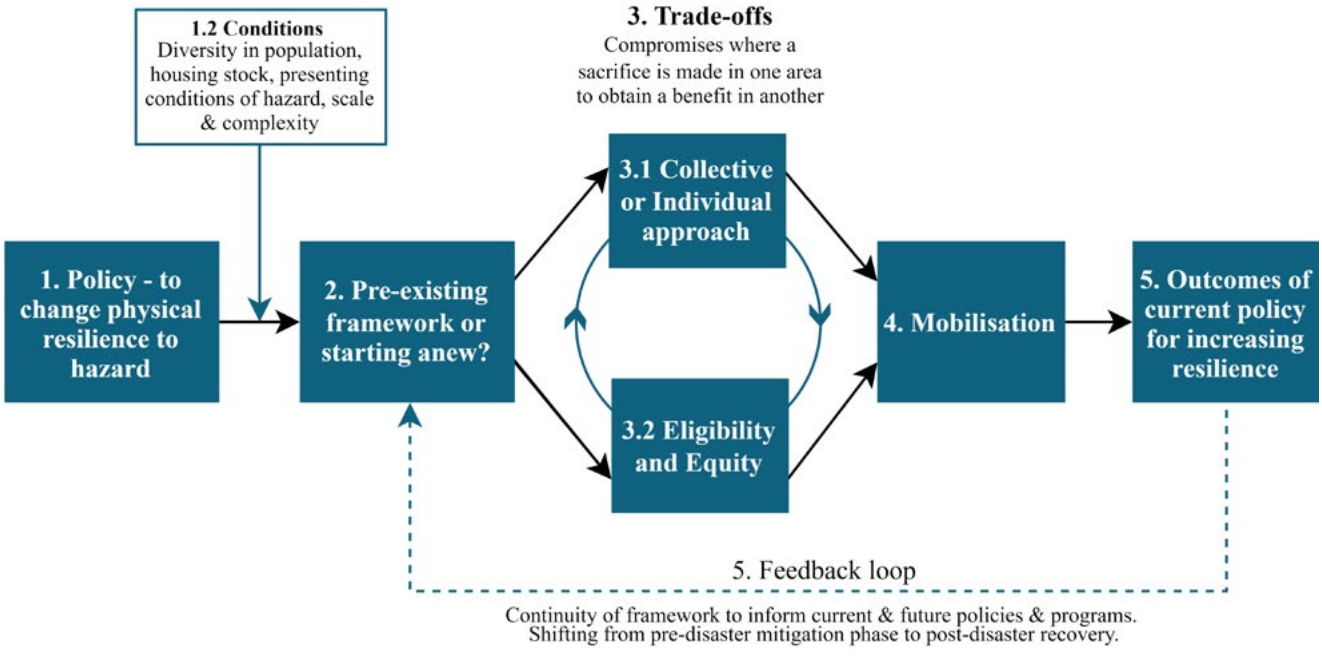
i. Collective and individual approaches to working with the target population. Collective approaches to whole communities enable many properties to be targeted simultaneously in a timely and consistent manner.

Individual, property-by-property approaches give homeowners time and autonomy to engage with decisions about what is often their most valuable asset and social investment.

ii. Eligibility and equity of access to the program. Eligibility criteria may focus on equal access, being available to all properties affected to a specified level of damage.

Yet, under constrained resources, trade-offs may be necessary in prioritising only some of the affected population. Hence, equity-based eligibility may prioritise those identified, through socioeconomic or other vulnerabilities, as having a greater need for government support.

Figure 1: Evaluative Framework



Mobilisation and ongoing outcome

The processes for mobilising the target population are an important consideration, as well as the outcomes that can be achieved. Both incentives and social support were found necessary to mobilise often-traumatised people to take up a program.

Specific resilience programs are usually one government intervention in a longer-term flow of government policies aimed at addressing the ongoing resilience of the population. Any program needs to be considered in terms of its specific outcomes and also how those outcomes contribute to the ongoing disaster resilience process.

Research impact

This Hazard Note is the first in a series as part of the *Evaluating the Resilient Homes Fund* project. The framework developed in this part of the project will be used in the next research phase to understand how the Resilient Homes Fund impacts physical, financial, emotional and social resilience of individual homeowners and Queensland communities affected by floods.

Understanding how resilient housing programs change the lives of households and communities is essential not just for Queensland and Australia, but globally as authorities search for ways to manage climate impacts and reduce the devastating damage and loss to homes from weather disasters.

Above: Hurricane Sandy destruction. Photo: Leonard Zhukovsky, Adobe Stock Educational License.

The State of New Jersey: Superstorm Sandy (USA)

In 2011, Hurricane Sandy made landfall on the USA's east coast with a wind field of 1,000 miles (1,600 kms) wide, with New Jersey reporting that 346,000 homes had been damaged or destroyed and that recovery costs were estimated at $30 billion. In response, the New Jersey implemented 12 resilient housing programs including elevation, restoration and buy-back programs.

The program used household-level assessment within a broader program targeting larger parcels of land to create eco-sinks for water absorption and buffering against storm damage.

The program included incentives to stay within the community, which has resilience benefits, including employment, but has resulted in financial strain as insurance and housing prices rise.

The program specifically targeted low to medium income households and multi-family housing and included loan forgiveness and reimbursement for works carried out to facilitate financial recovery across the population.

End-user statement

Vina Varsani, General Manager, Resilience and Recovery, Queensland Reconstruction Authority

This part of the *Evaluating the Resilient Homes Fund* project develops a framework for evaluating the key enablers and trade-offs involved in implementing government-sponsored resilience programs.

It is expected that the framework that is described in the report will inform the basis for future phases of the Resilient Homes Fund (RHF) monitoring and evaluation project. The report makes eight future considerations for designing and implementing resilience programs.

Several of the future considerations are worthwhile considering for any future disaster response programs of a nature, similar to RHF, during the program design phase.

Further reading

Further reading is available in the full report titled *Resilient housing policies: A framework for evaluation*, available from the project website –

https://www.naturalhazards.com.au/research/research-projects/evaluating-resilient-homes-fund

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Natural Hazards Research Australia is the national centre for natural hazard resilience and disaster risk reduction, funded by the Australian Government and Participants.

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