

Abstract

Local governments are important actors in achieving the targets of the *Sendai Framework for Disaster Risk Reduction 2015–2030* (UNDRR 2015). While they play a key role, their level of action on disaster risk reduction varies substantially and the evidence base to explain this variation is limited. This paper reviews three strands of research that improve this evidence base and recommends further research. Data on local government action is generally limited or unavailable, although some survey work has generated valuable insights. Promising theoretical models from the public administration literature could be more strongly applied to disaster risk reduction. Research over the past few decades shows quantitative evidence for a range of factors that influence local government action including disaster events and risk, leadership, political system, advocacy, community characteristics and local government characteristics and resources. Avenues for further data collection, theoretical development and action research are explored.

When do local governments reduce risk? Knowledge gaps and a research agenda

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Introduction

To meet the challenges posed by emergencies and disaster events, governments and the international community have moved focus away from disaster relief towards disaster risk reduction (DRR) and disaster resilience. This is evidenced in the *Sendai Framework for Disaster Risk Reduction 2015–2030* (UNDRR 2015). Alongside this shift from response to resilience is the increasing attention globally of the role of local governments in DRR by international organisations and in the disaster literature (Blackburn & Johnson 2012, Godschalk 2003). Levels of government closest to communities have the best understanding of local hazards, vulnerabilities and risks and the greatest opportunity to implement DRR interventions (Malalgoda, Amaratunga & Haigh 2013). Yet despite increasing attention and these substantial responsibilities, many local governments around the world do little to reduce disaster risks.

If the targets of the *Sendai Framework for Disaster Risk Reduction 2015–2030* and the Sustainable Development Goals (United Nations 2015) are to be achieved, national and international actors need to understand and be able to influence local action. Campaigns such as Making Cities Resilient (Blackburn & Johnson 2012) and 100 Resilient Cities (100 Resilient Cities 2019) aim to achieve such influence. To increase effectiveness, successors to these campaigns need to be based on the best available evidence. Understanding the influences of local government action on DRR is key to this evidence base.

This paper summarises key theoretical and empirical research on local government DRR action and identifies research needs. It examines the limited existing data sources on local government action, explores promising theoretical developments and outlines theoretical work needed. The paper provides a summary of factors that influence local government action on DRR based on the empirical literature.

Data on local government action

To understand the influences of local government DRR action, data on DRR action is required. One of the more notable efforts to collect that data is the Disaster Resilience

Scorecard for Cities¹ as part of the Making Cities Resilient campaign.² However, this is a self-assessment tool and only 169 scorecards were available for analysis in the most recent *Global Assessment Report for Disaster Risk Reduction* (UNDRR 2019).

Surveys of local governments have been undertaken in some countries, such as Sweden (Nohrstedt & Nyberg 2014) and the USA (National Association of Counties 2019, Leep *et al.* 2017). These surveys, as well as other voluntary reporting, are subject to limitations, particularly selection bias that may lead to over-representation of high-performing local governments. If this type of survey were extended across more contexts it would likely produce a richer data source for analysis.

Local government expenditure on DRR may be an appropriate proxy measure for its overall level of action. Spending on disaster mitigation projects has benefit cost ratios of up to 1800:1, although this varies substantially depending on the hazard, context and type of project (Shreve & Kelman 2014). In Australia, there has been substantial discussion on the allocation of funding for disaster mitigation activities versus response and recovery by state, territory and federal governments (de Vet *et al.* 2019). While information on Australian state and territory government expenditure is generally available, there is limited information on mitigation expenditure by local governments (Productivity Commission 2014). Greater levels of reporting by local governments of expenditure on DRR would provide for analysis of the influencing factors. Reporting obligations could be imposed, however, international collaboration on reporting standards may be required for this to provide a useful data source to compare local governments across countries.

Models of government action

While there is extensive literature on developing models of disaster resilience (Cutter 2016) and some literature on organisational resilience (Shaw 2012), few have explicitly considered the role of local government in reducing disaster risk and building resilience in their communities. There is also relatively little agreement on how to operationalise resilience concepts in these models (Beccari 2016). The investigation of governance in the broader urban studies literature is likewise lacking in theoretical models subjected to study involving the comparison of multiple local government organisations (da Cruz, Rode & McQuarrie 2019).

Although models of local government action on DRR have not been developed, there is considerable literature examining individual policies and influencing factors. The grey literature discusses potential drivers and barriers, but these are largely based on case studies and expert opinion (Blackburn & Johnson 2012, Red Cross 2010). Quantitative studies of specific aspects of local government DRR action have been undertaken in fairly narrow contexts using relatively few variables. These studies have investigated:

- the quality of hazard mitigation plans (Olonilua 2016)
- the US Federal Emergency Management Agency's Community Rating System (Li & Landry 2018)
- US homeland security preparedness (Haynes & Giblin 2014)

- wildfire mitigation (Muller & Schulte 2011)
- flood mitigation (Khunwishit, Choosuk & Webb 2018; Nohrstedt & Nyberg 2014)
- implementation of the US National Incident Management System (Jensen & Youngs 2015).

These studies showed limited application of theory to define variables for investigation or to explain their results.

One of the few theories of policy development and change applied to DRR is the multiple-streams framework developed by Kingdon (1984). This has been applied to disaster policy in general by Birkland (1997, 2006) and municipal emergency management policy, in particular by Henstra (2010). In this theory, disasters act as focusing events that create windows of opportunity for policy change. However, this change is made more likely by an active policy community and political leaders willing to adopt policy and learn instrumental and social lessons from a crisis. The multiple-streams framework provides a useful lens for examining DRR policy change. However, it fails to explicitly account for a local government's context nor address whether a policy will be implemented effectively.

The broader literature on public administration and organisational resilience includes work on organisational capacities as determiners of local government performance. Capacities of local governments to implement the functions assigned to them vary significantly and the gap between their responsibility and capacity is large (Wallis & Dollery 2002). Wallis and Dollery (2002) apply a model of state capacity developed by Grindle (1996) to explore local government activity. It contains institutional, technical, administrative and political capacities that are interlinked with each other and with the activities of the central government. These capacities are underpinned by the social capital in the local government's community. Social capital may enhance local governance and economic performance and be built by local government activity. Capacity-based models have been discussed in the disaster literature. Kusumasari, Alam and Siddiqui (2010) proposed that institutional, human resources, policy, financial, technical and leadership capabilities of local governments are key to effective emergency and disaster management.

Other scholars have focused on the relationship between local government management and performance (Walker & Andrews 2015). This literature has been extended to consider the influence of context on the management-performance relationship (O'Toole & Meier 2015). This work identifies political, environmental and internal contexts that influence the overall effectiveness of management in public organisations as well as determining the effectiveness of individual management actions. Bullock, Greer and O'Toole (2018) have extended this theory to consider risk management in public organisations and set out ten hypotheses for further investigation.

1 Disaster Resilient Scorecard for Cities. At: www.unisdr.org/campaign/resilientcities/toolkit/article/disaster-resilience-scorecard-for-cities.

2 Making Cities Resilient. At: www.unisdr.org/campaign/resilientcities/.

Ongoing theoretical work should seek to integrate the strengths of these different streams and produce testable hypotheses to drive empirical research. Models also need to explicitly consider time to examine windows of opportunity and develop hypotheses that require testing through longitudinal study.

Influences to explore

While further theoretical development is highly warranted and may present some utility for those seeking to influence local governments, any model needs thorough empirical testing. A scan of selected literature (Table 1) reveals evidence for a variety of factors that influence local government DRR action.

Much of the existing literature summarised in Table 1 investigates similar concepts, but variables are operationalised differently in different studies and incomplete statistics are included. This

makes the literature highly resistant to quantitative synthesis that would guide theoreticians to develop their models. Investigators should publish complete statistics and, ideally, raw data to enable better comparisons between studies and eventual quantitative synthesis. Limited longitudinal research is available. This is needed to test theory models that explicitly consider variation over time. This will help to rigorously evaluate the effects of international campaigns such as 100 Resilient Cities and Making Cities Resilient.

There is a need for empirical studies in a variety of global contexts, including in the Asia–Pacific region. Much of the literature summarised in Table 1 is from the USA. There are limited examples of research conducted elsewhere, for example, Canada (Mehiriz & Gosselin 2016), China (Kim & Rowe 2013), Germany (Becker, Aerts & Huitema 2014), Sweden (Nohrstedt

Table 1: Summary of evidence for influences on local government DRR action.

Influence	Existing evidence
Disaster events and physical risk	Disaster events and disaster risk are a focus for research and have been frequently cited in the qualitative literature (Red Cross 2010). Quantitative evidence is mixed with studies finding disaster events and disaster risk may (Li & Landry 2018; Shi, Chu & Debats 2015) or may not positively influence government action (Muller & Schulte 2011, Nohrstedt & Nyberg 2014). There is evidence suggesting that risk and disaster events play different roles (Burby 2003).
Local leader commitment	The commitment of local leaders to DRR is highlighted in qualitative literature (Blackburn & Johnson 2012) and has received quantitative focus with some studies examining other leader characteristics (Becker, Aerts & Huitema 2014; May & Birkland 1994; Shi, Chu & Debats 2015).
Political system and organisation	A government’s political system and relationships with other governments may influence its effectiveness in reducing disaster risk. Decentralisation (Avery & Zabriskie-Timmerman 2009), local government form (Johnson <i>et al.</i> 2015) and urban coverage (Nohrstedt & Nyberg 2014) have all been examined. A key focus of research from the USA has been the effects of state and federal government mandates on local action (Berke, Lyles & Smith 2014; Muller & Schulte 2011) while grants and other financial support have also been investigated (Lindell & Whitney 1995).
Advocacy for risk reduction	The role for local activism in driving government action has long been acknowledged in the qualitative literature (Alesch & Petak 1986). A variety of forms of local advocacy, public and stakeholder participation and city-to-city advocacy have been addressed in the literature with mixed findings (May & Birkland 1994, Nohrstedt & Nyberg 2014). Cementing the empirical link between advocacy and political decision-making is evidence that the performance of political leaders in disasters influences voter behaviour at subsequent elections (Quiroz Flores & Smith 2013).
Community characteristics	A range of community characteristics have been studied consistent with theoretical models that incorporate community capacities. These are wealth (Li & Landry 2018; Shi, Chu & Debats 2015), education (Muller & Schulte 2011, Paille <i>et al.</i> 2016) and population size and growth (Avery & Zabriskie-Timmerman 2009, May & Birkland 1994, Nohrstedt & Nyberg 2014). These community characteristics have been the focus in the literature while some researchers have used a Social Vulnerability Index to aggregate relevant variables (Rahm & Reddick 2011).
Local government organisation characteristics	While the internal context of a local government organisation may play a critical role in the effectiveness of local government action, this area has received limited attention in the literature. What has been examined is organisation structure (Randol 2012), management culture (Wang & Kuo 2017), organisational risk perception (Johnson <i>et al.</i> 2015) and internal communication (Brody, Kang & Bernhardt 2010).
Local government organisation resources	Limited financial resources for DRR is a commonly cited barrier (UNDRR 2019) and has been a focus in the quantitative literature. The evidence for its role is mixed with studies suggesting financial resources may (Becker, Aerts & Huitema 2014; Shi, Chu & Debats 2015) or may not influence local government action (Muller & Schulte 2011, Nohrstedt & Nyberg 2014, Paille <i>et al.</i> 2016). Beyond financial resources, local government staffing and skills have been examined (Brody, Kang & Bernhardt 2010; Randol 2012). Access to technical resources such as maps (Deyle, Chapin & Baker 2008) and information technology (Johnson <i>et al.</i> 2015) may also play a role.

& Nyberg 2014), Taiwan (Wang & Kuo 2017) and Thailand (Khunwishit, Choosuk & Webb 2018). More international research is critical to ensure that theory models developed can be applied in multiple contexts.

Conclusion

Despite substantial work over many decades there are still many gaps in the understanding of what influences local governments to reduce disaster risk. The literature, as summarised, provides suggestions for further research. This includes greater deployment of local government surveys in international contexts, collection of longitudinal data, improved reporting by local governments on DRR expenditure and greater data sharing by researchers. Collaboration by researchers in fields of disaster, urban studies and public administration presents an opportunity to share data and develop joint data collection programs.

Rigorous and independent evaluation of campaigns to promote local government action will improve knowledge of local government influences beyond campaign effectiveness. Mixed-methods approaches should include a quantitative arm that examines pre- and post-intervention data and comparisons with local governments that were either not program participants or joined later. Action research in collaboration with organisations that seek to influence local governments to increase their DRR efforts, such as the United Nations Office for Disaster Risk Reduction, will help bridge the policy-research nexus, improving the quality of programs and data collection and ensuring that theory has a better grounding in practice.

While there is extensive theory on the performance of local governments, this largely has not been applied to DRR. The multiple-streams framework, capacity model and management-performance theory (including recent developments considering risk management) each have strengths. Integration of these strengths into a single theory with testable hypotheses offers one avenue of research. Application of different frameworks to a single dataset on local government influences and DRR action could identify superior models for further development and application.

Emerging rapid research on the 2019 Novel Coronavirus pandemic is already documenting differing responses by governments and noting potential influencing factors (Hale *et al.* 2020). This presents a unique opportunity to study the differential response of local, national and other subnational government responses and the factors that influence these; informing the evidence base for public health and disaster risk reduction.

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