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Disaster Risk Management: Insights from US Experience

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Andrew Gissing recently visited the United States to attend the annual Association of State Floodplain Managers Conference, American Planning Conference and to meet with representatives of FEMA, North Carolina Emergency Management and the University of North Carolina. This article summarises some of the key insights gained from his visit.

Governments and communities should use disaster recovery as an opportunity to transform resilience and use hazard mitigation plans to inform post event mitigation activities

"Disasters are both personal and transformative" (Dr Gavin Smith)

The scale of recent American Hurricane disasters have been beyond that of Australian experience in terms of death, damage, disruption and displacement. Out of the devastation from these events opportunities have arisen to enhance community resilience as a consequence of increased political and community interest in mitigation and the availability of additional supporting funding. This is allowing for the building back of safer, more liveable communities. Some examples where this was observed were in communities of North Carolina following Hurricane Matthew (2016) and New York City post Hurricane Sandy (2012).

North Carolina

Hurricane Matthew impacted communities in the South Eastern United States including North Carolina in October, 2016. In North Carolina, 28 people died, some 80,000 households registered for federal assistance and 2336 swift water rescues were conducted. As of early May 2017, some 130 people are still displaced, living in hotels. The event was similar to Tropical Cyclone Debbie with heavy rain causing flooding in rural communities, and with only around 30% of households reported to have insurance cover.

Previous major Hurricanes had impacted the State most recently in 1996 (Fran) and 1999 (Floyd) and in the aftermath voluntary property buy-outs and house raising had been implemented. These measures were said to have significantly reduced damages during Hurricane Matthew. Lessons captured in recovery from previous Hurricanes were key in forming recovery strategies after Hurricane Matthew, and local University staff and students have been contracted to assist in providing expertise and innovative thinking.

Following Hurricane Matthew, voluntary property buy-outs and house raising are again being pursued, along with the demolition and rebuild of structures to improved standards. Currently some 2600 households have volunteered for either buy-out, house raising or demolition and re-build. Funding may constrain the extent of possible implementation, in particular with the recent rejection of disaster relief funding for North Carolina by the White House: 99% of funding was not approved.

In the case of buy-outs the state provides a fair market price for the property based on an independent appraisal, with an additional incentive of seventy thousand dollars, if owners remain within their existing County. The home is then demolished and the land deeded to the Local Government. There is often, however, not a systematic community wide approach to buy-outs resulting in a patchwork of buildings remaining on the floodplain and concerns by Local Government that buy-outs will reduce rate bases. Vacant land had also become a site for illegal dumping.

Following Hurricane Matthew an analysis of existing housing needs is being undertaken to inform future plans to reconstruct homes away from flood-prone areas. The timeframe for executing individual buy-outs was often said to be challenging with the process sometimes taking several years to deal with valuation, assessment of any contamination, title searches, negotiation and completion of the transaction. Financial counselling is provided to households to assist their decision-making and community engagement was said to be key especially when considering the diverse socio-economic and cultural circumstances of those impacted.

In the case of businesses, buy-outs were said to be rare, though business retrofits are being pursued. These were challenged in some areas due to the historic nature of the buildings involved.

Programs are implemented through Local Government, and their capacity is key to success. It was also evident that prior hazard mitigation planning was key to informing strategies to ensure efforts were proactively implemented post the disaster. Loss avoidance studies to ascertain the effectiveness of mitigation efforts are also routinely conducted post disasters. Such studies would be useful in the Australian context as practitioners and politicians continue to understand the value of disaster mitigation efforts.

New York City

Hurricane Sandy impacted New York City in 2012 resulting in coastal flooding that caused 44 deaths, 19 billion dollars damage and affected some 443,000 residents. The City encourages preparedness of residents. Numerous people commented, however, that the narrow focus on terrorism in the lead up to Hurricane Sandy may have reduced thinking and preparedness for such a catastrophic hurricane event. It was also acknowledged that the event exposed numerous existing stressors within the community.

Recovery efforts are being implemented with the realisation that risk is changing in particular the consequences of sea level rise on coastal flooding and, despite the attitude of the White House towards climate change, New York City officials held a strong focus on the need to address climate change.

After the Hurricane a design competition, known as *Rebuild by Design* was launched. The competition coupled innovation and global expertise with community insight to develop implementable solutions. Participants collaborated with community and local government stakeholders to ensure concepts were based on the best knowledge and talent and final proposals were realistic and replicable. Several successful projects were presented at the

American Planning Conference including the construction of *The Big U*, a system of some 10 continuous miles of flood barriers to protect lower Manhattan from future coastal flooding events and rising sea levels. Information about the *The Big U* and other successful projects can be found at www.rebuildbydesign.org/our-work/sandy-projects. A clear message in the design of all of these projects was the need to: identify co-benefits to maximise return on investment; tailor initiatives to the contexts of individual community needs; and engage and involve communities throughout the process.

In order to build a resilient future, New York City has developed the One NYC Plan (see onenyc.cityofnewyork.us). The Plan includes initiatives known as *Resiliency Design Guidelines* to institutionalise resilience in the design of infrastructure to account for climate change, and a partnership with Copenhagen to improve resilience against urban storm water flooding through green infrastructure. The City has also launched an online portal, known as *flood hazard mapper* to raise awareness of flood risk and the impacts of climate change (see nyc.gov/floodhazardmapper).

Presenters at the American Planning Conference expressed the view that to enhance community resilience through urban design that it is critical urban planners are involved at the core of disaster recovery efforts. Again the linkages with hazard mitigation planning were identified with one speaker stating:

> *. . .should have a list of hazard mitigation projects ready to take advantage of when post disaster funding becomes available.*

All up some $50 billion is being expended in recovery efforts after Hurricane Sandy. However, there is little to no investment to undertake a comprehensive evaluation of recovery efforts, something very worthwhile to identify learnings for the future.

Across both areas the demands for quick restoration of homes and infrastructure was identified as often in conflict with the need to deliver effective and resilient recovery outcomes. This begs the question as to what metrics best define effective and resilient recovery?

Integration across a whole of community approach is key to catastrophic disaster planning

The US has developed a preparedness program focused on the development of catastrophic disaster plans for identified scenarios including mass power outages; large hurricanes, earthquakes, floods and volcanic eruptions; and nuclear and biological incidents. The principles behind such plans are outlined in the FEMA Operational Planning Manual. Key steps in the planning process include: identifying the scenario; building the plan; identifying required logistics; exercising the plan; and evaluating and implementing lessons learnt. The Department of Defence are integrated in the planning process to ensure logistical requirements for deployments in support of responses managed by States are well understood.

To build unity of effort through a whole of community approach, FEMA engages with private sector organisations through public-private partnerships. Most partnerships are voluntary in nature, with organisations motivated by public good and to ensure their own business continuity. FEMA maintains a private sector division and integrates business through a representative of Fortune 500 companies in the national operations centre. Businesses apparently appreciated the opportunity for FEMA to share information with them, though there were challenges in businesses sharing commercially sensitive information about their supply chains.

Public-private partnerships were also in place at a state level at Emergency Management North Carolina. Here some 300 private sector partnerships have been developed including infrastructure providers, peak bodies and big-box retailers. The method for constructing partnerships focused on identifying companies that already had an interest in providing disaster support and asking them what Emergency Management North Carolina could do for them. A business emergency operations centre and a web-based platform have been established to facilitate the sharing of information.

There are federally-legislated accountabilities ensuring the cost effective employment of resources meaning that often commercial resources will be utilised before defence or government resources are. Such practices, would challenge the routine deployment of Australian Defence Force personnel following Australian disasters and ask if more cost-effective options maybe viable.

Exercising was considered key to ensuring that plans and preparedness efforts remained effective. There was an identified need to continue exercises throughout all phases of a disaster in particular considering the longer-term recovery implications, for example, of mass migration and contamination following a dirty bomb attack. *Thunderbolt*exercises are routinely undertaken with no notice provided to participants to give a sense of realism in the case of rapid on-set disasters.

Building community preparedness remains a challenge

According to annual research conducted by FEMA despite efforts applied to raise community awareness and preparedness through engagement activities, the percentage of the community claiming to be prepared for disasters remains low. Further research was required to understand why this remains to be the case.

Key drivers to motivating action were claimed to be ensuring information provided is relevant; that there is evidence regarding the efficacy of actions encouraged; that people know how to prepare and can easily undertake actions; and that there is a sense of urgency to become better prepared.

Visualisation techniques were advocated to promote likely hazard scenarios in a way that community members can see and relate to them. Numerous hazard portals were presented at the American Association of State Floodplain Managers Conference including from North Carolina (fris.nc.gov/fris/ & irisk.ncem.org) and Colorado (gis.co.gov/mycohazard). Innovative

and interactive methodologies were also on display, for example, the FEMA immerse program which utilises virtual reality to communicate flood mitigation options to local officials and an interactive mapping table that models the impacts of green infrastructure projects on storm water problems.

Urban stormwater flooding is a growing problem requiring further integration between stormwater management and floodplain management

In numerous areas it was said that the majority of flood losses are now occurring outside the traditional floodplain, for example Illinois where 92% of flood damage is now attributed to urban stormwater. Often such systems are combined sewer and stormwater posing significant public health risks as a consequence of flooding. Aging infrastructure combined with an intensification of urban development is making the problem worse. Unlike traditional floodplain areas, flood mapping is not routinely conducted for stormwater flooding. Commonly, it is difficult to implement structural solutions to control stormwater due to cost-effectiveness issues. Green infrastructure approaches appear to be an increasingly popular management technique throughout the US in an attempt to reduce stormwater run-off.

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