

Examining the resilience of rural communities to flooding emergencies

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Abstract

This paper aims to examine the resilience of an Australian rural community to the impact of flood emergencies. In the past five years, a number of serious flood events have impacted Australian communities, resulting in death and injury to people as well as devastating loss and damage to property and infrastructure. Many inland rural communities are declining in population whilst the average age of these communities is increasing. This decrease in population and increase in age reduces the service functions within those communities which in turn has an impact on the vulnerability of those communities to the impact of natural disasters such as flooding. This vulnerability relates to not only the potential increase in susceptibility of those communities to flooding, but also the decrease in community resilience.

A study of an Australian rural community susceptible to flooding has been conducted to examine the resilience of that community to flooding and to identify issues relating to community vulnerability i.e. resilience and susceptibility, that exist within that community. From this study we hope to be able to identify community resilience strategies that may help other rural communities better prepare for and respond to the impact of natural disasters, including flood.

Keywords: *resilience, susceptibility, vulnerability, emergency management, community preparedness, flood emergencies*

Introduction

Flooding is a major hazard that threatens a large number of Australian communities on an annual basis. It has been described as Australia's most deadly natural hazard, with deaths from flooding across the nation between 1788 and 1996 being estimated to be at least 2213 (Gissing, Morgan & Ronan, 2007, p.1).

Be it localised flash flooding resulting from intense rainfall events such as thunderstorms, to widespread and long lasting riverine flooding resulting from heavy rainfall over river system catchments, the results can be devastating in both terms of human impact and damage and destruction to infrastructure and the environment. Flooding has been determined to be Australia's most costly disaster, with average annual losses estimated to be in the vicinity of \$400 million (Bureau of Meteorology, nd (b)).

The Bureau of Meteorology has stated that in coming decades:

“An increase in the number of dry days is expected across the country, but it is likely that there will be an increase in intense rainfall events in many areas.” (Bureau of Meteorology, 2010, p.6)

We have seen this prediction become reality with the intense rainfall events that caused the severe flooding in Queensland and NSW in 2010/11 and again in the severe flooding of southern Queensland and NSW in early 2012, with the rainfall experienced reported to have been the heaviest in 125 years (“Flood evacuations”, 2012).

The 2010/11 flooding experienced in Queensland alone resulted in 35 deaths, with three persons still missing, 2.5 million people affected, 29,000 homes and businesses inundated by floodwater and the overall cost of the event estimated at \$5 billion (Holmes, 2011, p.20).

One of the recommendations from the Queensland Floods Commission of Enquiry related to the need for local governments, who are susceptible to flooding, to conduct community education programs (assisted by the Queensland Government), providing local information on flood awareness and preparedness (Holmes, 2011, p.123). Given that public education, awareness and training is an essential part of the emergency management framework used by all Australian State government emergency management agencies, the message of this recommendation should be adopted nationally.

Bangladesh Australia Disaster Research Project

In late 2009, a group of academics and researchers at Charles Sturt University, representing the fields of emergency management, economics and psychology, began developing a research project aimed at enhancing the flood awareness and preparedness of local rural communities.

The project was designed in two phases. Phase 1 was the examination of community flood preparedness in an overseas developing country at risk from the types of flooding experienced in Australia. Phase 2 was the examination of an Australian rural community at risk from flooding. The results acquired from both phases of the project would then be compared and analysed to identify any similarities, differences, strengths, weaknesses and lessons that could be drawn from the way these different communities approached their flood preparedness.

For this first phase, Bangladesh was selected as the focus of investigations. Three communities within Bangladesh were chosen on their susceptibility to different types of flooding – flash flooding, inland riverine flooding and coastal estuarine flooding. With the assistance of the Bangladeshi Government’s Disaster Management Agency, a data gathering visit to Bangladesh was undertaken in late 2010 by two of the CSU researchers.

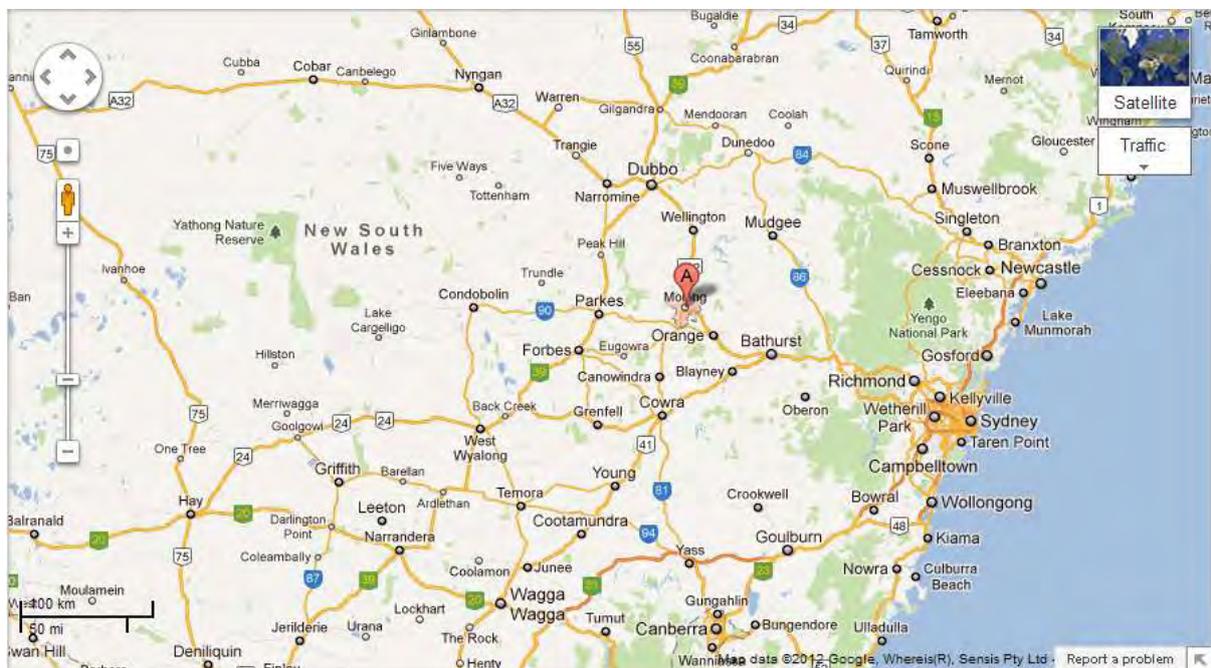
The second phase, based in Australia, focused on the small community of Molong in central west NSW, which is susceptible to flooding and has experienced major flooding on a number of occasions over the past 10 years. A postal survey was

distributed to residents in early January, 2012 and followed up in early February 2012 with a community meeting and focus group session.

This paper will focus on Phase 2 of the project, the Molong community's flood preparedness and the preliminary findings that have come out of that study to date.

Molong and its flood threat

Molong is a small rural village, located in the central west area of New South Wales within the Cabonne Shire and on the Mitchell Highway between Orange and Wellington (see location A in Map 1 below). Molong's population is approximately 1,600 people. Molong was first settled in the early 1830s after being visited by Australian explorers Charles Sturt and Sir Thomas Mitchell. Molong is located in a prime farming district, producing sheep, cattle, wheat and fruit as well as grapes for the local wine industry. (Cabonne Council, 2012)



Map 1 – Molong, NSW (Google Maps, 2012a)

Molong is situated on the Molong creek and experiences minor local flood events on a regular basis resulting from local rainfall. The town is also susceptible to major flash flooding as a result of heavy rain fall in the upper catchments of the creek system around Orange and Mt Canobolas. Major flooding of this type has occurred throughout Molong's history, however extreme events occurred in 1956, 2005 and a major one in 2010, when the lower part of the town's main street and the Mitchell Highway were inundated with water up to 1.5 to 2 metres in depth, resulting in the flooding of a number of residential properties and also a number of business premises in the town's main street.

Flood Preparedness in Molong

Flood preparedness and response in NSW is coordinated by the NSW State Emergency Service (SES). The SES are responsible for the NSW State Flood Plan

and Local Flood Plans, developed in consultation with Local Government authorities. In addition to this planning function, the SES also have a community Floodsafe program, providing information and guides to local communities at risk of flooding. In addition to community Floodsafe guides, the SES also produce rural, business and specialist location Floodsafe guides. A specific Molong Floodsafe Guide as well as Molong Flood Evacuation Plan has been produced for the Molong community by the SES in collaboration with the Cabonne Shire Council. These guides are provided online as well as in hard copy to the residents of Molong via letterbox drops and also through the Cabonne Shire Council offices in Molong (NSWSES, 2011).

In addition to the flood preparedness information and guides, the Bureau of Meteorology (BOM) in collaboration with the SES also provide specific flood warnings to communities at risk of floods. These warnings come in the form of flood alerts, flood watches, flood advice, generalized flood warnings, warnings of minor, moderate and major flooding, as well as specific river height predictions, (BOM, nd(a)).

A dam and creek monitoring station at Borenore, just north of Orange and on the Molong Creek, provide the residents of Molong with warning of potential flash flooding, with between one and two hours notice. One resident stated, *“It’s not flooding like western plains flood where you know it’s coming in about a week. We get two hours, three hours at the most”* (Molong resident, 2012)

However, if local heavy rainfall at Molong is also experienced or prolonged rainfall in the area has saturated the ground, this warning may be reduced to virtually no warning at all, as occurred in the 2005 flood and again in the 2010 flood. Residents during a community focus group stated that *“Sometimes, as in the 2010 flood, the first warning you receive is when the torrent of water reaches the town and the town is flooded within an hour or so.”* (Molong resident, 2012).

Molong Study Preliminary Findings

A community flood preparedness postal survey was distributed to the residents of Molong in mid January, 2012. Altogether 730 surveys were distributed and so far approximately 13% have been returned. Analysis of these returns is currently in process. Additional surveys will be conducted in neighbouring villages throughout 2012 to provide a larger base of data for analysis.

In addition to the postal survey, a community focus group meeting was conducted in Molong on the 8th February, 2012. Twenty five participants attended the focus group meeting. These participants represented a cross section of the Molong community and included home owners, business owners, local government officials and emergency service representatives. A series of questions relating to community preparedness, resilience, experiences, and economic and psychological impact of flooding were asked of the group. The following are the issues and reflections from community members that came out during the focus group meeting.

Community Preparedness

Molong residents rely on the formal flood watch and warning systems that are in place and managed by the State Emergency Service (SES). Because of the localized impact area, local SES volunteers carry out a house to house warning when they can and when they have sufficient warning. Some residents also have an informal notification system, where they call their neighbours and other family members when floods are predicted or occur.

The residents rely heavily on this small amount of warning in order to lift furniture and goods within their homes and businesses to above the 1 to 2 metre flood level. One resident stated, *“we had been away and we were coming home and I said to my husband I think we should lift all the furniture because we had had a lot of rain and the ground was very wet. So we might have had about three weeks of steady rain, and I said if we get any more rain we are going to go under because the ground is just not going to take the water. And of course yes...”* (Molong resident, 2012).

When discussing the type of warning and amount of notice that they receive, one resident stated, *“Well the last flood that we had here which was in 2010, I was in the SES by that time...but the first I knew about it was about at 7 o’clock. My pager went off, and it said residents of Molong had rang in and said the river was flooding. And within half an hour the SES came in and were sand bagging, but that’s the first we knew about that flood then. That was our first warning.”*

One resident stated, *“When the rainfall is over a longer period of time, the predictions for future flooding is better and the warnings provide a little more time to prepare.”*

Economic Impact of Flooding

Flooding in Molong has had a major economic impact, particularly on the business community situated in the low lying area of the town and main street (See location A in map 2 below). Business owners in those locations have stated that locating their businesses in those areas is very good for attracting customers – due to the proximity to the main Mitchell Highway and the town’s main street, Bank Street. However, the location, due to its proximity to Molong Creek and as it is in the low part of town also attracts a higher degree of risk from flooding.



Map 2. Molong Street Map (Google Maps, 2012b)

When asked what made the 2005 flood worse than the previous floods, one resident and previous business owner stated: *“Water was spewing down through the back of my premises in the main street. The mud was spewing from up on the hill, not from the bottom end of town, it spewed through the shop in a matter of 20 minutes to half an hour. And then all of a sudden, maybe in a hour, there was a terrific roar, you know just like another cloud had burst, and the bloody water was just flowing everywhere. It seemed like in a matter of minutes....there was no time to do anything, no time for sand bagging...nothing. It just hit us. And within oh probably an hour at that, some of the shops experienced 7 or 8 foot of water, something like that. I could go on for hours, but....it put me out of business, I never went back.”*

When asked about their ability to recover and restore their businesses after a flood, one business owner stated, *“We’ve found in the last floods, there was a lot of people willing to help move things above, but when the flood goes, that’s when the hard work starts. Because it’s a lot harder to get stuff down and back on the shelves and get the business running back to normal again. Because we found after the flood people think ‘oh he’s too busy down there, we’ll go somewhere else to get our goods’. And that’s when you need the income, after the flood.”*

Business owners are extremely frustrated and vocal about the impact that flooding has on their businesses. One businessman stated, *“The business centre here, has never recovered. Never recovered since 2005. Um...as a matter of fact any business that’s here and still operative...they’re all hanging. Just hanging.”*

When asked what the impact of another flood of similar proportions to the 2005 flood event would have on the town and businesses, one business owner stated, *“it has affected Molong to the extent that some parts of the affected street are valueless. We will end up probably having to give the properties away. It’s gotten nearly to that point with valuation. Valuations on residential in town, it has greatly affected that*

area whether they are in the flood plain or not....because of Banks on the lendings. And they have affected the borrowing for people here, to borrow for their properties to the effect that they can't get money from them."

One business owner, when asked why he remained in the flood affected area of town stated, *"As I said before it's economic reasons that I'm here. I owe the bank money. I can't go anywhere. We looked at other premises, but where else do you go? If I go somewhere else I'm losing my foot traffic. Like I'm right on the highway, I'd lose all my highway traffic. If I move my business I'd lose 50% of the business. Straight off. And I can't afford to do that."*

There is also a strong vocal outcry from business owners regarding insurance and obtaining appropriate compensation/ payments for flood losses. One business owner stated *"I lost in the vicinity with businesses and stock, \$760,000. I was paid 25% of that. That's all I got, and I never went back. I thought bugger it, I don't owe anyone anything and I got out. But the fact is that I still own the property there. That's the nerve-racking thing when you see property developers coming in and want to do something, and then it comes back to development but there's no re-development in that area, they're the things that play on us as property owners, it's nerve-racking."*

Residents feel strongly about the impact that engineering of local transportation routes such as the rail and roads has had on the severity of flooding experienced. Local government has undertaken cleanup works within the Molong Creek to reduce the impact of flooding along the creek. One resident, commenting about the speed of the water flow through the creek system during the 2010 flood event stated, *"One thing I will say that I think we all will agree had a beneficial effect was getting rid of a lot of the rubbish in the creek where the water did flow through quicker. A lot of people will agree in the last one in 2010 the water did flow through a lot quicker than previous floods. It certainly moved quicker than it did previously."*

However, some residents also feel very strongly about the lack of pro-active measures taken by the local government in the form of construction of levy banks and other engineering solutions to reduce the impact of the flash flooding on the town. One business owner stated, *"The problem.....the 2010 flood, what happened to me, it came up through the drains, not from the river. And that's what you try and get your head around, is that something that's taking the water away is causing the problem, because it's not taking water away it's backing it through, and you're thinking why? And then you see the flood plans come out, and you see 'not cost effective, not cost effective, not cost effective'. And a levy bank was gunna cost \$2 million and I think, I've got a business here that turns \$2 million over a year, but it's not cost effective to spend \$2 million to protect it. And you hear on the radio like this afternoon there was a flash flood in Brisbane and there is a kid missing. So what do you call cost effective and what don't you call cost effective? Is a life cost effective? And that sort of plays on your mind all the time, they say not cost effective but these pricks, excuse the language, probably don't have a business where there is a flood zone. And they don't go through the effects of what happened. The just sit in their ivory towers telling us....and that's what plays on your mind. You know it can be prevented and it's not being prevented."*

When discussing the community's perception of lack of action being undertaken by the local government, one resident stated, *"the saddest thing coming in here tonight is the number of people here. This place should be packed, but the reason it's not packed is because everybody knows that nothing is being done. After all the trouble we've been going through for the last fifteen years to get something done....and expenditure in water reports and feasibility studies...and it's all come to the fact that nothing can be done."*

Psychological Impact of Flooding

When asked about the psychological impact the flooding had caused and whether any form of psychological support had been offered or received, the responses were varying.

An interesting comment to come out of the focus group related to the support provided by Government to residential victims of the 2005 floods and not business victims. One business owner stated, *"....people in the residential side of Molong, they were offered grants. They got electrical offsets, furniture....given to them. But if you were in business, you were given nothing. Not even offered a grant at a low term interest rate or anything."*

From discussions it appeared that no psychological care was overtly offered to the town. The residents stated that they had experienced stress from a variety of inputs. One resident stated, *"I mean we went through a lot of bloody stress, and we're still going through it because we can't sell the property."*

Another resident stated, *"I suppose it would be a lot more stressful....someone coming up and offering you however much money for a house you grew up in and you want to grow old and die there. To me that would be more stressful than moving. A lot of those people are elderly, you know if someone came up and said 'here's \$250000 for your house, get out', I'd be upset. That's your house, that's where you've been brought up."*

Finally, one resident summed up their frustration by offering a humorous, but unfortunately all too real comment, *"We took it all out on council. Council were our psychologists."*

Community Resilience

All of those interviewed during the focus group stated that they knew of the flood risks associated with living in Molong and most had experienced major flooding in Molong over the past seven year period.

One resident summed it up by stating, *"I think you'll find most of the people who have lived here for a very long time will always know...they know what the creek is doing and they you know, are all out looking anyway."*

Some residents have taken mitigation measures themselves to reduce the impact of flooding. One resident when talking about measures his father had taken, stated *"Yes, he had looked at all previous flood records, and decided that the house should*

be built up to a certain height, which he did. And that 2005 flood was the only flood that I can remember to have even reached the house. It was the only one that reached the floorboards.”

When asked about their own preparedness and resilience to flooding, one resident stated, *“Well at this particular point in time, I suppose...I think when we lifted things up in 2005 at my mother’s house, we never put them back down. Most of the stuff in my father’s shed is still up above the benches, and it’s never gone back down. So if the water goes through those sheds again it’s not going to damage anything.”*

The residents were also very complimentary about the assistance they received from the emergency service, particularly the SES and the Fire Services. The SES were able to provide sandbagging assistance in 2010 and during minor flood events. One resident found the SES use of black polythene sheeting and sandbags in the construction of dams around residential properties very effective. Another resident could only speak praise for the Fire Brigade who during the cleanup after the flood event were able to use their high pressure fire hoses to wash out affected premises, thereby easing the stress and efforts required of home owners.

When asked about why the residents stay in Molong, knowing that floods will continue to occur and that the impact of those floods could be very damaging, one resident stated, *“We’ve got two schools, a hospital, three doctors, a dental surgeon, a bank...we’ve got probably the best climate that I know of. There’s no humidity here, it’s a very healthy town, vibrant community, agriculture par excellence, very low crime. People can still not lock their doors at night. Why wouldn’t you want to live here? It’s a great town, it’s one of the best towns there is.”*

Residents feel that the town, when it isn’t flooding, is their version of paradise. The location, in proximity to major towns, distance from Sydney, the climate, local facilities and services make it an attractive place to live.

Another resident stated, *“Yeah. I travel quite extensively around the state and people say why do you live in Molong and I say it’s the closest place to heaven.”*

One resident discussing their own personal resilience and why they chose to move to Molong and remain there, even after personally experiencing major flooding stated, *“We see floods and fires all around us and it doesn’t matter where you live. I came from a place called Bowen Mountain at Kurrajong. When I bought up there people said you must need your head to be read. Fire will go through there and there is only one road out. But the floods aren’t here all the time. My little house is 120 years old and the floorboards haven’t gotten rotten yet. But you know, it passes quickly. There is always the clean up, but it goes, it doesn’t stay for three days or a week. It doesn’t stop us, we just get back into it.”*

Conclusions

The community in general appears to be very much aware of the types of flooding that Molong faces and the impact that such flooding produces in the short, medium and long term. However, given this flood threat and the known impact it will have, residents are still willing to remain in Molong for a variety of reasons. Some stay because they have to for financial reasons, whilst the majority remain because they simply love their town and its location, climate and the community spirit that pervades there.

Residents recognize that the worst flooding occurs as flash flooding caused by extensive and heavy rainfall in the hills around Orange, which then cause a flood of water to flow down the Molong Creek system. They thus rely heavily on the relatively short warnings that they receive from the upstream dam monitoring stations, the BOM and the SES.

There appears to be a resignation to the fact that floods will continue to occur and that properties will be inundated, with main street businesses and low lying areas suffering the most effects. Business owners in the lower end of Bank Street (main street) and the Mitchell Highway appear to be caught in an unforgiving loop, in that they need to continue in business in those areas of town because the location not only attracts the greatest customer numbers, but also enables them to maintain mortgage and loan repayments to the banks. However they also recognize that by staying in those locations, they will suffer greater impact from floods in the future, if flood mitigation works on the creek system are not undertaken.

Flooding in the Molong township affects the town's economic stability, with major flooding (such as occurred in 2005 and more recently in 2010) having devastating effects on the main street and highway businesses located in the eastern, lower end of town.

Residents of Molong love their community and see the floods as a hazard that can be reduced. They recognize the positive impact that recent cleanup works in the Molong creek system by local government have had, but they still believe that their flooding risk can be greatly reduced with the construction of a levy system along the Molong Creek banks on the eastern side of the township.

It is recommended that the Cabonne Shire Council work together with the community and continue to examine the feasibility of a levy system on the Molong Creek in order to improve the resilience of the community to flooding and the long term viability of main street businesses.

It would appear that the residents, particularly the business community impacted by severe flooding over the past seven years, are experiencing high degrees of stress. This has been caused not only by the actual physical impact of the floods on their businesses, but also by the long term effects that the floods have had on their financial security.

It is recommended that the Cabonne Shire Council, SES and NSW Ministry of Health work together with the community to develop strategies for the implementation of short, medium and long term psychological support to those Molong community members affected by floods.

Even though the local community appears to be generally resilient to the impact of flooding, they rely on the support and assistance that they receive from the emergency services during and after floods (particularly the SES and Fire Services). Without this support, the impact of the flooding and its cleanup afterwards would be far more devastating.

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