

Raising the Bar Sydney 2018

Dale Dominey-Howes – The end of the world as we know it?

Welcome to the podcast series Raising the Bar Sydney. Raising the Bar in 2018 saw 20 University of Sydney academics take their research out of the lecture theatre and into bars across Sydney, all on one night. In this podcast, you'll hear Dale Dominey-Howe's talk "The end of the world as we know it?" Enjoy the talk.

[Applause]

Thank you very much. And I'd like to thank the organisers for putting on this Raising the Bar event, for Della Hyde for hosting us and their fabulous bar stops. Now do make sure you spend lots of time buying drinks. That will make me a lot more interesting as the evening goes on.

So you've come down here this evening I guess because you've looked at the information on the website, and you thought, well, okay, that sounds kind of interesting. Thank you so much. Let's think about it. The Earth is a dangerous place. Hazards happen all the time, and far too often, those hazards turn into events we label as disasters.

Now just because disasters happens doesn't mean that we need to lose everything that we value on the matters to surround us. There are in fact lots of things we can do to keep ourselves, our families, our homes, our communities, and our businesses if relevant, safe from the effects of natural disasters. So that's what I really want to spend some time talking to you about this evening, about 20 minutes, more or less.

And over that 20 minutes, I want to share really four major ideas or themes. And the first of those four is really what's that on the bridge? The weirdest disaster management experts use. I'm a geographer by training, but my area of expertise is natural hazards and the disasters that they cause. But I'm not just an academic at a university. I'm what I kind of call a pracademic in that I actually work on a practitioner side of disaster risk management as well.

So I work alongside emergency service organisations and governments that have to plan for, respond, and recover from disasters. I work at levels from the local council level here in Sydney all the way up to I'm privileged to be the chairman of the UNESCO Global Working Group. The deals we've had, we go out and do post-tsunami disaster impacts and assessments. And tsunami is my primary area of expertise.

So at least four things I want to talk about the language we use, so we understand the difference between what's a hazard and what's a disaster. In the second of the four ideas, what I want to cover is that as the planet around us is so terrible, what are probably the five top disasters of all time? Now please indulge me.

These are my ideas about the top five, the ones that have taken the most lives or led to the biggest changes. These could be contested, and there are likely lots of other great examples, but they're the ones that I decided were my favourites. So I hope that that's okay. Sounds terrible when we're talking about disasters, but I want to raise the bar, make it slightly more interesting and not focus too much on the terrible. In the third, I'm going to be terribly provocative, if I may, and explore the potential link between climate change driven by human activity and the occurrence of these events that we label as disasters and ask the question, are

some of these related? And then in the fourth and final part of the talk, I want to turn to the so what the hell can we do about this? If I paint a picture of death and destruction and disaster, I do need to leave on a positive note that actually we do have some control over this. So they'll be the four things that I aim to do.

Now I spent a bit of time meeting some of you, and many of you have now seen this paper tsunami globe that's gone around the room. This is a globe of tsunami events that have occurred throughout history and are known to humanity up to 2010, when this map was generated. I'm going to give you a task, if we're not too busy or [inaudible] for you. If you want to make up that globe, you can disassemble it and actually turn it into a globe that fits together and even make a base for it to sit on. If you choose to do that while I'm talking, there will be prizes for the three fastest individuals, tables, or teams that actually finish that globe. So if you finish it, raise your hand, shout out, and I'll bring a prize to you. There's only three prizes, okay? So that's what we're going to do over the next 20 minutes or so.

So turning to the first of those four themes and the idea that we as disaster experts use a particular language, if you switch on the TV, if you watch the news, listen to the radio, read the newspaper, hazards and the disasters that may follow from those hazards seem to happen all the time in Australia and all around the world. Just last week, events, earthquakes, tsunamis in Sulawesi, Indonesia, tropical cyclones in America. Words like hazards and disasters are used all the time, and the media uses those words interchangeably. But to a pragmatic, slightly anally retentive Virgo like me who's an expert in this field, those terms mean very different things. We need to kind of get our heads around each of those two before we go further forward. So would you be interested in knowing that actually all around the world, it doesn't matter where we live, Bangladesh, United States, Australia, Japan, the United Kingdom? I'm originally from London, UK. Word hazard is very specifically defined, and it's been agreed globally.

So a hazard is an object, process, or thing that has the potential to cause harm to us or the things we care about. So I'll repeat that. A hazard, object, process, or thing that has the potential to cause harm to the things we care about. And in there, the critical thing is potential. So hazards might include things like solar flares, earthquakes, bush fires, floods, and tsunamis.

>> We got it! We got it!

>> Oh! Wow! That was way faster than I thought, but fresh from Japan, a pair of tsunami socks for you. Many congratulations, and, ah, we also had a second prize. Many congratulations! You've won as well. You get a t-shirt, tsunami t-shirt. So thank you very much. Two prizes gone already, and we're not even through the first idea. So going back to hazard, the issue here is potential. So that earthquake, whilst it might be very large, is only a hazard if it actually buggers up the things we care about. So we need some other things to happen. We need exposure. So we need stuff, people, buildings, businesses, things we care about.

>> Done.

>> Was that a done? Ah! Ah! Well, do you know what? The third prize was another one of those.

[Laughter]

And I've got at least two winners, so well done. Truth is I think I've got another 50 down here. So may I suggest till the end of the talk you come and claim your consolation prize. Back to the hazard, and my gosh, you're fast. There's some real engineers in here, right? So a hazard could be very large, but then there's this stuff on the ground exposed in the place where the flood happens. And also that stuff is vulnerable to being damaged. That thing isn't even a hazard. So to put it in context, we could have a really large earthquake, magnitude 9, really,

really big. If it happens in the middle of a desert where there are no people and no buildings, no critical lifelines, and nothing to be damaged and harmed, it isn't even a hazard. It's just an earth process. It becomes a hazard if it intersects with us and the things we care about and actually causes damage to those things. So that's really what I mean by hazard. So we need to separate out these naturally occurring things in the world around us from events that we call disaster. So turning to disaster itself, we might ask the question, well, what is a disaster? Any immediate suggestions, given that idea of losses? Any immediate thoughts about what governments define as a disaster? When do they declare disaster?

>> Death.

>> Death. Okay. Death is kind of involved for sure. But are we talking 10 deaths, 100 deaths, 1,000 deaths? Any thoughts?

>> No deaths.

>> Or maybe no deaths, okay. Lots of people have lots of ideas, and depending on your responsibility, for example, the insurance industry categorises an event as a disaster if a certain amount of economic loss happens. But from a government perspective, and this definition has been adopted across the whole planet, a disaster is an event that requires a response that goes beyond the coping capacity of the local community. So if a community is affected by an event and they can't cope with it themselves and they reach out and ask for outside assistance and support, at whatever scale that happens, that's defined as a disaster, and the government steps in to provide assistance.

So disasters are what I as a geographer a scale-independent. So scale doesn't matter. A disaster can happen and can be declared in a small village where just a few people live, or a disaster could affect a whole nation, depending on the effects. And to give you a kind of illustration of how disaster impacts very significantly, let's take, for example, a tropical cyclone category 4. Back in 2005, Hurricane Katrina, which was a category 4 tropical cyclone, barreled in and hit New Orleans. It caused \$200 billion of US damage, huge amount of economic losses, and tragically, 1800 people lost their lives.

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And so, Tropical Cyclone Katrina, category 4, \$200 billion of damage, 1800 people killed, terrible disaster. Same size storm, category 4, impacted the coast of Bangladesh in 1991, \$400 million of damage, 198,000 people were killed, same size storm. So disaster impacts are scaled and relative to the society and place that they impact. So when we think about planning for disasters, we need to think about that exposure on the ground, the vulnerability of people and communities that are in the way of where these potentially hazardous processes will occur. So given I've given you a very quick overview 101 of hazards and disasters and this language, I guess what you really might want to know is what were the top five disasters of all time? And certainly, my students at the university always are, ah, yes, here comes the death and destruction, and that's what most people want to know. So given I've told you then disaster is defined as this event that needs response from the government outside your community, ah, that's a bit boring really, to be perfectly honest.

So I've decided I'm going to compromise between maximum number of people killed and damage done versus this outside support and assistance. So looking back through relatively modern history, the five top disasters in reverse order, number five, 2004 Indian Ocean earthquake and tsunami back in December 26, 2004. The earthquake that triggered the tsunami was magnitude 9.3. It was the third largest earthquake ever recorded in Earth's history. In terms of its kind of effects, it was significant in that in some areas, the ground actually continued shaking for ten minutes. Imagine being in this building with an earthquake

shaking the land beneath our feet for ten minutes. The earthquake was so large that it released the energy equivalent to 550 million Hiroshima-sized bombs going off during that ten minutes. And the earthquake was so large that it actually caused the Earth to wobble on its axis because of the redistribution of energy and the tectonic plates or crust on the Earth's surface. Furthermore, the Indian Ocean or the sea floor moved as much as 40 metres sideways, and in some places, the sea floor was uplifted by nine metres during that ten minutes of ground shaking. But as you know, that earthquake caused an enormous tsunami, and it was actually the tsunami that caused the enormous loss of life. That tsunami is the most deadly on human record, and estimates are somewhere between a quarter of a million and 300,000 people lost their lives. About \$15 billion of damage around 14 countries around the Indian Ocean, and that event triggered the largest international humanitarian aid response ever in the world, including the Austrian government making a single donation to Indonesia of \$1 billion.

The event also changed the way in which we detect, monitor, and then warn for tsunamis in the world. So that's number five on my top five list of disasters that have affected the planet. Really cheery, right? And it only gets better from here, depending. So number four, very quick on its tail was the 2011 Japan earthquake and tsunami, magnitude 9.4, fourth largest earthquake ever to occur. Again, huge movement of the sea floor, and in fact, the earthquake was so large, it caused the Earth's axis to change by ten centimetres. So the Earth actually changed its angle of rotation around the sun. It also was so large that it moved Honshu, the main island of Japan, 2.5 metres to the right. It was that large. The tsunami that was triggered flooded up to ten kilometres inland from the coastline and flooded to a height of 49 metres above sea level in some places. This was a unique event in that it also is what we refer to as a cascade disaster, or a so-called black swan event, in that we didn't see it coming, and it triggered a series of events. So the earthquake caused the tsunami, and the tsunami caused the nuclear accident of Fukushima. So this was a kind of hybrid natural/technological disaster, over 16,000 dead. As of this week, 2,500 people are still listed as missing, and 50,000 people are still living in evacuation shelters, not back in their own homes, seven years down the track.

Also, it showed us that these earthquakes and tsunamis occur at a much larger and at varying places where we didn't really know that they would be that big. So it's been a really awful wakeup call for disaster researchers everywhere. Just in case you're interested in the biggest loss of life for an earthquake ever, in 1552, there was an earthquake in China, and Chinese dynastic records suggest 830,000 people lost their lives in that earthquake. Number three on my list of top five, changing direction, tropical cyclones. So November 1970 in the Bay of Bengal, a tropical cyclone formed on the 3rd of November. It tracked north and crossed the coastline in an area that at the time was called East Pakistan. We now know East Pakistan as Bangladesh. That cyclone, magnitude a category 4, made landfall on the 12th of November. It was a multiple hazard process in that there was strong winds over 200 kilometres an hour, torrential heavy rainfall that led to freshwater flooding flowing off the landscape towards the ocean. But critically in this storm, it generated a storm surge, i.e., water that ten metres deep, or it storm surged ten metres high, so flooded over the landscape.

Why is a ten-metre storm surge problematic in Bangladesh? Because the coastline is only a maximum of three metres in elevation. It's flat and low-lying. That means there was seven metres of water above the land surface that flooded inland. And because of the low-lying elevation, the storm surge made it as far as 150 kilometres inland, following rivers up into the mainland of Bangladesh. Because of the politics at the time, Indian Meteorological Agency was ordered not to give early warnings to East Pakistan. There were few emergency shelters and no preparations. As a consequence, it's estimated that between half a million and 750,000 drowned in that storm surge with that tropical cyclone. And ultimately, it led to genocide atrocities in East Pakistan, the fall of that government, and the formation of modern

Bangladesh as we know it. So that's number two. Now turning to number one, I thought about - oh, sorry -- turning to number two, I thought about this. I wanted to talk about malaria. Malaria kills probably a million people a year. But malaria is not treated as a disaster because it happens continuously all over the world, yet the microbes that cause the infection that leads to malaria and death is clearly a problem. So I'm going to change direction and choose a different bacteria. I don't know if you can see it, but I've got all this gorgeous little sausage-shaped blue thing with a tail. It looks a little bit like sperm, but never mind.

[Laughter]

That's cholera. This is the bacteria *Vibrio cholera*. So cholera is a bacteria that leads to gut infection when we consume contaminated food or water. It leads to shitty, watery diarrhoea. Sorry. And it leads very quickly to death in a matter of hours if the cholera isn't treated via massive dehydration and then a collapsing of all of the organs in the body. On average, cholera probably affects 400,000 people a year with maybe 50 to 100 deaths from cholera every year. It's seasonal. So cholera lives in the ocean. So in coastal places particularly in the tropics, we know that cholera outbreaks tend to occur in the summer season. So we can kind of predict them and prepare and plan for them. But we also know cholera often breaks out after other disasters because of poor sanitation and water -- clean water supply.

So cholera is a major problem. When we look back through modern history, there have been seven global cholera pandemics in the last 200 years around the planet. The first one started in 1817 and originated in India. And there have been these multiple pandemics of cholera event spreads around the planet, taking lives and causing devastation. The most recent, or seventh, global pandemic started in Indonesia in 1961 and technically, we're still within that global pandemic at the moment. So the World Health Organisation and government are in a disaster emergency phase continuing to try to contain and treat cholera. It's highly political in that recently in 2010 there was a large earthquake in Haiti. I'm sure many of you remember of it, enormously devastating, over 200,000 dead. But critically, Nepalese humanitarian aid workers working under the umbrella of the UN didn't set up their own humanitarian camp correctly in terms of processing sanitation waste. And they were actually carrying -- some of the Nepalese aid workers were carrying cholera in their gut, which made its way into the sewage system that ended up in the water course that native Haitians were extracting for drinking that led to a major outbreak that killed thousands. So this has become a major issue, and the UN is embroiled in a event that's really still taking lives. And they haven't yet worked out what to do.

So that brings me to number one. In my mind, the number one worst disaster of all time -- I'll throw cholera back to its owner over there -- the number one disaster in my mind of all time, Mediaeval Black Death, the Plague. The Plague spread around the world in the mid- to late-14th century, and I'm really treating it as a singular event. It passed around the world in a series of waves, but it was really one single event. So the Plague, our Bubonic Plague, was spread by bites of fleas carrying bacteria in the fleas. The fleas lived on black rats and ship rats. They really liked to be close to people. And because of the unsanitary conditions and no one knew what it was, how it was spread, the Plague was able to travel along trade routes out of Asia where it originated, followed ships, the Silk Road, and ended up moving right the way round the planet. And the bacterium that causes the Plague, once it gets inside your body, it makes its way to lymph nodes in the neck, armpits, and groin. Within three to five days, large pus-like boils break out across the body, and another three to five days, people died in agony. It was appalling. The wave of Black Death killed tens of millions of people around the world. That's a lot, absolutely for sure a lot. It's not a lot compared to some other global pandemics. So 1918 to 1919, there was something called the Spanish flu. That spread around the world and killed 100 million people, probably even more than the Mediaeval Black Death. But let's put it into perspective. Historians and health experts think that the

Mediaeval Black Death killed something like 60 to 70% of the entire population of the Earth at the time. That's why for me that's the number one disaster of all time. From contemporary disaster management perspectives, the number one risk in Australia that government plans for is bacterial or viral pandemic. That's the one most likely to occur, and that's the one that worries disaster managers the most. So they're my five top disasters. So the next part, I just want to turn briefly to the idea of climate change and ask the question, is there any link between climate change and disasters? Now as I said earlier, I'm being provocative. I'm starting with the assumption that anthropogenic or human climate change is real. It is not a conspiracy. It's not a bunch of scientists getting together in broom cupboards and working out how we're going to screw the money for research grants.

The vast majority of the world's poor are living with the material consequences of climate change every day. We are privileged here in Australia mostly that we're not. Eighty percent of all declared disasters are what we called hydrometeorological. That is, they're weather and climate related. Tropical cyclones, heat waves, bush fires, droughts, storms, and floods, you can immediately see that there could be a relationship at least for disasters that owe their origin to weather and climate extremes. So why might climate change have a role to play? It is my view and the view of climate scientists that as our atmosphere and ocean heats up, it contains more energy. Put a cold pot of water on a stove, switch on the heat. What happens? As it boils, it gains energy, and that water starts to bubble and explode. That's pretty much what's happening to our oceans and atmosphere as we add heat energy. So the more energy that goes into there, the more turbulent our atmosphere and our ocean systems become. Consequently, we can imagine in the future that the occurrence of different types of weather and climate-related hazard events will change in frequency and in intensity. And since 80% of all disasters are weather and climate-related, it seems appropriate to me we should start planning for a more disastrous future.

So in my mind, there is a definite connection between those two. Then if we can't say right now, for example, the hurricane in the US last week was a direct consequence of climate change, it is indicative of the sorts of events that we'll see in the future. So having covered all of that, death, disaster, destruction, and so on, what the hell can we do about it? And that's the last thing that I want to consider with in this very last part of my talk. Would you know that really there is a lot that you, your families, your communities can do, and also if you're a business owner. But ultimately, what governments and emergency services want is in the event of a disaster happening, can we as individuals and families be completely self-sufficient for 72 hours? That is no water, power, sewage, food supply, emergency drops from heaven, as the government drops in supplies. Could you be self-sufficient for 72 hours if a disaster occurred? That's ultimately what governments want. But there's lots we can do. In the place you live and call home, do some background research and find out the hazards and disasters that could actually affect that place. Then go and talk to the emergency services. Talk to your local government area. They'll have -- pardon the expression -- shitloads of information available for free to help you plan how you might respond to the hazards that are known to occur in the place you call home. Develop a personal household disaster plan. But don't just develop a plan. Actually practice it with everyone that lives in the home. If you've got kids, work out what the hell would you do if a disaster's declared and you're at work and your kids are at school, and you can't get to them. That's a major situation that occurs for people affected by sudden onset disasters when mums and dads understandably want to go to get their kids and keep them safe, but roads are shut down and impassable, and they can't get there.

Talk to your schools about what you would do. If you've got pets or animals, think about what you would do to look after those pets and animals. We know from post-disaster surveys, don't many people don't evacuate their home because they don't know where to take little kitty with them, or they may even have horses or other types of animals. And animals are part of our family. And people want to know that they can take their animals with them. If you've got

animals, pre-plan. Talk to emergency services. I can't say this enough. Get insurance. Make sure your insurance premiums are up-to-date, and make sure you're not underinsured. And practice, practice, practice those disaster plans. Last and foremost, we are served by community volunteers in state emergency service, rural fire service, and other agencies, amazing people that are doing incredible volunteer work. Why don't you consider getting involved, supporting your local unit, or at the very least, go to an open day hosted by state emergency service or fire service and find out the things you can do in your local area to keep you, your family, your business safe.

So there we are. There were the four major things that I wanted to share with you this evening. Time's gone quickly. I've probably spoken for too long. Gary hasn't told me to shut up. So I guess I'm maybe okay. Disasters happen all the time. We can't stop the majority of them. But we can think about some actions we can take as individuals to prepare and respond and when necessarily recover. I also can't emphasise enough get to know your neighbours. You're part of a community. What we do know is when strong communities are together and you know your neighbours, you tend to work better on recovery after disasters. It's much, much better. We can't stop disasters, but there's a lot to do. I hope that you'll now leave after this talk with some ideas of tips, tricks, things you could do, places to go to get more information in order to ensure that down the track you're not a survivor. Well, you're a survivor, but not a victim of a major disaster in Australia. Thank you so much for your time and support.

[Applause]

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