

# Disasters as windows of opportunity: overcoming inertia through experimentation and learning

## The argument

Rethinking the use of experimentation in response to emergencies and disasters could drive a step change in sustainability and climate resilience.



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To move beyond ‘business as usual’ climate adaptation plans, we argue, a renewed engagement with the mechanism of ‘experimentation’, especially in contexts of disasters, is needed. We argue that this could prompt a step change in how learning and systemic change happens, and through this mechanism, provide a catalyst to improve sustainability outcomes and climate resilience.

### View

**Urgency:** We need urgent reform to reduce Australia’s risk to high-risk hazards and disasters. This is because Australia is experiencing an accelerated rate and severity of climate-related extreme weather events with associated disasters including floods, droughts, bushfires, heatwaves and storms. The *Royal Commission into National Natural Disaster Arrangements – Report* (Commonwealth of Australia 2020) indicated that, with a rapidly warming climate, exceptional events like the Australian summer bushfires (2019–20) will be more frequent. This is ‘now our future’ (p.6). The impact of such frequent events will include disruption and huge costs. Recent and repeated storm and flooding events across Australia in 2020–22 alone led to more than \$12 billion in insurance claims (Insurance Council of Australia 2022). It is clear to policymakers at all levels of government that the status quo is not an option (Nohrstedt *et al.* 2022).

**Baseline:** The most recent thinking in climate adaptation research puts the focus on the capacity for decision-making that will consider a growing level of uncertainty and that will enable positive adaptation pathways to be implemented. A key part of the change is to develop and mainstream new solutions, often across sectors, that weren’t previously considered. However, the current mechanisms for decision-making and reform

are unfortunately not where they need to be; as the mechanisms for learning from disasters still tend to be event-driven, short-term, mitigation-focused, sector-specific and rarely use integrated ideas of sustainability (Yeganeh, McCoy & Schenk 2020; Aguiar *et al.* 2018; Dilling *et al.* 2017). It is essential that we accelerate our understanding of mechanisms that enable us to move into sustainable pathways within the context of frequent, overlapping and ongoing disaster events. Time is of the essence because of the connectedness of the effects of systematic changes and for our social and economic survival (Raymond *et al.* 2020).

**New ways of instilling change:** To speed up change, we must move beyond current inertia and build novel solutions to drive greater appreciation of the necessity to reduce our exposure to risk and the benefits of change and innovation. Here we suggest the need for innovation for learning that we refer to as Natural Disaster–Induced Sustainability Experimentation (NDISE). NDISE is opportunistic in the sense that it draws on the window of opportunity for change that emerges as a result of disaster events. It draws on the notion of what resilience scholars and social-ecological systems theory refer to as ‘radical innovation and reorganisation’ (Walker 2020), as per the adaptive cycle of Panarchy (Gunderson & Holling 2002) and that, in general terms, can be referred to as ‘bouncing forward’. This potential for reorganisation and change comes about through at least 3 mechanisms, during and often after a crisis:

- Old ways of doing things (paradigms) can be challenged and new ways of doing things can be imagined. This means there is less inertia for change and greater capacity for imagination than there otherwise is.



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- Societal systems and their responses often move beyond the norm and from a complex adaptive systems perspective, creating an opportunity for probing and sensing and therefore learning through experimentation in a way that is usually not possible (Kurtz & Snowden 2003).
- Testing new solutions becomes acceptable. Novel experimentation becomes feasible and provides a way of translating insights about systemic solutions and how they can be turned into mainstream practice and/or cross-sectoral reform. This is an important step in order to turn opportunities into lasting change.
- after the town of Greenburg (USA) was largely destroyed in an EF 5-strong tornado, responses included experimentation with a novel interagency sustainability-working group. The resulting sustainability master plan that was derived from this collaboration was so impactful that Greenburg received an international award for it.

Importantly, many of the pathways to resilience depend on an enabling environment of cross-sector governance and learning, co-production, co-design and collective action to bridge the gap between intent and implementation (Moglia *et al.* 2021), which can be based on experimentation (Webb *et al.* 2020). Post-disaster, it is important to capitalise on these opportunities for a paradigm shift.

## But how do you 'do' NDISE?

NDISE is different from traditional experimentation. Traditionally, what is referred to as experimentation usually occurs in dedicated pilot programs targeted to address the causes and implications of climate change via innovation learning and building new adaptive capacity based on experience (Castan Broto & Bulkeley 2013). NDISE occurs in a coordinated, hopefully well-prepared yet opportunistic manner, capturing and expanding on emerging insights and directions in a way that builds systemic solutions that go beyond mere resilience but aims for a just and sustainable future. It draws on collaborative partnerships between community, government and the private sectors alike.

So far, however, there are no guidelines for how to 'do' NDISE well, although there is fast-growing and maturing literature on experimentation in the sustainability transitions literature (see Brundiers 2018, Brundiers & Eakin 2018). What we know is that NDISE challenges business-as-usual by testing new ideas and methods and building capacities and paradigms for new ways of doing, thinking and organising; ultimately leading to lasting institutional change. NDISE suggests that all sectors aligned with emergency and disaster management to collectively explore opportunities for change, and to use experimentation as it will help to embed innovative solutions in post-disaster post-disaster activities and investments. Scholars within the field of sustainability transitions studies recently re-visited case studies across academic journals to illuminate the practices and lasting consequences of unplanned experimentation in times of crises (Brundiers & Eakin 2018). Unfortunately, no Australian case studies were identified, nevertheless, they identified examples that include but are not limited to:

- during/after the recurring floods and hurricanes in Soldiers Grove, Kinston (USA), actor groups were forced to experiment with regulatory changes, and this resulted in reforms to federal and state laws promoting renewable energy and natural resource conservation

Similarly, the Christchurch, New Zealand, earthquake was a catalyst for long-term sustainability through efforts to introduce new regulations such as low-emission wood burners; rebuilds using insulation and ground-sourced heat pumps; building better co-governance arrangements among Māori tribal council, city councils, and the central government to permit Māori values to influence land use and urban development plans and the Natural Environment Recovery Program, which was based on a strong notion of sustainability. Through this mechanism, the Christchurch earthquake enabled sustainability shifts that were more innovative than otherwise could have been the case because the disaster 'triggered and accelerated (practices) that were being put off'; further, 'some post-disaster sustainability initiatives leveraged opportunities to build buy-in for their visions' (Brundiers 2018, p.1083).

## Broad collaborations are key to success

Public and private sectors alike have long been advocating and implementing novel climate action experiments to demonstrate and contribute to a possible shift towards sustainable practices. Experiments, when built on broad collaborations, usually carry the promise to positively and proactively contributing to systemic change by developing new solutions that are also widely adopted by key actors.

Engaging a broad alliance of actors within these collaborations is also important because it acknowledges the plurality of desires and values, stimulates innovation, mitigates the risk of conflict and allows for diverse interpretations of reality, thereby providing a better chance for more transformative action (Cork *et al.* 2023). What is common across all these experiments is that they tend to leverage the opportunity for momentum and rapid change that arises from wide collaboration not just with governments, but also with civil society and business. However, such existing forms of experimentation rarely engage with disasters.

## Planned or unplanned

An important issue when thinking about NDISE is to consider the differences between 2 key types of experimentation: unplanned experimentation and planned experimentation. Unplanned experiments can draw on opportunistic insights as a crisis unfolds and can tap into the creativity and problem-solving that occurs during crises yet may, depending on institutional rules, lack the legitimacy and support required for widespread adoption.

Planned experimentation plays an important role in the way it is designed, organised and how policy and social learning are being monitored and evaluated. Especially in contexts where social capital is high, planned experimentation can deliver new policy

innovations and governance approaches tested/trialled and be part of a larger portfolio of actions or adaptation pathways that provide a crucially important diversity of responses (Werners *et al.* 2021, Walker 2020).

## Where to from here?

These examples and insights illustrate how, during emergency events, individuals, communities and organisations collectively recognise the need for new visions and solutions. Such new collectively agreed visions and solutions, may induce lasting behavioural or institutional changes. But knowledge of the entailed experimentation, or learning mechanisms, in crisis, is still limited and therefore opportunities risk being lost.

To maximise the potential for charting new directions using NDISE, we urgently need a better and systematised understanding of its forms, scope, limits, mechanisms and potential. Without this knowledge, we lack the tools to assess whether and how shocks to systems can open alternative pathways that harbour transformative opportunities that allow Australia to live more safely and productively within a sustainable future. Proactive, change-oriented sustainability experiments across the globe have demonstrated their potential and promises for many years. Therefore, we argue that we need to embrace NDISE as an area of focus in both research and policy, to bring it into the context of disasters.

In summary, we advocate for improving our theoretical and practical understanding of emergent processes of improvisation, problem-solving and social momentum and innovation during times of crises and to develop a fine-grain suite of NDISE analysis tools than are currently available. What is needed to support this activity? To begin, we invite a discussion on several questions and welcome new questions into the debate.

- Which factors influence the leveraging of post-disaster opportunities for change actions?
- What opportunities for innovation does a disaster offer?
- What were the main mechanisms of leveraging the opportunities that is, practices and attributes of the change agents?
- If opportunities were leveraged what specific post-disaster adaptations were undertaken?

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# Responses



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**Minderoo Foundation agrees with the authors on the need to draw on our collective experiences of disaster events to drive innovation and system change. We believe that, by harnessing the collective power of communities, industry, government, philanthropy, emergency services, non-government organisations and the research sector, we can identify the most important resilience-related problems and enable the most effective solutions to be delivered faster.**

However, to be truly effective we need to avoid duplication of effort by inventing new tools, frameworks and processes that ultimately seek to achieve the same outcome. Through better coordination, we can harmonise our efforts and reduce the burden on already disaster-fatigued communities. When we do this, we will collectively lift Australia to be the global leader in disaster resilience within a decade.

We are facing unprecedented challenges and change in both the current and future operating environments with a dynamic political, social, economic and policy landscape surrounding disaster risk reduction and resilience. This is being amplified by hazards that are increasing in frequency, intensity and severity due to human-induced climate change. The resulting social, cultural, health, economic, built and natural losses are deepening, and some consequences may last for generations. Compounding this issue is an increasingly harsh reality that governments simply do not have the financial capacity to make everyone resilient, and response agencies are unable to protect everyone.

In this context, innovation is critical, especially where systems and processes are fundamentally broken. The Royal Commission into National Natural Disaster Arrangements<sup>1</sup> highlighted many such examples. However, the luxury of being able to innovate, that is, having the time and resources to come up with and test new technologies and processes, may result in some instances of communities being unprepared for these worsening events because their basic needs are not met.

Arguably, the shift from response and recovery to resilience represents a major and largely unrealised innovation. Our collective but limited resources should be prioritised and targeted to improve and promote rapid system change and a shift to building resilience. We now know that financial resources are more effective if we are better prepared, with research showing an average return of \$3.70 against every dollar currently spent in response and recovery (Hugenbusch & Neumann 2016<sup>2</sup>).

Resilience is a shared responsibility and the success of our endeavours will depend on the collective and combined effort

of individuals, communities, businesses, non-government and government organisations. When combined, strong, well-connected networks and well-coordinated approaches across the emergency management cycle (and across disaster management arrangements) will provide a primed environment for disaster resilience initiatives to succeed and take effect.

In this context, innovation and experimentation are not necessarily concerned with what is new. We should be focused on reducing complexity, increasing transparency and harmonising tools, frameworks and processes. As such, we advocate for major innovations in disaster resilience:

- A national prioritisation tool (an index) to identify the least resilient communities (at a granular level) to disasters based on a range of core indicators. This can be used to prioritise where resilience and disaster risk reduction funding is best directed. Ideally, it can do so for all community-based disaster and resilience programs; national and state. This must be openly sharable, without restriction and underpinned by the most up-to-date data and information on what communities, assets and ecosystems or environments are, or are not, resilient and sustainable.
- A new, nationally consistent framework that is principles-based and supports communities to lead risk reduction and resilience planning. The outputs of such a framework should support the prioritisation and targeted application of limited resources and funding to communities in need.
- A national effort to connect the significant and largely untapped network of corporate and student volunteers. These networks should work with and through existing community-led organisations and non-government organisations on the ground to help communities and local governments prepare for high-risk hazards, such as fires and floods, before they occur. An example of where this is being achieved is through the Australian Resilience Corps.<sup>3</sup>

The Minderoo Foundation believes that our ability to survive, adapt and thrive, individually and collectively, depends on innovating existing capabilities and capacities that can be adapted as we recover and learn from today's crises events. How effective we are in this pursuit will depend on how we collectively tackle the resilience challenges and opportunities that come next.

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3. Australian Resilience Corps, at [www.resiliencecorps.org.au/](http://www.resiliencecorps.org.au/)





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**Rethinking the use of experimentation in response to emergencies and disasters to drive a step change in sustainability and climate science is a novel idea and should be explored further.**

Australia’s ability to reduce the risks associated with natural hazards has improved immeasurably over the past 100 years. As our urban and regional populations have increased, so too our economies have grown, our technology advanced and our knowledge base increased. This has enabled us to increase our risk treatment effectiveness from low-moderate intensity events at the beginning of the 20th Century through to severe intensity events in 2023. As our capability to treat risks has increased, the consequences (loss of life, economic, social, built and natural impacts) have decreased. We have, however, reached a point where the effectiveness of our capability has reached its limit and the intensity of natural hazard events are increasingly surpassing that capability, producing significant and unacceptable consequences.<sup>1</sup> The recent compounding, cascading and complex disasters that have occurred over the past 4 years are a testament to this effect.

As a sector, we have become relatively competent and confident in our ability to manage the more frequent but less intense disasters. We could say that these disaster events are within the scope of our knowledge, skills, experience and imaginations. We know a lot about them, we are skilled and adept in managing them, many of us have had at least some experience of them, and they tend to play out in a way that is within our capacity to imagine them. Under these circumstances, we tend to maintain the trust and confidence of the communities that we serve.<sup>2</sup>

However, for the intense disasters in the range of severe to catastrophic, the rules change. These disasters are rarer (although increasing in frequency largely driven by the effects of climate change in concert with other factors such as poor land use planning decisions and outcomes) and more intense. They generally exceed our knowledge of their potential cascading effects, surpass our skills in how to effectively manage them, are unique in the experience of many, and exceed our capacity to imagine their manifestation and their effects. When this happens, the trust and confidence of the community is severely eroded and often difficult, if not impossible, to recover at least in the short to medium term.

In these circumstances, there are two key factors that emerge: the need for responsivity and reflexivity.<sup>3</sup> The ability to react to the ‘unknown unknowns’ in a way that is novel, dynamic, strategic and perhaps most importantly, courageous.<sup>4</sup> The Natural Disaster-Induced Sustainability Experimentation (NDISE) proposed by Kathryn Davidson and Magnus Moglia provides that opportunity.

In my experience, the factors that influence the leveraging of post-disaster opportunities for change actions arise from courageous individuals who tend to ‘break rules’ or at least ‘norms’ and pursue

novel solutions out of a sense of moral duty, operational urgency and/or political opportunity. The introduction and use of social media during the Queensland floods over 2010 and 2011 by the Queensland Police Service is one celebrated example. The use of predictive fire mapping during the fire season on 2019–20 by the New South Wales Rural Fire Service is another example. These novel solutions often emerge when leaders come to understand that their systems of management have reached their point of limitation, the rules of engagement have changed (in often foreseeable but ignored ways) and the emerging crisis demands innovation and creativity.

With the changing nature of Australian politics in favour of an uncontested policy environment regarding climate change, agencies and organisations are now better placed than the previous 10–15 years to accept the inevitability of climate change influenced natural events. In so doing, they can afford to be more imaginative and creative in how they respond to emerging problems as well as how they reflect on the lessons learnt in preparation for future events. They also have the opportunity to engage in these processes with the communities they serve and protect. In so doing, they are afforded the opportunity to explore interventions that recognise and support the existing and available capabilities of communities to exercise their agency and contribute towards valued solutions.<sup>5</sup>

To achieve this, our collective political, operational and administrative leadership must be prepared to bring to the table their equities of power (such as legislation, regulation and influence), wealth (funding) and resources (people, things and capital) as well as their vast bodies of knowledge to share with communities. This would require a shift towards a participative democratic process; a sharing of responsibility for both problems and solutions.<sup>6</sup> The expertise of governments and their agencies would bring significant benefit to the definition of the problems that are likely to be faced into the future, and the values and preferences of community members would help shape the solutions in response to those problems.<sup>7,8</sup>

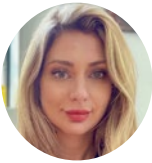
Finally, it is important that the change agents are prepared to ‘be in relationship’ with those they are seeking to serve and protect; that they genuinely understand the vulnerability of themselves and others and the potential for suffering to ensue. They also need to be committed in thought, word and action to alleviate that same vulnerability and suffering, be venturesome in that pursuit and remain accountable for their actions.<sup>9</sup>

I would contend that the NDISE approach provides a pathway for such a solution and should be applauded.

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**Minderoo Foundation agrees with the authors on the need to speed up change in the way that we respond to and prepare for and get ahead of disaster events by testing new methods, iterating and co-designing solutions with stakeholders across the system.**

Rapid experimentation is needed to develop nature-based solutions so we can adapt to a changing climate, and to standardise the way that we measure the effects of land management activities on reducing the fire and flood risk of our most exposed landscapes. In addition to rapid experimentation, co-designing approaches with First Nations communities and other important stakeholders is critical to achieving resilience.

Technological systems such as AI and machine learning allow continuous interaction through a mechanism commonly referred to as ‘Human in the Loop’ (HITL).<sup>1</sup> ChatGPT uses artificial intelligence to complete tasks, but still requires human input to ensure its outputs are customised and nuanced. When information is linked between systems, better decision-making can occur. So how can we harness both adaptive natural systems with human systems (social, technological and economic) to crack the code for a step change in climate resilience innovation?

Modelled on ‘moonshot’ programs, Minderoo Foundation Healthy Landscapes mission approach promotes innovative collaboration, with shared risk and reward. Experimentation within an ecosystem of strategic partnerships incorporates different experience and knowledge; opening the door to new solutions that address seemingly impossible problems. This is a time-bound, iterative and continually experimental approach, akin to a disaster resilience lean start-up.

An example of the lean start-up method that has been applied is Minderoo Foundation’s partnership with Greening Australia to plant 10,500 alpine ash seedlings throughout Victoria and New South Wales. Through experimentation and a product-development approach, the aim is to develop ‘super seeds’ that speed up regeneration of a keystone species that normally takes 15–20 years to mature after bushfire loss and is integral to most of Victoria’s water supply. This has reduced the risk of extinction as the climate changes and also enabled a better understanding

of supply chains, cost and benefit analysis and who the customer is for restoring the Alpine Ash.

The Royal Commission into National Natural Disaster Arrangements<sup>2</sup> highlighted that there are critical gaps in information, making vital decisions about safeguarding the environment a challenge. We need to drive the development of practical solutions that can help standardise the information we have, show science-based outcomes against actions such as hazard risk reduction and represent the value of restored ecosystem services and resilience at a regional scale. Providing this information in a simple and accessible format means it can be used anywhere by land managers. This demonstrates that interoperability between systems such as economics and ecology is possible for sustained investment in climate resilience.

Minderoo is a contributing partner and funder of the Burnett Mary Regional Group Natural Capital Account<sup>3</sup> covering 5.6 million hectares and certified through Accounting for Nature.<sup>4</sup> This experimental pilot set out to demonstrate how actively managing the environmental condition of landscapes can become an investable, risk reduction practice. A complete picture is forming at the local and regional scales as we work in the region to design interventions with traditional owners to protect high-value environmental assets that are most at risk of fire and flood. Soon, we will be able to scientifically evaluate and measure which methods yield optimal risk reduction and biodiversity benefits, while testing new technologies such as earth observation and eDNA<sup>5</sup> to capture the full gamut of ecosystem services. This will contribute to new environmental accounting methods specific for fire and flood management that can be replicated in other hazard prone regions.

Linking our human systems to natural ones provides an opportunity to generate feedback loops and develop a shared language and operating context that will create conditions for better experimentation. Combining information on environmental conditions and ecosystem services with traditional knowledge, natural capital and landscape management practices builds better resilience solutions, no matter the location. This will benefit our most exposed landscapes as well as the surrounding communities that depend on them.

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4. Accounting for Nature provides a global certification standard for environmental accounting. See: [www.accountingfornature.org/](http://www.accountingfornature.org/).
5. eDNA biomonitoring is ‘environmental DNA’ and refers to the DNA that can be extracted from environmental samples (e.g. water, soil, sediment). See <https://research.csiro.au/teamcoast/environmental-dna/>.



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**As we lick wounds from our worst ever bushfires followed by record-breaking floods through the subsequent triple La Niña, we brace for return of El Niño and its minions: heatwave, drought and fire. After years of escalating disasters driven by climate change, it is time for new approaches that assist local communities to find local solutions. The tendency to centralise resources and decision-making after major disasters is unlikely to meet the climate threat.**

Widespread rains are a double-edged sword; temporarily reducing fire danger while promoting prolific growth of grass and bushfire fuels and stopping crucial fuel-reduction burning.

Historically, following every protracted La Niña event, the east coast of Australia immediately burns, with major property losses in 1957, 1977 and 2001–02. A protracted La Niña also fuelled the largest grass fires in Australian history in 1974–75.

So, the big question is: have we learnt from the years of consecutive, compounding disasters, and are we better prepared as a result? The answer depends on your perspective, but every level of government has clearly worked hard to increase response and recovery capabilities and committed record levels of expenditure to better prepare agencies and communities.

The next question is: is it enough? The unfortunate answer, in my opinion, is no.

But before rushing to blame and condemn (an increasingly common reaction from armchair critics and social-media-informed ‘experts’) we must acknowledge that the intensifying effect of climate change challenges every facet of emergency management. Together with 40 other former chiefs from every fire service in Australia and a number of SES, forestry and national parks agencies that comprise Emergency Leaders for Climate Action, I am immensely relieved that the national dialogue in Australia has finally moved on from whether climate change is happening to what we must now do to address it. Scientists warned for decades that this horror scenario would come and the reality is crushing and frightening. Thankfully, we now have all levels of government accepting the need for simultaneous emissions reduction (though way too slow) and climate adaptation.

So, given this and the additional investment, why would I say that we are ill-prepared?

Unfortunately, the increasing frequency, intensity and geographical spread of extreme weather events are increasingly overwhelming centralised approaches (which nonetheless remain crucial). As an example, the recent *National Defence: Strategic Review 2023*<sup>1</sup> revealed that the Australian Defence Force (ADF) cannot sustain continual diversion of resources from defence of our external borders to cleaning up after disasters within.

So, what can be done to plug the gap that the ADF leaves? Firstly, we must not waste millions on creating new structures and bureaucracies and instead leverage what we already have by building on the volunteer and professional emergency services structures already located within communities. But that is just part of a very complex puzzle and I can’t help wonder, is there anything we might learn from the past?

I grew up in a semi-rural area where bushfires were a constant and, at age 12, became a volunteer firefighter like my dad. But back then, the fire brigade and the slow old fire truck were a last resort. Everyone knew how to prepare their homes for fire, did cool burns in winter around property perimeters and helped each other whenever a fire broke out. Before they were buzzwords, our community was resilient and self-sufficient.

Thankfully, today, emergency services personnel are vastly better trained, equipped and organised. However, amid calls for ‘new thinking’ and ‘innovation’, I wonder whether we may have inadvertently ‘thrown the baby out with the bathwater’ when we largely eliminate residents from the PPRR (preparedness, planning, response and recovery) of emergency management.

Following Australia’s bushfires during summer 2019–20, the stark reality of the truism ‘on a bad day you can’t expect a fire truck in every driveway’ was truer than ever. The rapidly warming climate is driving extreme weather events that regularly overwhelm formal emergency management structures designed for the threat environment of the 20th Century, particularly in the areas of response and recovery.

Following the horrendous bushfires and floods of recent years when previously reliable firefighting strategies regularly failed, predictions of flood peaks were rendered meaningless and emergency services struggled to cope, encouraging stories emerged from the gloom. Working outside formal structures, groups of farmers using ‘slip-on’ fire tanks and pumps on the New South Wales South Coast and on Kangaroo Island in South Australia saved many homes. In Lismore, the community ‘tinny flotilla’ rescued hordes of locals who were clinging desperately to roofs as flood waters swirled.

I think back to my resilient childhood community and reflect on literature explaining how true community resilience comes not from imposed, remote solutions, but from increased local information, autonomy, capability and decision-making. The tinny flotilla, farm fire units, community fire units and Brisbane’s ‘mud army’ all demonstrate community partnering that works. And after 200 years of ignoring our Indigenous brothers’ and sisters’ knowledge of cultural burning, there is finally a genuine interest to embrace tens of thousands of years of previously discarded wisdom.

As we continue the vital work to strengthen central capabilities, my hope is that we will also embrace the old/new approach of truly empowering communities, because if we do, it will be a force multiplier.

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### **Emeritus Professor Barbara Norman**

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**The phrase ‘bouncing forward’ encapsulates the key arguments behind the need to enable innovation and experimentation as a key response to emergencies and disasters. Implementing ‘bouncing forward’ at all levels—national, state, territory and local governments, in partnership with the private sector and community groups, will be essential.**

Experimentation and learning with innovation are central to bouncing forward. Demonstration projects funded through partnerships are critical for implementing change. Building back better after disaster events is an opportunity to advance leading practice in the built environment and can be done creatively by addressing several challenges, for example, developing affordable carbon-neutral mixed-use residential precincts. Such projects rely on successful partnerships and ongoing funding to allow for effective implementation, review and learning.

The active participation of First Nations peoples is critical in future land use responses as is the concept of ‘working with nature’. Coastal planning is a good case study of what’s possible. The Sea Country Plans by Aboriginal Land Councils provide excellent examples of a systems approach to forward planning in taking an integrated approach to environmental management, cultural knowledge and adaptive planning (see Dhimurru Aboriginal Corporation<sup>1</sup>). This approach provides a sustainable and practical example of learning being incorporated into planning responses over many years.

Climate-induced resettlement will be one of the most significant challenges of the 21st Century.<sup>2</sup> As discussed in my book *Urban Planning for Climate Change*<sup>3</sup>, the global impact will be immense affecting millions of people by 2050, whether it be due to glacial melt in Alaska, the sinking of Jakarta, the inundation of neighbouring Pacific islands or towns and villages around Australia due to sea-level rise and extreme events. Experimentation and learning in bouncing forward can be a proactive response to working with communities facing serious climate effects soon. The example of the relocation of the Queensland township of Grantham to higher ground following destructive flooding is a positive one involving community leadership and engagement. The establishment of the Queensland Reconstruction Authority was an innovative governance response at the time and that model has been adopted more widely.

Finally, for the above to happen, it will require reform to current governance and legislative arrangements. The Royal Commission into National Natural Disaster Arrangements<sup>4</sup> recommended ‘mandatory’ consideration of natural disasters in all land use planning. Fortunately, change is beginning to happen with the Australian Government now actively seeking advice and input from experts and the community on these issues. Reinvestment in tools for scenario planning and platforms for innovation will be

necessary to enable and support such change. Local governments particularly need the support of other levels of government to work with local communities to develop ‘climate resilient plans’.<sup>2,5</sup>

So yes, experimentation and innovation should be encouraged and facilitated in response to natural high-risk hazards and disasters. However, such an innovative approach could be mainstreamed in all land use planning through reform of legislation, policy and dedicated funding programs to provide the foundation for really ‘bouncing forward’. There is a great deal of innovation occurring at the local and community level as well as growing awareness that we can do better in planning for emergencies, disasters and climate change. This bodes well for the future. With more active support for these initiatives, collectively, we have the capacity to make a substantial contribution to a more sustainable future.

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### **Dr Russell Wise**

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**Davidson and Moglia raise an important question and provide valuable perspectives on disaster recovery that can, and needs to, improve and explores linkages between sustainability and disaster resilience agendas.**

In particular, they propose that disasters are opportunities for sustainability experimentation, innovation, change and renewal. This idea that disruptions (but not disasters per se, as suggested) provide ‘windows of opportunity’ is not new.<sup>1</sup> The authors give us a timely reminder of this and articulate the urgency and mechanisms for catalysing and enabling transformative changes to prevailing disaster management and development decision-making. This commentary is a response and provides qualifications to their position to stimulate constructive discussion.

Firstly, the authors use the concept of ‘natural disasters’, which the UNDRR and the Australian Government have been trying to shift away from for years. Disasters are not natural; they are the consequence of human decisions that put people and ‘things of value’ in areas exposed to natural hazards or make them vulnerable to disaster.<sup>2</sup> This is not a trivial point, as our language and narratives can reinforce or transform our thinking and practices. For example, post-disaster recovery efforts may be both a ‘window of opportunity’ and reveal or exacerbate the vulnerabilities and social structures that caused them, depending on how the causes of the disaster are framed and who ‘captures’



the opportunity. Perhaps the authors could use this as an opportunity to contribute to changing the disaster narrative by altering the acronym 'NDISE' to DISE, that is, disruption-induced sustainability experimentation and removing all uses of 'natural disasters' and highlighting the political-economy dimensions of 'post-disaster windows of opportunity'.

Secondly, although disasters can present opportunities to 'do things differently', we need to take care not to confound post-disaster opportunities for change with post-disaster experimentation. Experimentation is associated with uncertainty and the potential for failure and loss. Expecting traumatised people who have experienced loss and suffering to be resilient and undertake risky experiments is morally and ethically fraught. Experimentation is also unlikely to be effective after disaster events as people tend to be in an instinctively hormonal 'fight or flight' mode and may be unable to activate the strategic and innovative capacities required for transformative change.<sup>3</sup> This hormonal response that prevents executive function can persist for many months following a disaster; even causing chemical and structural changes in the brain (prefrontal cortex) and make it hard to return to a pre-disaster state.<sup>4,5</sup> Disaster events are also more likely to occur in less-developed regions that are already vulnerable and less well-equipped to face both grand societal challenges and, potentially, disaster recovery.<sup>6</sup> Additionally, politics has been a close companion of past disasters and tends to derail attempts to highlight and tackle the systemic causes of exposure and vulnerabilities for short-term personal or political wins.<sup>7</sup>

The size of the disruption matters. Smaller disruptions that are not overwhelming or excessively traumatic can provide situations ripe for experimentation where the intent is to dramatically alter the system. In such situations, people may not be overwhelmed, may be sufficiently frustrated with the causes of their vulnerabilities and may have the state of mind and agency to undertake the difficult tasks of engaging with contested issues and experimenting new ways of doing things. Importantly, however, there will also need to be sufficient levels of the appropriate capabilities, competencies and capacities to draw on to take advantage of the window of opportunity provided by the disruption. Yet, there are growing numbers of reports of severe limitations in appropriate capabilities and capacity.

Concerningly, disruptions caused by natural hazards are becoming more frequent, extreme and intense and their consequences more catastrophic. This is overwhelming every element of our social, natural and infrastructural systems and are threatening to leave communities and governments unable to effectively deliver even basic functions let alone design and drive strategic experiments for transformative change.<sup>8</sup>

So how can this concept of DISE (and the mechanisms for catalysing and enabling transformative changes provided by Davidson and Moglia) be effectively operationalised? In the case of disasters, the experimentation needs to have been done pre-emptively (i.e. before the event) using a range of visualisation and foresighting techniques (art, theatre, virtual reality, storylines of anticipatory histories<sup>9</sup>) to imagine and explore plausible divergent futures<sup>10</sup>, identify what society values and is at risk of losing and understand the underlying drivers of values and vulnerabilities and

identifying the levers for how to change these.<sup>11</sup> Additionally, the lessons from these 'virtual' experiments need to be acted on to ensure better preparedness for when the opportunities present themselves after a disruption or disaster. In doing so, it is critical to avoid situations where:

- local communities are left to do all the work of recovery and transforming themselves, but instead are supported and enabled by all levels of government
- the window of opportunity is seen as a blank slate rather than an opportunity to build on local efforts and strategies to shape their future (this is a danger where DISE focuses on the immediate disruption at the expense of ignoring what has come before, which has the risk of opportunities being shaped by competing visions and more powerful vested interests)<sup>12</sup>
- experimentation, innovation and learning are not supported or protected for long enough to develop and embed new fairer risk sharing arrangements and novel partnerships/models for funding and financing have been allowed to emerge and embed themselves.

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