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BUILDING BEST PRACTICE IN CHILD-CENTRED DISASTER RISK REDUCTION

Interim project report 2014-2016

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CQUniversity & Bushfire and Natural Hazards CRC



MASSEY UNIVERSITY





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EXECUTIVE SUMMARY

This Final Report summarises progress on Building Best Practice in Child-Centred Disaster Risk Reduction (CC-DRR), with a focus on the 3 year project, 2014-16. The first 3 years has included scoping and review, the development of a conceptual framework to guide the research, a utilisation roadmap, and the initiation of pilot and main research. The CC-DRR Project conceptual framework reflects a parsimonious research narrative designed to build on research-policy-practice progress to date but, critically, solve problems and challenges across that nexus. The narrative itself has two guiding questions as follows:

- Are CC-DRR programs effective?
 - Are they stakeholder supported and evidence-based?
 - Do they reflect practice-based evidence, including support for child and youth learning outcomes and for DRR and resilience outcomes?
 - Do they produce cost savings-related outcomes?
- Can CC-DRR programs be implemented effectively, including in scaled, and sustainable, ways?
 - In a range of practice settings including school- and community-based?
 - In ways that leverage and capitalise on disaster- and emergency management-related policy?

Research to date has focused on these major areas. This includes research started in 2014-15, but continuing in 2015-16, which is focused on major stakeholders' views, including those of children and youth, parents/caregivers, teachers and school personnel, emergency management/DRR professionals. It has included initial research across 2014-2016 on CC-DRR-related student learning and DRR/resilience program outcomes, commencement of costings-related research, and research on implementation obstacles and facilitators for schools and emergency management agencies. With project End Users as primary stakeholders, the 2014-16 project emphasised a continuous process of consultation, including frequent teleconferences, face-to-face meetings, and a number of end user capacity-building and planning workshops. This process has ensured, and inculcated, direct End User involvement in the Project to ensure that current CC-DRR-focused disaster resilience education (DRE) programs are meeting agency objectives and reflect theory and promising, good and best practices. For example, through a "co-development and co-evaluation" process with End Users, we have developed and refined a set of utilisation products and tools, starting with a Disaster Resilience Education (DRE) Practice Framework. Since its development, the Framework has been used to systematically evaluate End User agency DRE programs to ensure they reflect evidence-based practices (EBP's). The framework incorporates three core dimensions (design, implementation, evaluation) and three guiding principles (collaboration and partnership, protection and participation, diversity and equity) (see Figure 1 on p. 24). Importantly, the DRE Practice Framework was co-produced by the research team and the End Users, thereby ensuring it's utility and relevance for emergency management agencies.

Agency-based DRE programs are now being examined for "practice-based evidence" (PBE), including child learning outcomes and DRR and resilience outcomes, including a combination of pilot work and some finalised outcome, and process, evaluations. Both EBP and PBE steps are couched within an implementation framework, with project research designed to support both policy- and practice-based implementation of CC-DRR/DRE programs. Research on implementation began in 2014-15 and continued in



2015-16, identifying major implementation facilitators and obstacles as well as recent process evaluation that has identified additional factors that can be leveraged to assist with dissemination and implementation. This report goes into more detail on this program of research and related activities, including summarising progress in CC-DRR research to date, as well as some important challenges that have been identified.



END USER STATEMENT (S)

Tracey Leoffa, Department of Fire and Emergency Services, Western Australia

Through participation in the CC-DRR project DFES continues to review our approach to school education. The guiding principles of best practice Disaster Resilience Education (DRE) established through the CC-DRR project provide emergency service agencies with evidence based practical strategies that support effective school program development and delivery. The DRE Practice Framework provides more options for teachers offering greater curriculum choices and opportunities for students to be active participants in their learning.

With limited evidence demonstrating the effectiveness of school education programs combined with emergency service agency's limited capacity to access, translate and apply research, the work conducted by the Project Team is essential. Concepts such as scaled implementation and Comprehensive School Safety have filtered into school education practice and contribute to a renewed focus on disaster resilience outcomes.

As an all hazard agency DFES relies on the research and utilisation work provided by the CC-DRR project. The support and assistance offered by the project team is invaluable as we strive to achieve resilience based outcomes for students, households and communities that apply across emergencies.



PRODUCT USER TESTIMONIALS

Matt Henry, Country Fire Authority, Victoria

For many years, the Country Fire Authority (CFA) have developed and implemented fire safety education programs for children that aim to reduce risk and develop resilience. Whilst these programs have varied in design and method of delivery, the ability to evaluate their effectiveness to produce positive outcomes for children has been problematic.

The *Building Best Practice in Child Centred Disaster Risk Reduction (CC-DRR)* research initiative has engaged with CFA, and a number of other End Users as key stakeholders, to develop a set of utilisation products and tools to assist with the evaluation of current products and the future design and implementation of CC-DRR programs.

The development of a *Disaster Resilience Education (DRE) Practice Framework* has provided CFA with the opportunity to work collaboratively with other agencies, through a “co-development and co-evaluation” process, to ensure that all educational programs are well designed, reflect best practice CC-DRR objectives and can produce positive outcomes for participating children.

The *Building Best Practice in Child Centred Disaster Risk Reduction (CC-DRR)* research has provided CFA with a framework to guide future program design, an evaluation tool that can be used to collect valuable program data to assess program effectiveness and a framework that can influence CFA policy and practice into the future. Through the introduction of a consistent monitoring and evaluation process that can be used across all agency CC-DRR programs, CFA will now also be able to participate in a shared community of practice that can further enhance CC-DRR initiatives and outcomes.



INTRODUCTION

Emerging as a distinct approach to DRR over the last decade, the primary objective of CC-DRR is to strengthen children's knowledge and skills understand local disaster risks and can participate effectively in risk reduction and resilience activities in their schools, households and communities (Benson & Bugge, 2007; Towers, 2015).

While CC-DRR is becoming increasingly popular amongst government and non-government agencies and organisations around the world, rigorous empirical research on the efficacy of the approach has been scarce, including only one study being published in the academic literature prior to the year 2000 (Johnson, Ronan, Johnston, & Peace, 2014; Ronan et al., 2015). However, since the turn of the century, there has been a surge in child-centred disaster research (see reviews by Ronan, 2015b; Ronan, Alisic, Towers, Johnson, & Johnston, 2015; Towers, 2015) with now well over 40 studies published. This research has confirmed that child-centred disaster practices can confer risk reduction and resilience benefits for children, households and communities. At the same time, research has also identified distinct challenges related to both the effectiveness and implementation of CC-DRR-related programs, including the most common type in Australia, Disaster Resilience Education (DRE).

In recent years, the role of child- and youth-centred DRE has gained increasing emphasis in the international disaster resilience literature (Ronan, 2015a, b; Towers, 2015). The UNISDR *Hyogo Framework for Action* (UNISDR, 2005) explicitly identified disaster education for children as a key priority in the fight to reduce the impacts of hazards and disasters. In the new international accord, the Sendai Framework for Disaster Risk Reduction 2015-2030, children are identified as being particularly vulnerable and disproportionately affected in disasters (p. 4). At the same time, the Sendai Framework also identifies children and youth as "agents of change" who "should be given the space and modalities to contribute to disaster risk reduction" (p. 20, 36(a) (ii)). In Australia, the role of DRE in managing disaster risk has been recognised as a priority in the National Strategy for Disaster Resilience (Australian Government, 2011): "*Risk reduction knowledge is [should be] in relevant education and training programs, such as enterprise training programs, professional education packages, schools and institutions of higher education*" (p.7). In its final report, the 2009 Bushfires Royal Commission also emphasised the importance of educating children, explicitly stating that it "remains the most effective approach to instilling the necessary knowledge in Australian families" (Teague et al., 2010, p.55). Moreover, the Commission formally recommended that the "national curriculum incorporates the history of bushfire in Australia and that existing curriculum areas, such as geography, science and environmental studies include elements of bushfire education" (Teague et al., 2010, p.2). Of course, the current project has bushfires in scope, but it also includes a range of other natural hazard events that are common to Australia and New Zealand (e.g., storms, floods, earthquakes, heatwave, drought).



PROJECT BACKGROUND

A recent review article (Ronan et al., 2016) follows research and other reviews, including one commissioned by UNESCO and UNICEF for the UNISDR Global Assessment Report on Disaster Risk Reduction 2015 (Ronan, 2015), that documents an increase in CC-DRR programming over the past 15 years. At the same time, in both Australia, New Zealand and at the broader international level, programs are rarely subjected to formal evaluation. Those that are evaluated tend to be time-limited, one-off case examples or demonstration projects that have been implemented by schools or emergency management agencies. Thus, a “project mentality” is pervasive in this area. Overall, there is a dearth of systematically gained knowledge about the role of CC-DRR and DRE programs. Research that examines these programs over intervals longer than immediate pre- and post-test is particularly scarce. While we do have evidence of immediate DRR and resilience benefits (i.e., in the Prevention, Mitigation and Preparedness phases), we don’t know whether CC-DRR and DRE programs, are capable of producing increased risk reduction and resiliency outcomes in the Response and Recovery phases of the disaster cycle.

A series of systematic reviews have been undertaken by our team, including one recently invited by the *Australian Journal of Emergency Management* (Ronan et al., 2016), a UNESCO/UNICEF-commissioned GAR15 background chapter (Ronan, 2015); another systematic review of evaluations of disaster resilience education programs for children and youth (Johnson, Ronan, Johnston, & Peace, 2014); a critical review and summary paper invited by a high profile journal (Ronan et al., 2015); and a comprehensive review and scoping exercise and compendium (Ronan & Towers, 2015) that was completed as part of the first year of this project. Overall, over 40 CC-DRR studies focusing on disaster resilience education have been published in the grey or academic literature since the mid-1990s, with all but one of those published since 2000. A review of the first 35 studies (Johnson, Ronan et al., 2014) provides in-depth information about design, methods and basic findings. Overall, these studies point to the promise of DRE as a mechanism for risk reduction and resilience. The majority of pre-post studies reported that DRE can produce significant gains in knowledge, more realistic perceptions, increased preparedness and other resiliency indicators (including reduced fears of hazardous events). Thus, preliminary data suggest that CC-DRR/DRE programs do improve risk reduction and resiliency outcomes during the Prevention and Preparedness phases of the disaster cycle. Across studies, however, the design and methodology could be improved in three key ways: 1) a greater emphasis on process evaluation would provide a more in-depth understanding of which program elements produce which gains. Second, a greater focus on DRR and Resilience outcomes, as opposed to just knowledge-related outcomes, would provide much needed data on the extent which program actually reduce risk and increase resilience; and 3) collecting data from a wider range of stakeholders including children, parents, and educators (teachers, emergency management staff and volunteers) would enable a more rigorous analysis of both program outcomes and implementation.

Another major problem with existing evaluations is that they have been carried out by professional evaluation teams from academic settings. Clearly, building the capacity of agencies and schools to systematically evaluate their own programs is a task that merits attention. As discussed in the next section, our End User agencies have requested assistance in this area, including enhanced capacity for developing evidence-driven DRE



programming and for a sustainable, and embedded, monitoring and evaluation process that ensures ongoing internal evaluation (versus one-off external evaluations).

Further, research is also necessary to answer the critical question: do CC-DRR/DRE programs translate into more effective Response and Recovery for children and their families? Currently, no study worldwide has examined this question.¹ Another fundamental problem in this area is the problem of scaled implementation (Ronan, 2015). As noted earlier, CC-DRR/DRE programs are often limited in size, scope and duration. Teacher survey and focus group research (Amri et al., 2016; Johnson & Ronan, 2014; Kelly & Ronan, 2016; see also Johnson, 2014) appears to indicate a number of obstacles preventing large scale uptake of CC-DRR/DRE programs and initiatives (see next section for more detail). End User agencies have also identified scaled implementation of programs as a key priority and indicated a clear preference for moving beyond patchy implementation to implementation at scale, including in some cases, moving beyond sole direct delivery of DRE programs to facilitating their delivery on larger scales in school, and other community, settings (see next section for more detail).

¹ It might be added that there has been no study done internationally that has looked at a Prevention and Preparedness phase education/intervention program, whether for children or the public more generally, and systematically followed that same cohort into the Response and Recovery phase of a natural disaster. There is an example in relation to prevention and preparedness in relation to housefires in Canada that we document in our scoping and review compendium (Ronan & Towers, 2015).



RESEARCH APPROACH

Over the past 3 years, the project has focused on a program of research that revolves around a guiding conceptual framework (see p 25). This section first outlines the conceptual framework, and the accompanying research narrative. It then documents progress across each of the main areas of the framework/narrative and presents accompanying utilisation roadmap.

RESEARCH NARRATIVE AND UTILISATION ROADMAP

Despite widespread use nationally, and internationally, we currently do not have evidence-driven CC-DRR education programs, or activities, that are known to save lives, property, reduce injuries and reduce psychosocial consequences. Relatedly, the current expert- and consensus-advice (e.g., IFRC, 2013 and other important stakeholders²) has not been systematically developed or infused directly in developmentally-sensitive CC-DRR/DRE programs, starting with basic messages for younger children that emphasise child protection and safety (Ronan & Towers, 2014). Additionally, helping children learn important DRR and resilience knowledge and skills, or 'adaptive capacities', is also important (e.g., problem-solving/risk-based decision-making; emotional regulation; collective helping and support). With basic messages and skill development in younger years, there is then a foundation that can then be added to and built upon over time to more advanced topics in later years. Further, getting the balance right in CC-DRR/DRE promoting child protection and child participation is an area of contention in the field (Ronan, 2015). Based on the international child rights architecture (e.g. the UN Convention on the Rights of the Child) and research findings (e.g., Webb & Ronan, 2014), both protection and participation have been emphasised strongly in this project. At the same time, child participation needs to match a child's cognitive, emotional, and behavioural capacities. With increasing age, and guided participation that matches the child's growing developmental competencies, increasingly more sophisticated forms of child and youth participation are then warranted.

A basic problem in the development and delivery of CC-DRR/DRE programs is that they tend to be one-off, time-limited initiatives that are not systematically delivered or infused in the curriculum. Thus, developing evidence-based, expert- and stakeholder-supported programs that infused in the curriculum and can be delivered, and implemented, on wider and larger scales that help children to acquire essential knowledge skills and values through active learning is necessary. This includes learning that translates directly into effective prevention, mitigation, preparedness, response and recovery behaviours that protect children, families, schools, and communities.

At the same time, research suggests that across both policy and practice, there are significant obstacles preventing the systematic uptake of evidence-supported education programs. At the practice level, focus group and survey research with teachers and principals and other delivery facilitators (e.g., EM agency personnel; NGO's) (Amri et al., 2016; Johnson & Ronan, 2014; Kelly & Ronan, 2016; see also Johnson, 2014), and

² These include emergency management (EM) professionals, parents/households, teachers/schools and children themselves. In the case of EM professionals, they are aware of local conditions which may impact on key messaging developed by international/national experts. In the case of other stakeholder groups, it is important to see what these groups see as key messages. This would include creating DRR messaging that accounts for widely held myths as well as to amplify widely held messages that are more likely to lead to effective responding.



additional consultation with our BNHCRC End Users, have identified some significant obstacles. Obstacles include a lack of teacher training in CC-DRR curriculum development and delivery, resource and time limitations (e.g., overcrowded curriculum in schools), lack of current policy support for these programs, and the perception that such programs might scare children (Johnson, 2014; Johnson & Ronan, 2014). According to school personnel, an implementation facilitator appears to be support from and partnerships with EM-focused agencies (Johnson et al., 2014; Amri et al., 2016).

As noted above, there is some policy support for CC-DRR being directly infused in the school curriculum. There are places in the current Australian national curriculum that are identified as spaces within which CC-DRR curriculum can be directly infused (e.g., Year 5 Geography). At a more basic level, while anecdotal evidence suggests practitioners and policy-makers support the general idea of CC-DRR/DRE in the curriculum, there is a lack of research to document that support.³ However, research conducted in this project has found that both parents and teachers strongly support children being exposed to DRE programming and being involved in home- and school-based decision-making (e.g., Amri et al., 2016; Kelly & Ronan, 2016). That is, with research-based support for the “aspiration” of CC-DRR/DRE by children, households, schools, EM agencies, this can be used to promote CC-DRR-related policy and curriculum development through “bottom-up” (community-driven) pressure. In addition, pending wider support from stakeholder groups, if CC-DRR program development can also help policy-makers and practitioners solve identified problems (e.g., duty of care; crowded curriculum; lack of teacher training), that may also assist in promoting increased implementation efforts.

Moving from policy development to actual policy implementation also involves working with relevant government stakeholders (e.g., education and emergency management sectors) and assisting them to advance sector-wide mapping, including ‘scoping and sequence’ policy and planning activities. Such planning is necessary to support the development of a K-12 curriculum that (1) meets children’s developmental needs, (2) inculcates evidence-based and consensus-driven DRR and resilience objectives, (3) produces “ultimate” outcomes (saving lives, property, reducing injuries and psychosocial consequences), and (4) overcomes various implementation obstacles such as those identified in our 2014-16 research and outlined above. Another area for evaluation includes cost-benefit and/or cost utility/effectiveness analyses, an area of research commenced on in this project (see later section for details).

More evaluation is clearly necessary through research that follows a coherent, defined pathway that addresses fundamental issues linked to practice and policy. In particular, rigorous evaluation of the following is necessary: (1) CC-DRR/DRE program content and delivery (e.g., content analysis; fidelity assessment⁴; stakeholder input), (2) program effectiveness in producing important outcomes (including immediate, ultimate and cost-benefit and cost-effectiveness outcomes) and, finally and critically, (3) effectiveness of dissemination and implementation practices. This includes evaluation of national capacity-building of DRR curriculum and teacher/EM professional training

³ An exception here is a mapping exercise conducted through the Australian Red Cross that documents places in the current national curriculum where CC-DRR/DRE can be infused directly or indirectly linked to other core curriculum.

⁴ Fidelity (also known as integrity) assessment refers to evaluation of the delivery of an intervention, or education, program and ensuring it is being delivered as intended.



implementation and effectiveness. Research and development is underway across all of these areas (see later sections).

In terms of this overall narrative and related guiding framework (see p 25), it is the opinion of this team of researchers that building the capacity for large scale implementation of programs, which are delivered by well trained teachers and EM professionals and are effective in promoting risk reduction and resilience, requires a different mindset. We need to move from a project-based mentality to a longer-term, strategic design, evaluation and implementation mentality: One that starts with and is “fuelled” through the development of key relationships between key stakeholders across policy-practice-research sectors. This also includes practice and policy advocacy efforts that are framed in ways that help practitioners (e.g., schools and school systems; EM professionals and agencies) and policy-makers solve known problems (e.g., school-related emergency planning duty of care issues). A longer-term view will also benefit substantially from research that evaluates the role of CC-DRR programs in producing immediate and longer-term risk reduction and resilience benefits for children, families, schools and communities and provides leveraging points for implementation in school, and other community, settings.

PROJECT PROGRESS UNDERPINNING GUIDING FRAMEWORK AND RESEARCH NARRATIVE

- Active research and development focused on both effectiveness and implementation of CC-DRR programs, that reflects the conceptual framework discussed in the previous section, derived from a series of scoping reviews of CC-DRR policy, practice and research and from close consultation with major stakeholder groups, starting with End Users;
- The active research has included getting important information on both effectiveness and implementation of CC-DRR/DRE programs, including stakeholder wants and needs. Major stakeholder groups include children, households, teachers/school personnel, emergency management/DRR professionals. It has also included additional research focused on effectiveness, including ensuring the integrity of currently developed programs (see next bullet point) and initial evaluations of school-based DRE program outcomes (e.g., Triple Zero; Red Cross’ Pillowcase program). Further agency-based DRE programs are currently being evaluated, all starting in the second half of 2016. These programs include the CFA/SES School Curriculum Natural Hazards Resilience Package (SCNHRP), CFA Survive and Thrive, ARC ‘Pillowcase Project’, Fire and Rescue NSW ‘Fire ED’, NSW RFS ‘Guide to working with school communities’ and DFES ‘Bushfire Patrol’ (see later section for more detail).
- Studies have also focused on DRE practice implementation facilitators and obstacles in classroom and schools settings, including a most recent one that was finished in the last two quarters leading up to this Final Report (Australian Red Cross Pillowcase Program, see later section). Policy analysis, research and advocacy has also commenced, including through a state government-level education-EM initiative in Victoria (see later section for details);
- Close consultation with project End Users, including a series of capacity building and planning workshops, including the most recent one in November 2016 in Melbourne. This ongoing consultation model and process has included the



beginning of co-developing with End Users a series of utilisation products, starting with the CC-DRR Practice Framework (see p 26) to evaluate current DRE program integrity/fidelity factors (e.g., design; monitoring and evaluation; implementation). Through the use of this new tool, initial evaluability assessments of End User agency-based DRE programs and resources have been completed. Following this, evaluation methodologies, methods and procedures have been systematically determined, and co-developed with End User agencies, to guide outcome evaluations.

- Close consultation with project End Users to establish a project and implementation road-map, with feedback informing a stepped logic model, linked to core research questions and End User-focused utilization needs.

Scoping and review of CC-DRR policy, practice and research

Starting in 2014, scoping and review for this project has included a four chapter Compendium that focuses on the following: (1) the national/international context, (2) theory, (3) policy, (4) practice and research in the CC-DRR area (Ronan & Towers, 2015). Additionally, theory, policy, practice, research developments in DRR more generally are presented to help give context for CC-DRR developments. Initially, a five chapter Compendium was planned. However, based on consultation with End Users, one chapter, focused on CC-DRR practice, was initially consolidated with the chapter on research. Thus, the current four chapter compendium opens with an introductory chapter providing some international and national context and rationale for research, practice and policy in this area. Chapter 2 focuses on guiding theory across the policy-practice-research nexus. Chapters 3-4 focused on CC-DRR (and DRR) policy and on CC-DRR (and DRR) practice and research, respectively. The compendium was put out to review to international experts, to End Users and to project team members. Reviews were requested by June 30 2015, with feedback then being used to make improvements. Since then, other improvements continue to incorporate important developments in research, practice and policy. Following ongoing consultations with End Users, including at a full day capacity-building workshop held in Sydney prior to the 2015 Research Advisory Forum, another in Melbourne in November 2015, and another series of consultation meetings at the 2016 Hobart RAF, a separate chapter, and journal article, on CC-DRR practice, practice frameworks and related was then “co-produced” with project End Users (Towers, Ronan et al., 2016; see later section for more detail).

Close consultation with project End Users: Co-production, co-evaluation

The research team has held several meetings and consultations with End Users since the start of the project. By way of background, a face-to-face capacity building workshop was initially planned for the end of 2014, soon after getting word on successful BNHCRC funding. However, as we then ran that idea by End Users, there was consensus opinion that late 2014 was not good timing, primarily owing to “hazard season” concerns (e.g., bushfire risk high at end of year; floods also are not uncommon) needing their attention and availability. Thus, based on a “what’s most convenient for most”, the capacity building workshop was then moved to occur right prior to the BNHCRC Research Advisory Forum (RAF) in Sydney in early April 2015. Thus, following several teleconference-based meetings with End Users, including one in March 2015 and others in 2014, a full day workshop with End Users was intended to help build capacity linked to CC-DRR policy, practice and research. This workshop presented information on DRR



more generally to give context and “funnel” to the CC-DRR landscape. A CC-DRR policy-practice-research nexus was established and was linked to the current project’s core research and utilization narrative. Emerging from this workshop, and follow-up consultations, was an increased level of clarity about the progression of research and utilization in this project. That is, End Users at the workshop were unanimous in endorsing a progression of research that moves more from “researcher-driven” to that which is “co-created, co-produced, and co-evaluated.”

While End Users endorsed the research model and narrative presented (see p 25), another real benefit of that and ensuing workshops and additional individual and collective consultation meetings was that they also expressed a preference for delaying CC-DRR/DRE outcome evaluations until they had been assessed and modified according to the existing evidence-base, through co-development of a CC-DRR Practice Framework. That is, a number experienced not wanting to move to outcome evaluation before they had their agency CC-DRR/DRE program(s) evaluated first via such a framework to ensure that these programs reflected evidence-based content and delivery. Thus, whereas I as the project leader envisaged doing outcome evaluation at the same time as doing practice framework evaluations, End Users were clear they preferred a stepped, logic model-type process. Thus, one major, current project borne of that first capacity building workshop was to co-develop a CC-DRR/DRE Practice Framework (see p 26). Alongside, co-evaluating agency DRE programs also commenced to ensure these programs reflect the existing evidence- and theory-base.

Thus, in following principles set out in the Sendai Framework about “co-creation” processes, and the NSDR theme of “shared responsibility”, it is the mutual feeling of the team – Project Team and End Users – that close collaboration across each step of the research narrative and utilisation roadmap will produce enhanced benefits (e.g., increased uptake and usage). The resultant output of this Practice Framework and co-evaluation step is first a CC-DRR “main study” article published by the BNHCRC (Towers, Ronan et al., 2016), with both Project Team and End Users as co-authors. This then forms the basis of an additional Compendium chapter on practice guidelines and the Practice Framework itself.

Research and Development: Evidence-based/stakeholder-supported practice; practice-based/user-satisfaction evidence; implementation

Research and development described in this section is linked to the conceptual model described earlier (see also p 25) and the utilisation roadmap that accompanies this Annual Report, tied to the two main questions that comprise the project research narrative:

1. Are CC-DRR/DRE programs effective?
 - a. Are programs themselves evidence-based, do they have content and delivery that reflect promising, good or best practice? Do they include input from stakeholders?
 - b. Do programs produce important student learning outcomes and disaster risk reduction and resilience outcomes? Are they cost effective?
2. Can CC-DRR/DRE programs be implemented on large, sustainable scales?
 - a. What are facilitators and obstacles to both local and scaled, sustainable implementation?



- b. Can programs be constructed that help surmount empirically-identified obstacles, and leverage facilitators, to implementation?
- c. Can programs be implemented by EM agencies, schools and others on a large scale and produce effective risk reduction and resilience outcomes?
- d. Can programs be implemented in cost effective ways?

Stakeholder research

The research here has intended to get input on important aspects linked to research, practice and policy across these stakeholder groups:

- Children
- Parents/households
- Teachers/school personnel
- DRR/EM Professionals

Barb Kelly, Anto Amri, Julia Crowley, Elisabeth Tooth are doing a combination of quantitative (correlational, experimental) and qualitative research (e.g., interviews, focus groups) across these groups. Additional research is also be conducted by the research team to supplement these projects.

Student research. Data have been collected, analysed and written up by Anto for the purposes of his pre-PhD (Masters) thesis. With that finalized, these pieces have been converted to two manuscripts and were submitted to refereed journals in the first and second quarter of 2015-16 (linked to deliverables, 2.4.5 and 3.2.1, respectively). Barb finalized data collection in 2015, with data analysed analysed and written up as a Masters thesis. A manuscript has been written based on this research and is to be submitted to a refereed journal.

Over the projects conducted by Barb Kelly and Anto Amri, stakeholder views are intended to shed light on important issues linked to CC-DRR/DRE content, delivery, effectiveness and implementation. For example, in Anto's pre-PhD, Masters-level project, children wanted "to know more about how to stay safe from disasters" (96%). They were also seeking a more participatory role in school-based CC-DRR/DRE programs and safety initiatives (83%), and they wanted to be more involved in making their homes prepared for disasters (86%). The research also found that both parents and teachers support strongly children being exposed to DRE programming and strong support for their being involved in home- and school-based decision-making. While teachers did support child participation, they also presented some mixed views that could present obstacles to children's genuine participation in CC-DRR/DRE programs in classroom settings.⁵

Another exemplar finding was that there was a notable discrepancy between children's perceptions of the extent to which they would be able to keep themselves safe during a hazard event and their factual knowledge about how to stay safe. That is, for the children who indicated they know how to be safe from disasters (71% of the sample), nearly all of this sub-sample (96%) were categorized as having a low-medium level of factual knowledge. In other words, only 4% of children who felt they knew how to keep safe had

⁵ Research supports experiential, interactive and participatory forms of learning versus sole reliance on didactic, text-driven, rote-based learning approaches (Ronan, 2015).



factual knowledge in the high range. One other exemplar finding worth noting is that teachers rated implementation obstacles and facilitators, both those derived from previous research by our team in New Zealand (Johnson, Ronan, Johnston, & Peace, 2014b) and some additional hypothesised obstacles/facilitators. Findings here replicated and extended this previous research. For example, teachers saw teacher training as the biggest facilitator and deterrent, respectively. Another important facilitator was having partnerships established between schools and local EM agencies/councils, another finding echoing New Zealand findings (Johnson et al., 2014b).

In Barb Kelly's Hons, and then, Masters research (and another study done in Bendigo in partnership with the council there), we surveyed a range of stakeholder groups, starting with households (i.e., parents/caregivers). The Hons project looked at various factors linked to community preparedness, with one focus being the role of passive versus more engaged community and household education platforms, including engaged education that involves CC-DRR and its effects. In this initial study, a child being involved in a DRE program was found to predict household preparedness for disasters (along with perceived personal responsibility for preparing, and reduced negative DRR outcome expectancies). It is worth noting that participating adults who engaged in community-based emergency/safety-related training were also found to have a significantly increased preparedness. Thus, as this study concluded, "engaged" forms of education, including that which includes both children and adults in the preparedness and planning process, appears to be quite important to overcoming low rates of community preparedness for disasters. Thus study is currently being revised and resubmitted to *Natural Hazards*.

Barb's Masters-level study collected data from children, teachers and household (parents/caregivers) in Australia. The first study from this dataset on household preparedness found that involving children in community and household DRR is worth pursuing. For example, children participating in DRE programs was found to correlate significantly with an increased participation in household preparedness activities as well as actual household preparedness. Other findings showed that parents support DRE programs with a problem-solving focus. Data from teachers replicates this finding – they too demonstrated a preference for a problem-solving/decision-making learning and teaching platform. Both teachers and parents also supported children being involved in DRE programs. Additionally, household participants (parents/caregivers) supported strongly children actively participating in both school and household decision-making. Finally, the study also found that of the minority of households (29%) who report having a household plan for natural hazards and emergencies, very few of these were able to identify more than 1 or 2 actual steps or components of what would be considered as a bona fide plan. This finding that shows a discrepancy between report of a household plan and what constitutes the basic components of an actual plan replicates previous overseas research. This same finding was also replicated in another community survey in Bendigo. These findings are currently being prepared for publication, with the first manuscript to be submitted looking at household/parent-stakeholder factors linked to CC-DRR/DRE.

Additional stakeholder research. Another study, now being led by Briony Towers, is using a Delphi approach with Australian DRR/EM professionals to identify "key DRR and resilience objectives and outcomes" across natural hazard events. Currently, "key messages" tend to be top-down driven. For example, the IFRC (2013) did a Delphi-like exercise with international research experts to derive key messages for wildfires (and



other hazards). In supporting bottom-up processes (e.g., privileging the views of EM professionals who work at the “coalface”), and in light of the Australian context being different than some other international contexts (e.g., stay and defend versus early evacuation here versus evacuation-only in other countries), it is important to establish where there is agreement, and divergence, from top down-derived (i.e., research- and normative-driven) key messages. The first step here occurred at the Hobart Research Advisory Forum in May 2016. After a presentation and consultation on CC-DRR project specifics, participants from EM agencies (including some of our End Users) were asked to list what they considered to be the most important DRR and resilience knowledge, skill and behavioural outcomes of DRE programs. Work was done to collate this information, and it was presented to End Users at our most recent End User Capacity Building and Planning Workshop in November 2016 in Melbourne. There is now a plan to move to a next iteration, including incorporating these findings within utilisation product development (i.e., a monitoring and evaluation toolbox).

Other stakeholder research underway includes the following: 1. CC-DRR/DRE meta-analysis (led by K Ronan and E Alisic; analyses underway, manuscript anticipated for submission in 2017); 2. Household planning, preparedness and motivation as a function of resident children at different ages (Kevin Ronan in partnership with Illy McNeill from another funded BNHCRC study based at University of Melbourne; manuscript, initially submitted in second half of 2015; it was recently revised and submitted to *Natural Hazards*); 3. Household survey research that builds on and extends Barb’s and Anto’s research documented above, with a CQU panel sample of c. 1600 nationally representative households. K Ronan won an internal CQU university grant for this study, with data collected in the latter half of 2015; data are currently being analysed in the context of student thesis, with completion slated for 2017; 4. Cyclone Marcia-related research, two surveys, one CATI survey;⁶ another, on-line (led by K Ronan, in partnership with BoM, Risk Frontiers, Geoscience Australia, ABC, with funding from BoM and CQU university, \$40K); data collected in the second half of 2015, with an initial internal report completed in late 2015, and a conference presentation and proceedings paper in 2016 (AFAC/BNHCRC Conference) – additional research on this mixed methods dataset is planned for 2017 (2-3 student projects); a formative evaluation of the CFA/SES ‘School Curriculum Hazard and Disaster Resilience package (led by Briony Towers with \$75,000 of CFA funding for a fulltime research assistant). Another manuscript on main findings was accepted for an AFAC/BNHCRC Conference symposium in Aug-Sept 2016.

Evidence-based practice research and development: Current programs

The main study here has been underway, commencing in 2014-15, first with a review of the literature around promising, good and best practices in CC-DRR/DRE programming. Since then, reflecting a co-development process with CC-DRR Project End Users, a DRE Practice Framework has been developed that has undergone a number of iterations, combining evidence and theory with End User input. The initial DRE Practice Framework initially had 12 components. Through consulting with End Users, the Framework now has three core dimensions and three guiding principles (see end of document, p 22, for figure of the Framework). Work then commenced in 2015-16 to co-evaluate End User agency nominated CC-DRR/DRE programs while continuing to co-develop the Framework. In the second half of 2015 and the first quarter of 2016, initial co-evaluations were carried out, with detailed reports provided back to End Users for the purposes of

⁶ CATI = computer assisted telephone interviewing; similar to methodologies used by big polling firms such as Newspoll, IPSOS, Galley, others.



upgrading their DRE programs and resources. An additional output will be in the form of publications, starting with a manuscript published by the BNHCRC in 2016 (Towers, Ronan et al., 2016). In addition, other publication outputs include a report (or chapter) with three main parts: 1. Practice Framework guidelines for agencies and 2. Supplementary technical report that presents (a) published evidence and theory underpinning the guidelines and (b) outlines the process of co-production. Additional refereed journal submissions that detail various aspects of the Framework, including the co-production and co-evaluation process, with plans to include End Users as co-authors. The first publication (Towers, Ronan et al., 2016) has a number of End Users as coauthors alongside Project Team members.

Evidence-based practice research and development: Drills-focused program

Work has been underway to develop a gaming app, through the funding support of BNHCRC, the National Emergency Management Projects funding scheme and CQUniversity, that helps children learn, practice and demonstrate DRR knowledge and skills that are linked to drills/simulations. The first set of drills that have been in development within a prototype app are those related to school fire drills, starting with structural fires. As a sub-theme of two Project PhDs (Andrew Clarke, Matt Henry), and the overall Project itself, development, a set of drills-focused learning, and performance-based assessment, modules are also being developed to help children inculcate important DRR knowledge and skills. Scoping research done on school drills has found that drills themselves, when undertaken according to routine drilling procedures, may not help children learn important knowledge and skills. Findings also suggest that routine drilling, undertaken in accordance with “key safety messages” but not accompanied by inculcating other knowledge and skills may in some circumstances potentially produce unintended consequences, including increasing. Such consequences have been documented recently in field observations of children responding to earthquakes in Nepal and in recent research, including studies done in this Project (e.g., Amri et al., 2016; see Ronan et al., 2016).⁷

⁷ As documented in a review article in AJEM (Ronan et al., 2016): “While findings to date support that learning key safety messages can confer benefits, this focus may have unintended consequences. In different studies, it has been shown that education programs can improve knowledge of what to do in the event of a hazardous event (Johnson *et al.* 2014a). However, while children may know a correct set of responses, two studies (Ronan *et al.* 2001, Johnson *et al.* 2014) have shown that these same children can also endorse a range of incorrect DRR responses. In some instances, a majority of children may at the same time endorse incorrect responses (Johnson, Johnston, Ronan, & Peace, 2014). Such findings demonstrate that while children may know a correct key safety message, they also believe that other behaviours that raise risk are also correct. Thus, research has demonstrated that children may lack of clarity about which behaviours are the ones that will keep them safe. Additional research shows that children who participate in DRE programs tend to have reduced fears of hazards and increased DRR-related confidence. However, one study has demonstrated that confidence increases do not correspond to knowledge increases (Amri *et al.* 2016). In that study, 71 per cent of the child participants indicated confidence in what to do to be safe in disasters. However, only four per cent of the overall sample had DRR knowledge in the high range category, whereas 96 per cent had knowledge in the low to medium range categories. Another example of unintended consequences are field observations in Nepal during the 2015 earthquakes by Paci-Green and colleagues (2015), who concluded: ‘Notably, school staff in all three Rasuwa schools indicated that some school children that had been taught drop, cover and hold ran back into collapsing stone houses to crawl under tables and beds. The students did not understand how to protect themselves while outside. They stayed inside stone houses, when perhaps they could have exited, as there had been no instruction about how to



Thus, a drills-focused CC-DRR/DRE program and app is intended to help overcome some of the problems identified as well as solve some problems linked to scaled implementation (see later section). The app work is underway with the developer, Strategenics, and is being informed by an Advisory Panel that consists of interested End Users (four have nominated), Project Team members (3) and children (2 have been nominated, with more likely to be added). Initial versions of the prototype were completed in late 2015 (v1) and early 2015 (v2, Feb; v3, May), with the final version (v4) delivered September 2016. Pilot testing begun through the Advisory Panel was expanded to include evaluation with children and youth and to get additional feedback via focus groups, interviews and written feedback from End Users, teachers and parents in this Sept-Dec quarter of 2016. The learning modules and companion teacher training are being developed through collaborative efforts with two Project PhDs, one focused on learning and training modules (Matt Henry); the other, on performance-based assessment (Andrew Clarke). When completed, the program will be evaluated for outcome effectiveness (see practice-based evidence section that follows).

Practice-based evidence: Outcome evaluation research

A suite of outcome-focused evaluation-focused studies have been planned and conducted, or are currently being conducted, including evaluating current CC-DRR/DRE programs as well as newly developed ones. These answer the core question “do CC-DRR/DRE programs produce important (1) student learning outcomes and (2) DRR/resilience outcomes, and (3) are they cost effective?” (see Figure on p 25). Initial data collection on formal versus informal CC-DRR/DRE (i.e., non-specific involvement in DRE programs) and its effects has occurred through three projects detailed earlier (Barb Kelly; Anto Amri; Cyclone Marcia).

Current CC-DRR/DRE programs that have been implemented, with some initial data being collected include the Triple Zero Kid’s Challenge Teacher’s Guide and Pillowcase programs, both developed through End User agencies. The Triple Zero Kids Challenge is an effort involving some of our End User agencies, with Briony Towers designing and implementing the evaluation. The evaluation, involving 22 foundation year students, found that the teaching and learning activities in Teacher’s Guide had provided children with essential knowledge and skills for identifying and responding to legitimate emergencies, including major accidents, medical emergencies, fires, and serious crimes.

The Pillowcase program, designed by the Red Cross, has been implemented in a number of schools through the Australian Red Cross (ARC), with initial data collection occurring in 2015. This project has involved collaboration between ARC and this project. The Project Leader (Kevin Ronan) consulted with ARC personnel (John Richardson; Antonia Mackay, Pillowcase project manager), reviewed materials prior to its dissemination and assisted in the development of initial evaluation material. A draft report has been written by Antonia Mackay (ARC), with input to the draft provided (by K Ronan). Additionally, work on a manuscript for refereed journal submission has commenced based on initial findings and based on the fact that the Pillowcase program has some features that can assist in overcoming known obstacles to scaled implementation of CC-DRR/DRE programs. Additional implementation, and companion evaluation, has since followed. An Hons student (Julia Crowley) evaluating the roll-out

protect themselves in the most prominent housing type – stone construction’ (Paci-Green, Pandey & Friedman 2015, p. 17).”



of Pillowcase in Central Queensland. Using a mixed methods research design, Julia combined experimental evaluation (pre-post program) with other qualitative/quantitative methods (focus groups, surveys that gather a combination of quantitative and qualitative data) to evaluate both outcomes and process factors (i.e., design, delivery, implementation). That study is completed, with the manuscript in preparation for submission to a refereed journal (and already submitted to the BNHCRC portal).

Another CQU Hons project being undertaken by Elisabeth Tooth and supervised by Briony Towers, investigated disaster relief and recovery from the perspectives of caregivers of infants and young children (0-3yrs). Infants, young children and their caregivers have been neglected in disaster research and this is impeding the development of evidence-based policy and practice. Elisabeth conducted interviews with 11 parents of children aged under 4 years who had experienced a natural disaster or major hazard event. Many of these parents reported that while they had made a conscious effort to prepare for emergencies and disasters, a lack of preparedness information for parents of young children meant they were not adequately prepared to care for their children during or after the event. Elisabeth's research will provide governments and NGO's with empirical data that can be used to inform the development of information and advice that is specifically tailored to the needs and capacities of caregivers of infants and young children.

Other practice-based (outcome) evaluations commenced in the second half of 2016 and include those from a number of additional End User agencies, including those currently with whom we are co-evaluating their agency programs' "internals" (i.e., design; delivery; monitoring and evaluation approach; implementation) through the Practice Framework (see p 24). These include NSW RFS, NSW F&R, DFES, Vic SES, CFA, SA CFS and perhaps others (discussions currently being held with additional End User agencies for 2017). The other program evaluated in 2016 was initial aspects of a drills-focused program discussed in the preceding section, starting with evaluation of the gaming app. A summary report was produced for that work (Ronan, 2016).

A guiding question in these evaluations of program effectiveness is do they produce important student learning outcomes and DRR/resilience outcomes, both in the short-term and over longer periods of time? Thus, as part of our 2017-20 program of research, we will be aiming to follow evaluation cohorts over time to see about longer term risk reduction and resilience outcomes. This includes in relation to hazards that eventuate prospectively.

Cost-related outcomes evaluation is also underway, starting with a pilot project in partnership with DFES and Veronique Florec (and Fiona Gibson) from UWA, who are part of another BNHCRC-funded project.⁸ A review paper is currently in preparation, scoping costing elements linked to CC-DRR programming, slated for submission in December 2016 (Florec & Ronan, 2016).

As signalled earlier in this report, one other theme in this overall line of outcome-related research is to help agencies develop their own tools for evaluating outcome effectiveness. As introduced earlier, our systematic reviews have revealed that agency-driven outcome evaluations are rarely conducted. In addition, all published outcome evaluations of CC-DRR/DRE programs to date have been conducted by professional evaluators (mainly academic researchers) (Johnson, Ronan, Johnston, & Peace,

⁸ Economics of Natural Hazards Project, headed by Prof David Pannell, and including Drs Gibson and Florec.



2014a). Thus, one utilization product planned is a tool, or set of measures (and perhaps simple guidelines), that can make outcome evaluations easier to do. See accompanying CC-DRR Utilisation Roadmap for details. This Monitoring and Evaluation Toolbox is the next major utilisation product being planned, with 4 utilisation deliverables planned for the first half of 2017.

Others studies that are planned include those based on “CC-DRR success stories” (where DRE has led to DRR and resilience outcomes). Related to this theme, and from the data we gather across outcome evaluation studies, we are also interested in which types or combinations of of DRE programs, or which specific components of DRE programs, produce greater benefits.

CC-DRR/DRE Implementation

To support scaled, sustainable implementation of CC-DRR programs, research has been conducted, or is underway, through five thesis projects, Anto Amri, Barb Kelly and, most recently, Mayeda Rashid, Matt Henry and Julia Crowley. These five projects combine the evaluation of CC-DRR/DRE effectiveness with CC-DRR/DRE implementation (Anto, Barb, Mayeda, Matt). Across these projects, one line of the implementation-focused research is on extending previous research (Johnson, Ronan, Johnston, & Peace, 2014b) that has identified implementation deterrents and facilitators (Barb Kelly, Anto Amri). Findings thus far have replicated and extended earlier New Zealand research (Johnson et al., 2014), confirming and extending our understanding in the Australian context (Crowley, Ronan, Mackay, & Richardson, 2016; Kelly & Ronan, 2016) of important obstacles to implementation (e.g., lack of teacher training; crowded curricula) and facilitators (e.g., availability of “ready to go” resources; innovative methods for curriculum inclusion, including combining curricula that revolve around school drills, partnerships with local EM and councils).

Mayeda Rashid’s PhD is planning to focus on creation of a DRE program, and teacher training, that takes account of implementation (and effectiveness) factors in a sociocultural context, across two cultural contexts (Australia, Bangladesh). This research is currently in final stages of the confirmation process (i.e., submitted and currently under review by external reviewers), with the research starting in the first half of 2017.

Matt Henry’s PhD is focused on the Comprehensive School Safety (CSS) Framework and its role in facilitating implementation (and effectiveness) of DRE programming.

As introduced in the previous section, cost-related research is also now underway in partnership with another BNHCRC project at UWA (i.e., with Veronique Florec) and End User agency (DFES). It is mentioned here to signal the importance of costing-related research as an important consideration in implementation, both policy and practice implementation.

Utilisation products from this line of research include providing a research-developed tool to assist in both policy and practice implementation. This includes assisting agencies/schools implement programs in scaled, sustainable ways, while ensuring their ongoing effectiveness in producing DRR/resilience outcomes. See the accompanying CC-DRR Utilisation Roadmap for more detail.





BUILDING BEST PRACTICE IN CC-DRR: GUIDING MODEL FOR RESEARCH

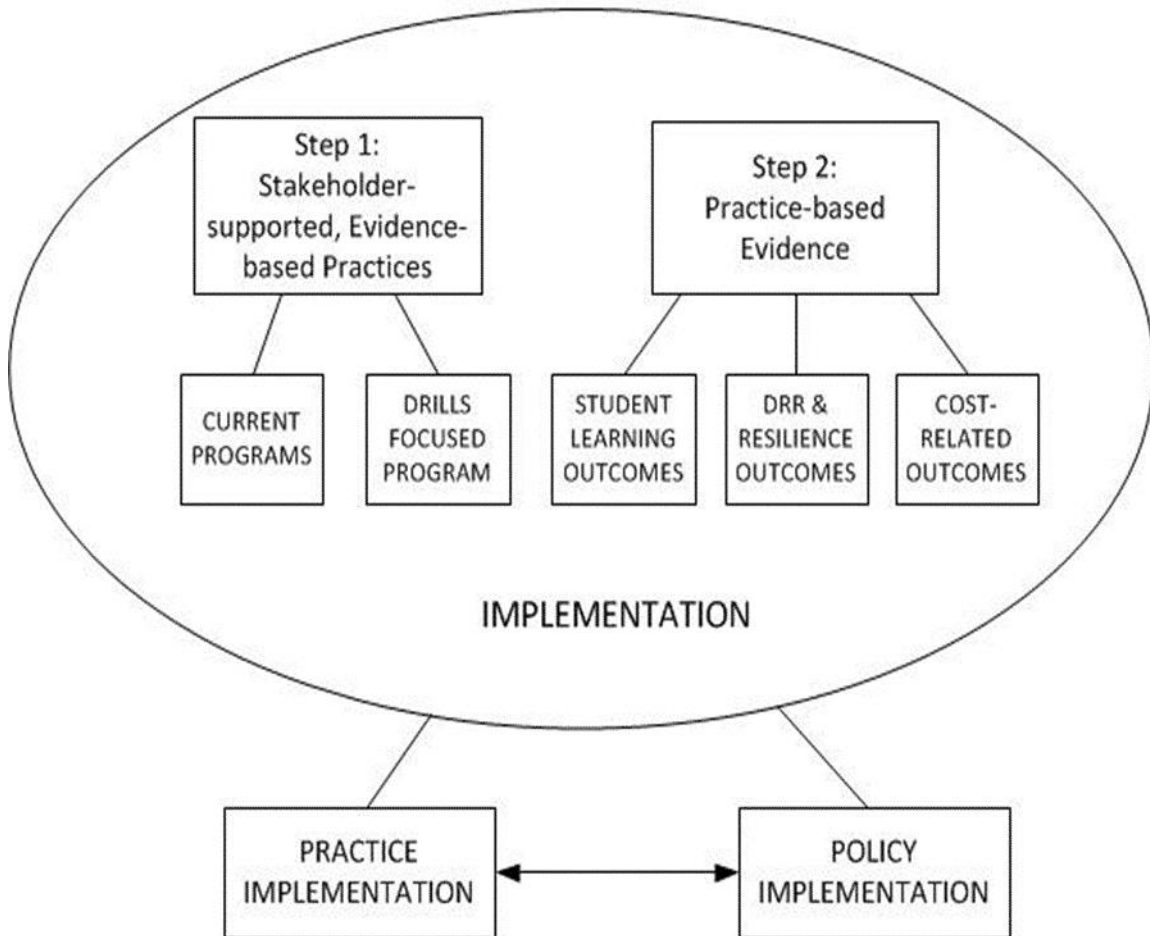


Figure 1. CC-DRR Guiding Model for Research



Figure 2. Disaster Resilience Education Practice Framework



KEY MILESTONES

All key milestones for the project have been met for this project, and include the following categories:

- Ongoing consultation with End Users (and project team), both those that were identified deliverables but also many additional consultations, including teleconferences; face-to-face group meetings; face-to-face meetings at agencies for co-development, consultation, planning purposes; capacity-building and planning workshops;
- Scoping and review to identify research themes, create a guiding model for research that answers core questions, an accompanying research narrative, and a full CC-DRR scoping and review compendium;
- End of year meetings with End Users to review yearly outcomes and plan;
- Presentations at RAF and AFAC/BNHCRC conferences annually, including combinations of posters, seminars and main presentations;
- Quarterly and annual reports;
- Research outputs, including those that were identified deliverables but also a plethora of additional research outputs, including numerous refereed journal articles, book chapters and conference proceedings papers;
- Numerous utilisation outputs that reflect our project plan but also reflect our guiding model for research and our extensive consultations with End Users and other major stakeholders. See next section for more detail.



UTILISATION OUTPUTS

ACHIEVEMENTS

Achievements range across the categories listed below, first with the aim of meeting BNHCRC End User policy, practice, and research needs. That is, while our program of research is intended to be “world first”, the main aim is to focus on “local need”, the needs of major stakeholders in the Australian context, starting with CC-DRR Project End Users.

Commercialisation/Utilisation

Achievements here include the following:

- Serious gaming app prototype focused on school drills and development of modules linked to a school drills-focused program. That prototype has been completed, with feedback being received from a diverse range of stakeholder groups (see previous section for more details). Further development on this product is intended for 2017-2020, in a partnership established with Associate Professor Dennis Jarvis at CQUniversity, an IT-focused academic, with many years experience in developing these applications, including in commercial contexts. A most recent meeting held in December 2016 began to establish a plan for further development and evaluation;
- In addition to the gaming app, another serious game was developed by Dennis' final year IT students as their major project project. This game is intended to help children build DRR and resilience knowledge and skills, through an interactive gaming format. That prototype has also been completed and along with another academic from China (a former PhD student of Dennis'), Dr Yufeng Lin, we intend to move forward with further developemnts, and testing there, in 2017-20, range across the categories listed below, first with the aim of meeting BNHCRC End User policy, practice, and research needs. That is, while our program of research is intended to be “world first”, the main aim is to focus on “local need”, the needs of major stakeholders in the Australian context, starting with CC-DRR Project End Users;
- Co-development with End Users of a Disaster Resilience Education Practice Framework, a new tool designed to help with design, delivery, monitoring and evaluation, and implementation of DRE programming. The first aim is to use it as a tool to design, or re-design, programs to evaluate content and delivery mechanisms, to ensure that programs increasingly reflect evidence-supported design and delivery;
- Following the Practice Framework, work has begun on a more differentiated Monitoring and Evaluation toolbox. This includes designing evaluation tools for use in formative and outcome evaluations of DRE (and related programs) that reflect student learning objectives (SLO) and DRR/resilience outcomes. This also includes a generic set of SLO and DRR/resilience outcomes but also, as part of our 2016 outcome evaluation work, indicators that reflect specific End User agency programs more specifically. These indicators are then being used in outcome evaluation work, with accompanying work on the side focusing on other elements for this toolbox, planned for the 2017-20 phase of this program of research;



- Alongside development of these tools, we have also been Co-evaluating with End Users their DRE programs, both for fidelity as well as for outcomes (and, in some cases, additional focus on process/implementation factors). This development and evaluation is intended to reflect that programs reflect “evidence-based practice” (and stakeholder input) and “practice-based evidence” (i.e., ensuring intended outcomes are occurring). Such work of course is intended to ask the question of whether DRE, and other CC-DRR programming, ultimately can produce important DRR/resilience outcomes in both current terms (i.e., as a direct function of the program) as well as across time (i.e., reduce risk and increase resilience to actual hazard events; produce generational change in DRR and resilience capacity in communities);
- Another utilisation product is our CC-DRR scoping and review compendium, initially a 4 chapter piece that is intended to reflect that “state of the policy, practice and research” in CC-DRR and to reflect best practice guidelines. More work on the compendium continues with the addition of a fifth chapter linked to the DRE Practice Framework. More work is intended in 2017-20 to keep up with developments but also, ultimately, be captured in a set of user friendly summary guideline documents (i.e., CC-DRR Policy; CC-DRR Practice/Teacher Training; CC-DRR Research);
- Other utilisation products that are currently in preliminary development include:
 - Drills-focused educational programming: Modules designed to revolve around school drills, based on a rationale of their being able to facilitate scaled implementation of DRE programs but also to enhance DRE programming, enhance a school’s duty of care (e.g., research demonstrates that drills done according to standard, rote practices may not reduce risk and, in fact, may in some circumstances have the unintended consequence of enhancing risk). A draft set of 3 modules was developed in 2014, in partnership with our Save the Children Australia research project partners (i.e., Marla Petal), but further work is now happening through development of agency-based DRE programming (e.g., CFA), with this work intending to occur across 2017-2020;
 - CC-DRR Policy and Practice Implementation Toolbox: Planning has begun for a set of tools designed to help End Users, and other major stakeholders, implement DRE, and related, programs on large scales, a toolbox that can account for known implementation obstacles and facilitators.

Education & Training

Education and training has occurred through a number of interactive venues documented in this Report, all intending in the first instance to raise End User, and other major stakeholder, capacity for developing, delivering, evaluating and implementing effective CC-DRR initiatives. This has included capacity building workshops with End Users; one-to-one meetings to educate, train, co-develop, consult; conference presentations; many published research outputs; major reviews that document best practices, both as specific deliverables for this project (i.e., CC-DRR review and scoping



compendium; published paper on DRE Practice Framework that was co-authored by project team and End Users) and additional ones yet (e.g., Ronan, 2016; Ronan et al., 2015; Ronan, 2015).

End User Engagement

As documented in this Report, and a core emphasis in this program of research focused on research translation and utilisation, End User engagement through this project has been extensive. Ongoing consultation with End has included many group-based meetings, both teleconference and live, one-to-one consultations, including travel to many End User agencies for direct engagement, consultation, co-development, knowledge and skill sharing and transfer and related capacity building. This engagement has resulted a project reflecting knowledge transfer and utilisation that first meets End User needs. However, in doing so, we are confident that our program of research is amongst world-first programs of research aimed at not only enhancing CC-DRR-related practices but also enhancing, and impacting, policy and research developments. As perhaps a reflection of the strength of our engagement strategy, our End Users have risen from 10 at the initiation of this project to now having 16 End User agencies involved.



Opportunities

Opportunities include those that have arisen based on a program of research designed on the one hand to have a guiding model that focuses on major core questions and utilisation needs; and on the other hand, being open to shifting our emphasis based on ongoing consultations with End Users and other major stakeholders combined with findings from research helping to hue next steps. As an example here, and as documented earlier, the original plan for research was to start CC-DRR/DRE outcome evaluations earlier. However, based on close consultation with End Users, it became apparent that End Users wanted an intermediary step. That intermediary step then allowed the project enhanced space to co-develop a DRE Practice Framework. That Practice Framework then fed into outcome evaluations of agency-based programs. Another opportunity has arisen through a partnership with Associate Professor Dennis Jarvis and development of serious games linked to CC-DRR initiatives, including DRE programs. Another of set of opportunities has arisen through our work through DRASEN/DRANZSEN and, more recently, through AIDR, and being part of their Disaster Resilience Education Strategy Group. Likewise, at the international level, opportunities for collaborating with with UN processes, major international NGO's who work in the CC-DRR space, and other international CC-DRR researchers, including being a member of a major European Union funded CC-DRR initiative's Advisory Board (CUIDAR; headed by Lancaster University, Prof Maggie Mort).



Impacts

Impacts include the vicissitudes of research and utilisation work including helping End User agencies to 1) further develop their CC-DRR programming in a way that reflects evidence-based content and delivery; 2) monitor and evaluate programs; and 3) develop innovative, practical strategies for scaled implementation of these programs. Related, we are confident that capacity has been lifted and there is an allegiance in our End User group to moving from past CC-DRR practices, where, for example, programs were developed and implemented in ways that didn't always reflect best practices as identified through research. As a group, End Users now appear to have an emphasis on working from an evidence-supported framework, including keeping current with promising, good and best practices identified in research, theory and new model/framework development. Through our processes of consultation and co-development with end-users we have been able to develop a shared language and set of values that are firmly grounded in existing policy, research and practice. This has increased capacity for the development of programs that reflect theory and evidence, are supported by rigorous monitoring and evaluation protocols and methodologies, and have, bona fide pathways to scaled implementation. However, going beyond traditional Disaster Resilience Education programming, impact also includes our Project Team and End Users moving beyond a sole DRE focus to one that includes a more systemic approach through the Comprehensive School Safety Framework (CSSF). At our most recent End User Capacity Building and Planning Workshop, November 2016, in Melbourne, discussions revealed consensus support for the value of a CSSF focus. This focus allows for embedding DRE within a school safety approach that can not only help children and households but also help schools themselves to reduce risks more readily. Further, through our analysis, a CSSF approach also is a more facilitative gateway to linking to larger community DRR education approaches. As such the CSSF has become a focal point in planning for the 2017-2020 phase of the project.

Tracking



Tracking of the project and its achievements and utilisation outputs has occurred through a variety of means, including both developments and reporting mechanisms with the BNHCRC. This includes development of a co-developed Utilisation Roadmap, quarterly and annual reports, and various deliverables documented, including research and utilisation products. It also includes written summaries of consultation/capacity building processes with End Users and other stakeholders groups (i.e., see previous sections for summary, including most recent summaries of extensive End User consultations, and follow-on workshop, Sept-Nov 2016; another recent summary of extensive feedback, and consultation process, linked to development of a school drills gaming app prototype).



WHERE TO FROM HERE

As documented in this Report, based on a research guiding model, and extensive End User consultations, including those done over the past 3 months, a clear plan has emerged. This plan includes carrying on with the guiding model of research to continue to do research of the sort that produces world-first research and theory through an emphasis on End User needs, focused on continuing to assist them to develop best practice DRE programming, embedded monitoring and evaluation, and implementation tools to ensure more DRE penetration in their “patches”. As documented in the “extension” project plan submitted to the BNHCRC, the specific near-term plan includes finishing initial outcome evaluations in January-June 2017, while focusing on continuing specific milestone-based elements linked to a monitoring and evaluation toolbox. From July 2017, it will include research and development that focuses on logical next steps, including longitudinal research which evaluates longer-term DRR/resilience outcomes, couples DRE programming within an all-of-school framework (Comprehensive School Safety) and links school programming with larger community DRR engagement, education and programming. Additionally, costing research initiated during 2014-16 will continue and expand to evaluate benefit-costs of DRE and related CC-DRR programming. More information is documented in the Project Plan submitted recently to the BNHCRC.



PUBLICATIONS LIST

Towers, B., Ronan, K.R., Haynes, K. Petal, M., Walsh, C., Brennan, G., Henry, M., O'Donohue, P., Richardson, J., Mackay, A., & Addison, L. (2016). Disaster resilience education: A practice framework for Australian emergency management agencies. *Bushfire and Natural Hazards CRC*. Online publication.

<http://www.bnhcrc.com.au/publications/biblio/bnh-2803>

Ronan, K. R., Haynes, K., Towers, B., Alisic, E., Ireland, N., Amri, A., Davie, S., & Petal, M. (2016). Child-centred disaster risk reduction: Can disaster resilience programs reduce risk and increase the resilience of children and households? *Australian Journal of Emergency Management*: in press.

Amri, A., Bird, D. K., Ronan, K. R., Haynes, K., and Towers, B. (2016). Disaster Risk Reduction Education in Indonesia: Challenges and recommendations for scaling up. *Natural Hazards and Earth System Sciences*: accepted manuscript under revision.

Amri, A., Haynes, K., Bird, D. K., Ronan, K. R. (2016). A critical review of child-centred disaster risk reduction: Progress, gaps and opportunities. *Children's Geographies*: in press.

Crowley, J., Ronan, K. R., Mackay, A., Richardson, J., Spehr, C., & Towers, T. (2016). Co-evaluation of a disaster resilience education program: Outcome and process findings. Manuscript submitted to BNHCRC (Dec 2016) and planned for submission to *Natural Hazards*.

Florec, V., & Ronan, K. R. (2016). Costs and benefits of disaster risk reduction and resilience education programs for children and youth: A scoping review. Manuscript in preparation for submission (planned for Dec 2016).

Ronan, K. R. (2016). NEMP-funded project, deliverables and final summary. Author: CQUniversity

Johnston, D. Tarrant, R., Tipler, K. Lambie, E., Crawford, M., Johnson, V., Becker, J., & Ronan, K. R. (2016). Towards tsunami-safer schools in the Wellington region of New Zealand: evaluating drills and awareness programs. *Australian Journal of Emergency Management*, 31(3), 59-66.

Hemstock, S., Buliruarua, L.A., Chan, E.Y.Y., Chan, G., Des Combes, H.J., Davey, P., Farrell, P., Griffiths, S., Hansen, H., Hatch, T., Holloway, A., Manuella-Morris, T., Martin, T., Renaud., F. G., Ronan, K. R., Ryan, B., Szarzynski, J., Shaw, D., Yasukawa, S., Yeung, T., & Murray, V. (2016). Accredited qualifications for capacity development in Disaster Risk Reduction and Climate Change Adaptation. *Australasian Journal of Disaster and Trauma Studies*: 20 (1): 15-33.

Lai, B. S., Alisic, E., Lewis, R., & Ronan, K. R. (2016). Approaches to the assessment of children in the context of disasters. *Current Psychiatry Reports*, 18(5), 1-8.

Amri, A., Bird, D. K., Ronan, K. R., Haynes, K., and Towers, B. (2016). Disaster Risk Reduction Education in Indonesia: Challenges and recommendations for scaling up. *Natural Hazards and Earth System Sciences*, Discussions (and under review for journal publication), doi:10.5194/nhess-2015-344, 2016.



Johnson, V. A., Peace, R., Ronan, K. R. & Johnston, D. M. (2016). Improving the impact and implementation of disaster education programs for children through theory-based evaluation. *Risk Analysis*, doi:10.1111/risa.12545.

Rashid, M., Ronan, K. R., & Towers, B. (2016). Children as change agents in reducing risk of disasters. In K. Winograd (Ed.), *Education in Times of Environmental Crises: Teaching Children to be Agents of Change*. New York: Routledge.

Towers, B., Ronan, K. R., & Rashid, M. (2016). Child health and survival in a changing climate: vulnerability, mitigation and adaptation. In Klocker, K., Ansell, N., & Skelton, T. (Eds.), *Geographies of Children and Young People. Geographies of Global Issues: Change and Threat*. New York: Springer.

Towers, B., Ronan, K., Haynes, K., Petal, M., Davie, S., Jarret, T., Doren Higgins, B., Walsh, C., Henry, M., Tomazic, L., O'Donohue, P., Richardson, J., Mackay, A., Addison, L. & Noonan, R. (2016). Disaster resilience education: A practice framework for Australian emergency management agencies. *Australian Journal of Emergency Management*: in press.

Ronan, K. R. (2015). Disaster risk reduction and disaster risk management training in higher education: An initial scoping review: UNESCO: Paris.

Ronan, K. R. (2015). Many advances, continuing challenges towards HFA2 and Post-2015: Policy-practice-research summary and recommendations. Hyogo Framework for Action Thematic Review: Priority for Action (PFA) 3 – Core Indicator (CI) 2: School curricula, education material and relevant training including disaster risk reduction and recovery concepts and practices. Background Chapter prepared for United Nations Office for Disaster Risk Reduction and the Global Assessment Report on Disaster Risk Reduction, 2015. UNESCO/UNICEF: Paris/Geneva.

Ronan, K. R., Alisic, E., Towers, B., Johnson, V.A., & Johnston, D. M. (2015). Disaster preparedness for children and families: A critical review. *Current Psychiatry Reports*, 17, 58-66. DOI 10.1007/s11920-015-0589-6.

Ronan, K. R. (2015). Progress made with school curricula, education material and relevant training in disaster risk reduction and recovery concepts and practices. Special section on Australian contributions to the UNISDR World Conference and the next cycle of the Hyogo Framework for Action. *Australian Journal of Emergency Management*, 30(1), 8-9.

Ronan, K. R. LeBlanc, J., Kelly, B., & Burke, S. (2015). Community health and disaster recovery. In E. Mpofu (Ed.), *Community-oriented health services: Practices across the disciplines (pp. 243-269)*. Springer: New York.

Ronan, K. R., Towers, B., McAuslan, K. Johnson, V.A., Alisic, E., Davie, S., Handmer, J., Haynes, K., Ireland, N., Petal, M., Amri, A., & Johnston, D. M., (2015). Promoting child resilience to disasters: Policy, practice, research. Bushfire and Natural Hazards CRC Annual Conference Proceedings.

Ronan, K. R. & Towers, B. (2015). *Child-Centred Disaster Risk Reduction: Scoping and Review*. BNHCRC: Rockhampton.

Ronan, K. R. (2014). Contribution to UN Science and Technology Group paper draft: How the implementation of the post-2015 framework for disaster risk reduction can be strengthened by mobilising the science and technology community. United Nations



Science & Technology Major Group. Planning for the Third World Conference on Disaster Risk Reduction, 2015. International Council for Science (ICSU): Paris.

Towers, B. (2014). Children's knowledge of bushfire emergency response. *International Journal of Wildland Fire*, 24(2), 179-189.

Petal, M., Ronan, K. R., Davie, S., Alisic, E., Towers, B., Haynes, K., & Ireland, N. (2014). Building best-practice in child-centred disaster risk reduction: Submission to the International Council for Science/United Nations Science & Technology Major Group. Planning for the Third World Conference on Disaster Risk Reduction, 2015.

Burke, S., Gridley, H., Reser, J., Ronan, K. R., & Kenardy, J. (2014). Natural disaster funding: A submission by the Australian Psychological Society to the Productivity Commission. Australian Psychological Society: Melbourne.

Johnson, V. A., Ronan, K. R., Johnston, D. M., & Peace, R. (2014). Evaluations of disaster education programs for children: A methodological review. *International Journal of Disaster Risk Reduction*, 9, 107–123.

Johnson, V. A., Ronan, K. R., Johnston, D. M., & Peace, R. (2014). Implementing disaster preparedness education in New Zealand primary schools. *Disaster Prevention and Management*, 23(4), 370-380.

Becker, J. S., Paton, D., Johnston, D. M., & Ronan, K. R. (2014). Societal influences on earthquake information meaning-making and household preparedness. *International Journal of Mass Emergencies and Disasters*, 32(2), 317-352.

Ronan, K. R. & Towers, B. (2014). Systems education for a sustainable planet: Preparing children for natural disasters. *Systems*: 2, 1-23; doi:10.3390/systems2010001.

Webb, M. & Ronan, K.R. (2014). Interactive hazards education program in a low SES community : A quasi-experimental pilot study. *Risk Analysis: Risk Analysis: DOI: 10.1111/risa.12217*.

Johnson, V. A. & Ronan, K. R. (2014). Classroom responses of school teachers following the 2011 Christchurch earthquake. *Natural Hazards: 72 (2)*, 1075-1092.

Ronan, K. R., Petal, M. Johnson, V.A., Alisic, E., Haynes, K., Johnston, D. M., Handmer, J., Towers, B., Davie, S., Ireland, N. (2014). Hyogo Framework for Action Thematic Review: Priority for Action (PFA) 3 – Core Indicator (CI) 2: School curricula, education material and relevant training including disaster risk reduction and recovery concepts and practices. Input Paper prepared for United Nations Office for Disaster Risk Reduction and the Global Assessment Report on Disaster Risk Reduction, 2015. CQUniversity: Authors.

Johnston, D., Standring, S., Ronan, K. R., Lindell, M., Wilson, T., Cousins, J., Aldridge, E., Ardagh, M. W., Deely, J. M., Jensen, S., Kirsch, T., & Bissell, R. (2014). The 2010/2011 Canterbury earthquakes: context and cause of injury. *Natural Hazards*, DOI: 10.1007/s11069-014-1094-7, 1-11.

Johnston, D. M., Ronan, K. R., & Standring, S. (2014). Children's understanding of natural hazards in Christchurch: reflecting on a 2003 study. *Australian Journal of Emergency Management*:

<http://www.em.gov.au/Publications/Australianjournalofemergencymanagement/CurrentIssue/Pages/AJEM29ONE/Historicalreflection.aspx>.



Ronan, K. R. (2014). Solving wicked problems linked to disasters, risk and uncertainty: Children are truly our future. *Australian Journal of Emergency Management*: <http://www.em.gov.au/Publications/Australianjournalofemergencymanagement/Currentissue/Pages/AJEM29ONE/OPINIONSolvingwickedproblems.aspx>.

Towers, B. & Whybro, M. (2014). *Triple Zero Kid's Challenge Teacher's Guide*. A curriculum based resource produced for Triple Zero Working Group and the Australian Government Attorney General's Department. Available online from the 17th September, 2014.

Johnson, V. A., Johnston, D. M., Ronan, K. R., & Peace, R. (2014). Evaluating children's learning of adaptive response capacities from ShakeOut, an earthquake and tsunami drill in two Washington State school districts. *Journal of Homeland Security*, DOI 10.1515/jhsem-2014-0012.

Ronan, K. R. & Alisic, E. (2014). Contributions to the Zero draft of the Post-2015 framework for disaster risk reduction: UN Major Group for Science and Technology. CQUniversity: Authors.



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REFERENCES

- Benson, L. & Bugge, J. (2007). Child-led Disaster Risk Reduction: A practical guide. Save the Children.
- UN International Strategy for Disaster Reduction (2005). Hyogo Framework for Action, 2005-2015. United Nations: Geneva.
- Australian Government (COAG) (2011). National Strategy for Disaster Resilience. Canberra: National Emergency Management Program/COAG.
- Teague, B. (2010). 2009 Victoria bushfires royal commission: Final report.
- NB. Other citations in the text can be found in the previous Publications section.