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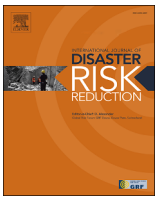

Evaluation of community engagement for resilience outcomes: A pre-engagement approach

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ABSTRACT

Recent disasters have placed enormous pressure on communities to be more resilient. Community resilience encompasses a range of structural, economic, and social dimensions that affect a community's ability to withstand change and disruption from disaster events. In recognition of the social processes that contribute to resilience, governments have increased investment in community engagement programs based on the assumption these programs of activity contribute to community resilience. While several studies identify the indicators of community resilience, few operationalize these indicators for community engagement in a way that can be used to establish baselines and evaluate change overtime. This paper addresses this gap. In-depth interviews with 16 community engagement practitioners in Australia investigated how community resilience in flood prone communities was conceptualized and how the outcomes from engaging communities for resilience building were identified. Findings from the study and the extant literature on resilience empirically informed the development of a four-step *pre-engagement* approach that extends current community engagement models and supports the measurement of engagement activities and aligned resilient outcomes. The pre-engagement approach can be adapted to diverse community contexts beyond flood emergencies and beyond Australian borders.

1. Introduction

Recent global weather events have highlighted the importance for communities to become more resilient to natural hazards and risks. A resilient community generally means that they have greater collective capacity to withstand a disruption, and to respond and recover from a surprising event [1]. The imperative for communities to recognize they have a shared responsibility in disaster preparedness, response, and recovery ([2], 2014), has meant governments and emergency management agencies are increasing their investment in community engagement (CE). While these investments are founded on a key assumption that CE contributes to community resilience, little evidence exists to support that assumption.

Resilience is a "system's capacity to adapt to or respond to singular, unique and most often radically surprising events" ([3], p. 61). Resilience operates as a "measure of the persistence of systems and their ability to absorb change and disturbance and still maintain the same" ([1], p. 14). Viewing resilience from a systems perspective ([1],1996) facilitates the dominant notion evident in the emergency management literature of "bouncing back" [4,5].

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Resilience is noted for its foundations in ecology [1], engineering [6], social systems [7], emergency management [8,9]; development [10], and psychology [11–13]. While variations are found in how resilience is conceptualized across different disciplines [14], there is a widely held view that structural, economic, and social, phenomena collectively contribute to, and influence, community resilience [5,15]. This current paper focuses on the social dimension of community resilience – that is the community.

A number of studies have considered community features that contribute to levels of resilience, such as social vulnerability [16–18], social learning [5], social networks [19,20], social capital [21], socio-economic capacity, demographics, geographic location [22] and participation [23]. Barrios [24] further highlights that "the qualities that make communities resilient, in turn, are seen as emanating from unique abilities—inherent or learned" (p. 329). Clark-Ginsberg et al. [25] emphasize the "human dimensions of resilience" acknowledging the social processes within a community that facilitate and support community resilience (p. 2). Social learning facilitated through social interaction plays an important role in building community resilience [5]. For disaster preparedness particularly, social learning and social interaction is often facilitated through CE.

Engaging a community is a complex endeavor. Communities are diverse, have varied expectations and experiences, and are responsive in different ways. In a disaster context, CE is a longer-term process that aims to support social and relational connections between community members to share and strengthen social knowledge and learning, to accurately know and perceive their hazard risks, to identify and access resources to respond to a hazard, and to achieve and maintain a social orientation to help others [26,27]. As a community development process, CE facilitates social learning and experience through communication, participation, and interaction, for socially valued outcomes [26]. While historical approaches to CE have focused on information provision [28], more contemporary CE programs facilitate and support shared responsibility [29,30] and building community led capabilities [31]. The challenge for emergency management agencies is knowing if CE activities that facilitate commitment to preparation are contributing to building this level of community resilience. This paper takes a step towards addressing this gap by developing a process tool to guide the initial measurement and evaluation of progress toward preparedness-based community resilience.

Drawing on empirical studies on resilience and in-depth interviews with emergency management and government agencies practitioners, this study outlines a process tool to support planning, monitoring, and evaluating CE programs and activities that support and develop community-based disaster resilience. As a process, this tool characterizes a *pre-engagement approach* and offers guide for practitioners to implement activities reflecting existing resilience frameworks (for example, [25,32,33]) with associated activities that allow the measurement of resilience outcomes in the community from CE activities that are focused on improving preparation.

The paper will first outline the contributing literature in CE and resilience, focusing on resilience as an outcome of CE. Three research questions are posed to guide the study. Next, the research design is presented, followed by the results addressing each research question. The results, discussion, and steps within the *pre-engagement approach* for resilience are discussed, tailored for agencies undertaking CE activities to support the achievement of longer-term outcomes from CE investment and effort. While there are several published indicators of resilience, few tools are available to help agencies structure the evaluation of resilience programs based on CE. This approach therefore is a much-needed step in overall community resilience capability building.

2. Theoretical framework

2.1. Community engagement

CE is a relational process that contributes to building social capital through facilitating understanding, involvement, community-led action, and enhancing social outcomes [26]. Strengthening community resilience through engagement and participatory frameworks is a key pillar of the United Nations (UN) Sendai Framework (2015–2030). In a disaster resilience building contexts, CE contributes to building community capacity to actively recognize and minimize their risks [27,34].

CE is a focal topic across industry and empirical literature, typically featuring frameworks that follow a continuum or process approach, yet few consider evaluation outcomes. For example, industry association IAP2's public participation spectrum (2006) describes a continuum of communication strategies, ranging from inform, consult, involve, collaborate, and empower. Shand and Arnberg's (1996) continuum of participation is based on choices relating to the type of participation sought, ranging from information, consultation, partnerships, delegation, and control. Bishop and Davis (2002) built on Shand and Arnberg's model and developed a map of participation linking participation type with communication or behavioral objectives and key instruments. Bowen, Newenham-Kahindi, and Herremans's (2010) continuum of CE synthesized existing models into three strategies of transactional, transitional, and transformational differentiated by the type of agency (i.e.: government, corporate etc.) across stance, tactics, communication type, frequency, and control. Johnston (2010), meanwhile, offered a process-based relational model of CE distinguished by interactivity and facilitated across a communication triad of information, consultation, and participation.

Specific to disaster contexts, government agencies and disaster organizations offer a range of CE guides and toolkits to support practitioners designing and delivering CE programs focused on disaster preparation, but little guidance is offered for evaluation. For example, in the US, the Federal Emergency Management Agency (FEMA) publishes a series of guides and toolkits to support more participatory led approaches to engagement. The Australian Institute of Disaster Resilience [29] *handbook of community engagement* articulates six principles of CE for disaster resilience, and a process founded on community understanding and relationships.

Research into CE practice in emergency management has found that generally four different types of engagement approaches are used, specifically, non-engagement, agency-led, community-agency partnerships, and community-led or participatory approaches [27]. Non-engagement approaches focus on information provision, while agency-led approaches reflect the needs of the agency, rather than the community. Partnerships and community-led approaches reflect more contemporary shared responsibility ambitions. The community-centered engagement model [27] is founded on community profiling and relationships, building community capacity and community-led action, and while monitoring and evaluation was featured in this model, how this was done was not addressed.

2.2. Community disaster resilience as an outcome of community engagement for preparedness

In emergency management, resilience is noted as a contested term [4]. Aksha and Emrich [35] found 60 different definitions of disaster resilience in the literature from 1996 to 2013, while Beccari [36] identified 15 different components of resilience. Resilience is commonly associated with the term "bounce back" [4,5], however contextual and environmental effects, or systemic dynamics [37], influences how resilience is understood. For example, Aldunce et al. [4] in a study of practitioner framing of resilience found meta-frames of resilience are informed by agency, control, and values.

Specific to the human dimension of community resilience [25] and the focus of this current study, Ryan et al. [38] found that a resilient community generally depicts a collective capability to withstand a risk, and this capability includes "knowledge, skills and values needed in that community to increase a commitment to valuing preparedness and keeping their community safe" (p. 10). However, current approaches to assessing community resilience range from "descriptions of community attributes to measurement of community assets and capacities" limiting the ability of disaster managers to accurately estimate the resilience of a specific community ([33], p. 3). Building community resilience therefore requires a greater and longer-term commitment to understanding and designing CE programs that contribute to building self-reliance, awareness of risk, and capacity building (see [39]), and more importantly, identifying processes that allow CE practitioners responsible for implementing these programs to evaluate and report on resilience outcomes.

While CE is increasingly being used in emergency management to address the sector's ideas of community resilience-building goals, evidence of the effectiveness of CE programs on activities that lead to resilience in the form of formative of summative evaluation of CE programs is scarce [40]. The reason for this lack of knowledge of CE for resilience is that most agencies are not collecting and using data to generate insights about community knowledge, attitudes, behaviors, and competencies. Resilience measurement tends to focus on a wide range of community attributes ranging from infrastructure to social capital [41]. Meanwhile, emergency management CE focuses on *preparation* for resilience, with outcomes of this work also not measured.

Evaluation of both preparation for resilience and resilience itself from CE programs remains a challenge as engagement practices are plagued by a lack of measurement, limited budgets, a focus on individual activities and activity based (output) measures, and a view that evaluating resilience is too complex [27,31], and a narrow view of resilience held in the foundations of emergency management in Australia. Calls by emergency management engagement researchers (see, for example, [40,42]) and international agencies, such as the World Health Organization [43], the United Nations [44], and UNICEF [45] reinforce the importance of programmatic evaluation of natural hazard preparation CE activities to understand not only impact, but also to learn from previous efforts. Evaluation of CE for community preparation outcomes will therefore depend on how resilience is conceptualized, leading to the first research question: RQ1 how are the natural hazard preparation factors of community resilience conceptualized?

A number of tools are available that identify a range of factors that collectively contribute to community resilience (see [46]; Sharifi 2016). Cutter et al [41] provided one of the first empirically based set of baseline resilience indicators for communities (BRIC), with categories across social, economic, community capital, institutional, infrastructural, and environmental. In 2022 FEMA analyzed commonly used community resilience indicators grouping 22 indicators into six categories to develop the FEMA Community Resilience Index (CRI). The social vulnerability index (SoVI) [33], used 29 socioeconomic variables to examine differences in social vulnerability and identifies geographic-based variations in capacity and resources for preparedness and response. In Australia, the interactive Australian Disaster Resilience Index [22] used eight measures across social, economic, and institutional domains concluding that resilience is geographically influenced. However, Australia's National Strategy for Disaster Resilience interprets resilience as activity by different groups across communities: *A disaster resilient community is one that works together to understand and manage the risks that it confronts* (2011, p.iv). The Strategy's account of government contributions focuses on six actions within the themes of infrastructure and educating people to be better prepared, overlooking the contribution of the myriad of other factors considered by many other frameworks to be factors affecting resilience. Examples of these are the six factors distilled by Derakhan, Emrich and Cutter [33] – natural, political, human and cultural, financial, infrastructure and social; the Australian disaster resilience index factors [22], which are social character, economic capital, planning and the built environment, community capital, emergency services, information access, social and CE and governance and leadership; or the 47 factors that the BRIC identified that align with those Parsons et al [22] and Cutter et al [41]. In overlooking the factors and focusing on action, it seems to conflate resilience and hazard preparation. As doctrine, the National Strategy for Disaster Resilience is expected to inform practitioners' ideas of resilience and that these action-focused aspects of resilience might then be measured.

One of the key criticisms of tools for measuring community resilience is in their methodological complexity, mainly because they measure a wide range of factors beyond preparation activity. As Clark-Ginsberg et al. [25] argues, "to be useful for operational programs, measures of resilience must not just be valid, but be easy to use and useful" (p. 1). Clark-Ginsberg et al.'s., (2020) tool, the Analysis of Resilience of Communities to Disasters (ARC-D) toolkit, was argued to be simple enough to "enable aid organizations to measure community resilience in a way that supports resilience building interventions" (p. 1). Given this aim, and the focal intervention is CE, this tool was selected as the basis of this study and outlined in the method section.

While Clark-Ginsberg et al. [25] argue that many factors may influence community capacity to achieve high levels of resilience, CE has been found to be influential in empirical studies that measure mitigation and preparation activities that contribute to resilience [29,31]. Cutter et al. [41] earlier noted the contribution from strong community social connections and increased community engagement to reducing disaster impacts. Given the complexity and multi-dimensionality of the resilience concept, understanding how emergency management CE practitioners plan for change, and how they know when a community's preparedness will result in that community being resilient, becomes central to this study. This frames the second research question, RQ2: What frameworks are used by practitioners to guide preparedness programs contributing to community resilience?

There is widespread agreement that CE is a fundamental activity to help communities prepare for, respond to, and recover from disasters. However, the measurement of outcomes of engagement activities aimed at resilience is marginal at best. Support is needed to provide CE practitioners with the skills to understand and apply resilience frameworks through CE programs, create partnerships that might contribute to non-preparedness factors of resilience, and then evaluate if their programs and activities have contributed, in a tangible and measurable way, to a specific community's overall resilience. This leads to the final research question, RQ3: how are the outcomes of preparedness-focused resilience building activities evaluated? The next section of the paper summarizes the three research questions guiding the study and details the method appropriate to address the research questions.

3. Research questions

The overarching research problem guiding this study and to extend resilience building CE practice, is to understand how CE programs and activities contribute to building community resilience in one type of natural hazard: flooding. This context is specific but generalizable to other emergencies. As identified in the reviewed literature, three research questions guide the study: RQ1: How are the natural hazard preparation factors of community resilience conceptualized? RQ2: What frameworks are used by practitioners to guide preparedness programs contributing to community resilience? RQ3: How are the outcomes of preparedness-focused resilience building activities evaluated? The next section outlines the research design used in this study.

4. Research design and method

4.1. Hazard context: flooding

It is not an understatement to say that flooding has emerged as one of the major natural hazards across many parts of the world. In 2022 and 2023, flooding in in Pakistan, Australia, Nigeria, Iran, and Venezuela showed that flooding disasters are becoming more frequent and intense. In the two decades to 2024, Australian states and territories have experienced more than 32 major flooding events (AIDR, 2024), placing flooding as the second most significant natural disaster, after heatwaves, to cause human fatalities (ACS.gov.au). This study centered on CE programs and activities undertaken in one Australian state (locality) that is flood prone.

4.2. Sample

The sample for this study was purposive and drew on practitioners working in emergency management agencies in the focal state who were responsible for CE for resilience. Participants were recruited from local and state government agencies, and local organizations. Organizational approval was provided for practitioners to participate. A population of 33 practitioners holding appropriate roles were identified and invited to participate in a research interview, with 16 accepting. Table 1 summarizes the sample detailing their organization type and participant role. University ethics approval was obtained for the study and protocols were followed.

4.3. Data collection

Data collection included 16 in-depth semi-structured interviews of 30–60-min duration conducted over Microsoft Teams. Participants were provided with the university ethics consent information and consent was obtained prior to interviewing. An interview guide developed from the literature review was used to guide questions with all participants. Interview questions included; What does resilience mean to you; Tell me about your community programs that aim to build resilience (probe goals/activities/objectives/outcomes); How do you evaluate/what are the challenges; What is important when planning/what role should monitoring and evaluation play in CE programs. All interviews were recorded and transcribed by an independent professional transcription service.

4.4. Analysis

Interview transcripts were loaded into NVivo 12 [47] for management of coding. NVivo is a qualitative data analysis and management software package that supports researchers to organize, analyze and visualize data [47]. A code book was developed based on the literature and the initial coding – to address internal validity. One researcher thematically coded the transcripts in three stages, following Wolcott [48]. The first stage was topic coding, where data were sorted according to relevant topics. The second stage of coding was analytic coding, where themes were identified by association and relationships between the data. The final stage was theoretical coding, where themes were further interrogated to identify emergent patterns. linking these back to empirical concepts. To ensure quality and consistency, coding was presented, discussed, and interrogated with two other members of the research team after

Table 1
Sample summary.

		N =
Organization	Local Council - metropolitan	6
	Local Council - regional	3
	State government department	6
	Essential services organization	1
	Total	**16**
Gender	Female	9
	Male	7

the transcripts were coded. Following this, further codes and coding were undertaken. At the end of the coding, 273 child codes were identified within 20 parent nodes.

5. Results

The interviews showed that CE practitioners in emergency management in Australia may understand that resilience is a complex and many-faceted community characteristic. However, they adopt the language flagged in the National Strategy for Disaster Resilience that reduces community resilience to infrastructure resilience and the openness of the community to accept information on and involvement in preparedness messaging. In responding to the question of how the outcomes of resilience building activities were evaluated, they talked about preparedness activities being integral to resilience; and even as a tool that could conceivably help them to achieve more the rounded resilience considered by Derakhshan et al. [33,49], in the 2010 BRIC framework, and the more recent Australian resilience index [22]. Measurement for them was about evaluating CE to determine outcomes relating to community preparedness as a single factor of the larger resilience concept.

5.1. Conceptualizing preparation factors of community resilience

To understand how CE contributes to building community resilience via improved preparation for natural hazards, RQ1 asked, how are the natural hazard preparation factors of resilience conceptualized by engagement practitioners? As expected, after considering the Australian doctrine's focus on action factors of community resilience, practitioners within this industry were considerably focused on preparation factors that contribute to resilience, rather than the many other aspects of human society and the human condition that contribute to this state. They tended to 'stay in their lane' and to consider only resilience factors that they felt they could influence within emergency management, which tends to carry the bulk of the resilience-building load in Australia. Their focus was evidenced in six key themes, including bouncing back, ability to act, being empowered, willingness, continuous learning, and uniqueness of each community. Very little reference was made, if any at all, to the other factors of resilience mentioned in the ARC-D framework that other non-emergency agencies might have oversight for, such as housing, mental and physical health, economic well-being, infrastructure or land use planning. Each of the six themes that emerged in the data analysis is described below.

5.1.1. Bounce/return to levels before

Bouncing back, a term that is widely used across emergency management in a concept that appears extensively in resilience discussion, was used to describe returning to an original state prior to the disaster event. Bouncing back was viewed as a positive attribute of a community showing that it was resilient and able to recover after an event:

> … "resilience" is just about people's ability to reduce their risks; and then be able to bounce back quicker, easier, …It's not about us making people resilient. It's giving them tools to do that. (28051)

> … it's your ability to bounce back, …; your ability to cope with the impending whatever and ability to bounce back following some kind of event. (17603)

The ability to bounce back was strongly associated with the capacity to act in ways that supported resilience building. This included residents in a community having the knowledge, skills and ability to know their risks, scope out their ability to respond and be able to respond.

5.1.2. The ability to act – capacity, knowledge and understanding risk

The ability of community members to take action - before, during, and after a disaster event - was viewed by these emergency agency staff as the basis of a community's resilience. The ability to act was a widely shared theme by participants and reflected their views that community members who had capacity either had, or could access, the knowledge to appropriately identify and understand risk, and were physically able to take action.

> It's someone's ability to act, to respond, because of the information/knowledge that they have. … knowledge is power----- (31051)

> it is the ability for individuals to mitigate the degree of hazards in their local environment, to the point where they can deal with that particular hazard, as a result of their own preparation and awareness. (09061)

For many practitioners, it was about individual community members having or gaining a deep sense of who they are, and their circumstances, to then identify what they personally need to do to mitigate risks.

> Resilience is people having the capacity to understand themselves, their limitations, their situations; where they can access resources when they are at capacity … Resilience sits in community development because it's about building capability and capacity with the community. (14061)

This theme of ability and capability was strongly aligned with empowerment, the third theme found to contribute to community resilience.

5.1.3. Being empowered, self-sufficient and self-reliant

Self-sufficiency and self-reliance as a theme featured consistently in the data, and showed that practitioners recognized that communities who were resilient were those that could identify and use their own resources at critical times, and not be reliant on others. While this level of empowerment reflected a personal quality, it was also reflected at a group or community level.

> Resilience is about empowerment; it is about capability; it is about ensuring that in the community. I am really big on community-led response and community-led resilience … Resilience isn't a three-week post a storm; resilience is something that should be in your values and should be something that is structured within everything that community thrives for, strives for. (17601)

Empowerment also referred to developing community capacity in ways that made them more empowered to make choices and act. Empowerment recognized that emergency services may not always reach a community when needed, so an empowered community was one that could take action to protect members during a disaster event.

> It's building up their [people's] ability to be able to look after themselves. If the emergency services can't get to them, they can survive until whoever can get to them; … It's giving them the skills or knowledge to be able to be self-sufficient, until emergency services could actually get there to assist them.(01061)

Aligned with empowerment was a sense of willingness to be empowered, or in other words, to commit to learning new skills and knowledge to mitigate risks. Willingness was found to be the fourth theme to contribute to community preparedness for resilience.

5.1.4. Willingness and commitment – recognizing shared responsibility

Willingness is really a disposition or an attitude for cooperation. This theme was used by participants to recognize that community members need to accept that being prepared for disaster/hazard risks, responding to, and recovering from, disasters is a personal and community responsibility rather than an agency or government responsibility. Willingness means that communities act in ways that recognize they have a very clear role to minimize the potential impacts of a disaster.

> … making sure that our community is prepared and they have an understanding of their requirements in terms of … disaster occurring. It's not up to [organization] to create their resilience. They need to have a willingness to undertake that for themselves; because they are the ones responsible. We can help inform them and give them the information but best practice is, they are the ones that should have strategies in place. (08061)

Many participants expressed the struggle for some communities to accept and understand what shared responsibility means, and noted the over-reliance of communities on traditional command and control approaches that tell them what to do and when to do it.

> We go back to the "shared responsibilities, community-led", … and I think that's the way it has to be. There's that reliance on government, whether it is Local, State or Feds, or combination of us all, there is a reliance on us to tell people what to do. And that's why, we provide them with the information … and let people make their own decisions. We don't have to tell them how to suck eggs (28051)

There was also an assumption held by some participants that if you give communities information, they will know what to do with it. This notion of learning and understanding was found to be a core theme associated with conceptualizing their aims of resilience through preparedness, discussed next.

5.1.5. Ongoing – continuous learning, assessing risk and adapting

Building community preparedness was acknowledged by participants as a journey, describing a long term learning process that required ongoing attention. This journey also required ongoing tailoring or adaptation to ensure communities were able to continually improve their capacity and therefore their resilience.

> Resilience is like a continuous process of learning and assessing risk and adapting to it. (26051)

> … it's not the be-all and end-all; … it's at the-start of the journey. (27051)

The ongoing nature and attention to engaging a community for resilience outcomes were contrasted with the stark reality that most practitioners were not able to work across the amount of time it takes for a community to go through these stages of understanding of their risk, and attitude and then behavior change. They and their agencies were also not able to influence the huge range of factors that are recognized to contribute to true community resilience. The type of community, or its profile, will determine the success or failure of engagement efforts. The community's profile emerged as the sixth contributor to participants' perceptions of community resilience, and was the factor that brought them the closest to the human, social and cultural aspects of true community resilience.

5.1.6. Different in every community: a role for community leaders

The community's profile (reflecting other resilience factors such as health, economics, culture, education levels) was identified by most participants as a key influence in how they understood resilience was felt or realized by that community. Context also influenced what was needed to build and maintain resilience. This finding reinforces the notion that all communities are different and require individualized CE efforts that respond to the characteristics of the focal community.

> Resilience looks different in each community … Some are very resilient; have got their boats; you know, they can look after themselves for days; where you have got some other communities that have struggled. It is the leadership within resilience. (17601)

While profiling a community identified to practitioners what a community's current risk knowledge was, the role of community leaders, or leadership, was viewed as central to building community capacity in a range of areas including hazard preparation. Effective leadership found in a community meant that community members could be gathered, motivated, rewarded and recognized. It also meant that unique community needs could be articulated and responded to. A resilient community had people who were willing to take on that leadership role, and had the capacity to develop and build on community connections.

This section has presented the findings that answer RQ1, that is, how are the natural hazard preparation factors of community resilience conceptualized? Six key themes were found to describe how practitioners viewed how the use of CE could collectively contribute to a community's resilience. However, a further finding was the tendency of practitioners to hyper-focus on the preparation aspects of resilience to the exclusion of all other resilience factors, while still having faith in a community's ability to 'bounce back', another term for its level of resilience.

5.2. Frameworks to guide resilience activities

The second research question asked: RQ2 *What frameworks are used by practitioners to guide preparedness programs contributing to community resilience?* Participants were asked to identify what organized their thinking and activities relating to their CE program or activities. While the findings suggested that the planning process for CE was often informal, unstructured, and activity-based rather than program-based, the most dominant framework found in these data represented a planning framework operating as working theory of change. Themes within this framework included goals and objective (setting), activities and tools (implementation), and the importance of community and agency connections. The findings also established that very little monitoring or evaluation was undertaken at this planning stage. Analysis of the planning framework themes follows.

5.2.1. Goals and objectives

Participants reflected on the goals and objectives from CE preparation activities. There was general consensus that building 'knowledge' and 'awareness', 'keeping people safe', and 'helping people to be self-reliant' were goals.

> Our goals and objectives would be – and I don't think we actually have it written down formally anywhere – it is to build that knowledge and build some resilience (01061)

> Keeping people safe; keeping people aware. (09061)

> … our objectives are around people understanding the risks that might affect them; that people are taking appropriate steps; they are making informed decisions when it comes to, say, heavy rainfall event or river flood. (26051)

Objectives set in this environment tended to focus on outcomes related to preparation activity, taking the preparedness focus that Cutter et al. [49] identified, rather than the broader social vulnerability and connections focus as suggested in the literature. The focus of objectives on generalized key activities did not align with programmatic goals for community resilience either within the stated programs or across the institutions in the studied region.

5.2.2. Activities and tools

The activities undertaken to achieve goals and objectives were generally achieved from information dissemination through advertising, direct mail and letter drops, information campaigns and social media. Participants mentioned numerous activities and community events as part of their program addressing community understanding of risks relating to [name of major river catchment system] such as "one offs" like using popup displays at local agricultural shows and fairs, disaster service days; face to face community events such as localized street meet and greets, education workshops, community forums, and information nights that encouraged community members to develop a plan.

Tailored activities for specific communities at risk were also identified with the aim to raise awareness of the risks and support these groups to become more knowledgeable about their options. These activities were identified in the ARC-D framework as one of the 30 resilience factors that contributed to community resilience. Overall, these activities were viewed as either community initiated and locally led or agency initiated.

> … going out and running a community event and trying to deliver communication … it is difficult; … I think we have been focusing a bit too much on just doing community events, when there needs to be more education provided. (28051)

Many participant organizations had dedicated disaster web based 'dashboards' available online as a source of information. Several participants regarded these disaster dashboards as a critical "source of truth" for the community and provided updated and accurate information in the time of a flood. During flood events, flood cameras were also regarded as an important resource for the community. Other online tools included the web-based Disaster Hub, and utilizing interactive online activities such as flood maps and photos.

> We are about to launch a portal, so people can go and look up their own information. (02061)

> we provide them with the information …, get the information on our website, …and let people make their own decisions. I think about giving community tools … give community access to data and make them be able to find out what's happening in rain events … (28051)

5.2.3. Social connections: community and agencies

Networks of connections and existing relationships were considered as providing important mechanisms for community members to inform and influence others in their network around behaviors and attitudes to support preparation and resilience. Collaboration and co-operation between agencies and organizations is not an overt factor in most resilience models, but it is necessary to achieve levels required in many factors that lead to community resilience. Most participants viewed community and agency partners as integral to the delivery of activities and referred to a range of these partners and collaborating organizations in their interviews.

> The other thing we are trying to really do is … linking in. So if [agency name] are at an event, we might have disaster management people there, because it … tells the whole story. So we are trying to do more linkages between different events … (01061)

> … this is actually a partnership with [name of local fire service and name of local water environmental agency] … .. saturating the social media … follow up with an information night. … then with a workshop where we will be helping people to develop individual property plans. (28051)

In addition to partnering, some participants recognized that many other agencies and organizations were doing good work in the disaster preparation space and expressed a desire to share knowledge.

> Let's not re-invent the wheel. Let's – if somebody's got a good product, let's see how we can tap into it. Let's not waste money. (01061)

In summary, the dominant framework used to guide preparedness activities contributing to community resilience aligned with a planning framework, operating as a working theory of change. Preparedness activities were organized by set or implicit goals and objectives, and focused on tools and activities to deliver the engagement in a more episodic and short-term way, rather than a longer-term relational approach to community engagement advocated by Johnston and Lane [50]. While evaluation was noted by some participants, few formally integrated evaluation into their outreach. The recognition of the role of community networks as partners in resilience building was confined to the place of other organizations in the community network, rather than the improvement of the integrity of the inter-resident social network, which was evident in the literature review as important in the social capital approaches to resilience [16,17,19–21]. The next section addresses specific measurements that participants used to understand if their activities were contributing to the achievement of preparedness goals and objectives, and, in turn, some level of resilience.

5.3. Resilience building via preparation for natural hazards

The third research question asked**:** RQ3 How are the outcomes of preparedness-focused community resilience building activities evaluated? Evaluation, as part of a planning framework generally and of resilience specifically, varied widely with some participants acknowledging that resource, time and capacity constraints prevented evaluation from being conducted, while others cited strategic institutional overarching frameworks were used to guide evaluation. These included local city plans, and a range of state and local government or agency assurance frameworks. Several participants also cited the use of experts – such as flood engineers – who provided technical data relating to the risk.

> The traditional method used for decades is your damage curve; … But those sort of damage curves don't necessarily help sell you a project, say, for evacuation routes … The damage curve doesn't demonstrate to you the value of a community awareness program … (27051)

Less than half of the sampled participants used existing demographics and documented hazards in the area as the baseline information before starting an activity. Additional data such as damage curves (see [51]), internal relationship management data, social media analytics and data from previous projects, events and observation also informed the baseline information, however access to this type of data was not consistent and depended on resourcing of the agency.

> What we do use, though, is some very rudimentary evaluation stuff. So first one is touchpoints … we also record the actual number of meaningful conversations that we have … The other one we do is the qualitative type feedback, so from different forums. So that's probably in our more difficult areas; or things that are more difficult to measure. That's our primary method. And what we will try and use then is observation from year to year. (14061)

> … even just during that rain event just before Easter, we had 27,000 hits on our Disaster Dashboard; which went from an average of about 10 a day up to 27,000. So people are using this; have been going there.(28051)

The measurement techniques used were strongly oriented toward operationalized preparation rather than social resilience, with social resilience measures overlooked in favor of trying to measure what people understood of the message, how they absorbed it, and how they acted upon it. The measurement activity undertaken indicates that it very much depends on the knowledge of the individual or team undertaking CE as to how they measure it and the types of indexes they make use of.

> Our biggest measure is really our internal … "[name of customer relationship program]" … [it captures] letters ..; on our website, people can hit a button to ask questions about flooding specific to them … We use surveys every year, Omnibus survey …

> to look at the metrics.. it measures how responsive people are to taking action to managing flooding. So the questions relate to, "Have you got a flood evacuation plan for your house? Are you aware of the flooding potential on your property? Are you aware of the websites and the information pieces?" (11061)

Only one participant reported their organization undertook baseline research to be able to scientifically measure outcomes, while other participants reported that research was not formalized.

> We usually try to gather a bit of a baseline before we go in … Before we went in, we ran a few different engagement activities to identify who our community was going to be for that project; and gathering a baseline in terms of whether people understood who we were, what [the problem was] … And then we pull that together and that essentially forms our baseline.(31051)

Participants regarded monitoring for outcomes as something that is done for governance oversight of programs by organizations, rather than as an indication of how successful an activity is towards achieving an emergency management resilience goal. When prompted, participants noted that activity focused feedback, either directly or through social media, provided evidence if an activity is or is not working:

> No, there hasn't really been a lot of definition around the monitoring and evaluation; probably more so the evaluation side of it. Certainly, from a monitoring perspective, there is a fair degree of monitoring and reporting done through some well-established governance arrangements with multiple agencies, which is very good. It's consistent. For the smaller events, we run a general consensus with the team at the end. We do a debrief on how we felt that it went. … overall, the evaluation on our [activity] is the general consensus from the staff that work there on the day. (27051)

Most participants recognized that evaluation served an important function in project management, but differences emerged when articulating whether evaluating smaller activities served any tangible purpose versus overall CE program outcomes. There was a perceived burden of measuring for impact that needed to be removed from smaller councils or counties. Participants also felt the use of summative evaluation data needed to be linked to, and measure, strategic initiatives and activities at a state level, rather at a community or town level.

Evaluation, unfortunately, is not a strength in [name of org], let alone disaster management. The emphasis is on ensuring that we are able to demonstrate that we have done something; opposed to checking the effectiveness of it.

> Evaluation is important; especially if we are wanting to do repeat engagement in the area. … we are able to gauge through our informal evaluation on the perception of risk in the area and adjust our engagement strategy. So a more formalized evaluation …. I just don't how – the best way to do that, without interfering with our engagement. (14061)

When asked what evaluation was being done, many participants referred to informal evaluation methods and 'counts and amounts'. Counts and amounts included community attendance at events, website analytics (clicks or visits), or the number of social media followers. While direct feedback from the community was viewed as most valuable, often evaluation of events and activities were undertaken through staff reflections and debriefs.

> If we do social media campaigns, we will record the metrics on those; and use reach and also click-through (14061)

> We will do an evaluation informally; where we sit down and talk about what worked and what didn't; I am evaluating in my head all the time the effectiveness of stuff … (28051)

Several participants referenced more formal research tools that played some role in gauging the success of the engagement activities – including a broader omnibus survey as part of an annual larger market research effort that contained several questions relating to preparedness and resilience activities. While many participants expressed that current evaluation for impact (outcomes) either didn't happen, or if it did, it was not good enough to derive real word insights. Some were optimistic in that they were improving because of greater coordination across local governments through shared programs.

Other differences emerged, and some participants suggested evaluation was a compliance activity only, and its purpose was as a tick and flick process – for compliance purposes. While a few said that evaluation was not in their role description, there was a shared view by a number of participants that evaluation was more about doing things – that is outputs. The metric of success in some local government areas was that the community saw the 'activity' occurring – such as council staff were out in the community "doing things". Activities are what the community expected, even if the activity did not achieve or reach the outcomes desired.

There were mixed perceptions of how much evaluation was valued and expected as part of engagement practice. For example, at an individual level, participants regarded evaluation as valuable and having an important role in informing practice, however, participants reported evaluation was generally viewed as a *discretionary activity* that was not valued or expected when reporting on activities. Contributing reasons for this involved a lack of time – that is having time to organize and implement the activity – and having time available to the practitioner. Evaluation was viewed as optimistic, 'nice to have' but not a 'must have'. Overwhelmingly, evaluation was seen as a burden, time-consuming and expensive.

> I don't think within the organization or the community there's that appetite for proper monitoring and evaluation. (14061)

> we haven't really talked a lot about the actual, ongoing monitoring and evaluation of programs; … I don't think the evaluation bit has happened or it's good enough. … I don't believe it's as good as it should be (27051)

Overall, participants reported that CE for preparedness may not be achieving its full potential to inform future practice, because the tools to understand the outcomes, or to learn from any evaluation, were quite limited. There also seemed, in some cases, to be organizational goals for CE that did not fit with the goals or objectives of the CE program, and this could further hinder potential. The sampled practitioners do not lack tools or motivation to engage —their answers show that they are committed to fostering community preparedness and to some extent, resilience. It appears however, that they often don't know how to approach evaluation of CE activities generally, or to allocate their scarce time and resources to set up the evaluation of CE activities for preparedness and resilience outcomes. The next section is the first step to respond to this need. The following section summarizes the findings within the ARC-D framework.

5.4. Engaging for community resilience – ARC-D framework

The key attributes of resilience reported from the data and aligned with the resilience measures from the ARC-D resilience framework [25] are summarized in Table 2. These measures are further operationalized for CE outcomes, and applied to Johnston et al.'s [27] community-centered engagement model. Table 2 therefore addresses three needs. First, it aligns the findings from this study with the ARC-D community resilience measures. These findings suggest that participants were aligned with ideal social resilience outcomes from CE activities. Second, the operationalization allows outcomes to be articulated in a way that supports meaningful measurement. Finally, the table offers insight into opportunities for future research in CE outcomes, particularly in economic and resource areas, and how these areas could translate into CE practices.

The next section of the article builds on the operationalization identified in Table 2, and outlines a pre-engagement approach that facilitates the evaluation of CE for preparedness outcomes. It could also lay a foundation for measurement of those factors within the ARC-D framework that line up with emergency agency CE activities. These resilience factors are knowledge of risk, accuracy of risk knowledge, awareness of risk, behavior, actions/motivation, willingness, shared responsibility, capability, capacity, learning process, adaptation, building of social/relational capital, and facilitating social connection.

Table 2
Social resilience outcomes based on ARC-D [25] in the context of community engagement [27].

Data	ARC-D (# number)	Operationalization of Social Resilience for CE outcomes
Knowledge of risk	1. Participatory risk assessment	Risk Knowledge
Accuracy of risk	2. Scientific risk assessment	Risk Accuracy
Awareness of risk	3. Dissemination of DRR	Risk Awareness
	4. Education of children on DRR	
	28. Education services in emergencies	
Behavior	3. Dissemination of DRR – improve practices	Motivation to act
Actions, Motivation	5. DRR in development planning	Intention to act
Willingness	12. Sustainable environmental management	Behaviors
Shared responsibility	26. Capacity in preparedness, response and early recovery	
Capability	14. Health access and awareness	Skills
Capacity	15. Secure and sufficient food supply	Application
Empowered	21. Social cohesion and conflict prevention	Empowerment
	25. Early warning system	Stewardship
	26. Capacity in preparedness, response and early recovery	
Learning journey (process)	24. Contingency and recovery planning	Learning
Adaptation	16. Hazard-resistant livelihoods practices	Flexibility
	19 Income and asset protection	Adaptation
	22. Critical infrastructure	
	23. Housing	
Resources/Tools	10. Rights awareness and advocacy	
Economic	11. Partnerships for DRR and recovery	
	13. Water security and management	
	14. Health access and awareness	
	15. Secure and sufficient food supply	
	17. Access to market	
	18. Access to financial services	
	20. Social protection	
	27. Health services in emergencies	
	29. Emergency infrastructure	
Planning	5. DRR in development planning	Organization
	6. DRR in land use planning	Planning
	24. Contingency and recovery planning	
Values	7. Community decision-making	Social capital
Social/Relational capital	30. Leadership and volunteerism in response and recovery	Relational capital
Social connection	8. Inclusion of vulnerable groups	Orientation to others
	9. Participation of women	Social connections
	11. Partnerships for DRR and recovery	
	21. Social cohesion and conflict prevention	
	30. Leadership and volunteerism in response and recovery	

6. Pre-engagement approach: foundation to evaluation

Based on the study's findings, and informed by literature on the human social processes found in resilience indicators and indices, this study's contribution to engaging communities for disaster preparedness is in the conceptualization of a pre-engagement approach that is necessary to support organizations to create baselines and plan evaluations of activities that contribute toward preparedness-based community resilience. This *pre-engagement* approach (see Fig. 1) operates as a *CE system* that can be adapted, based on continuous learning, for floods, fires, and other hazards. Operationalizing this approach also addresses a gap identified in Johnston et al.'s [27] *community-centered generative engagement model,* to support the monitoring, evaluation, and learning outcomes in communities for preparedness outcomes in emergency management. The next section explains each step in the pre-engagement approach.

6.1. Pre-engagement approach: four steps

The pre-engagement approach operates as four steps and positions CE for preparedness as a strategy that contributes to a community's resilience.

Step 1 The reality of monitoring and evaluating preparedness for resilience in a community context: An important discussion.

Most CE frameworks reviewed in the literature and used in practice, proceed from an assumption that the agency has already discussed the fundamentals of evaluation [40], or in other words, the key evaluation components. The findings in this current study suggests that this does not occur—rather, approaches to evaluation of resilience are often "placed" on top of existing activities, meaning the evaluation may (or may not) be done, pending time or resource availability, may occur in isolation or informally, or at output rather than impact levels [40]. This occurs because many organizations don't understand how to organize, articulate, and embed evaluation components within a planning framework, or fail to develop a theory of change to guide their engagement outreach. The first step towards embedding evaluation in CE practice is a planning level agency discussion, for example, to discuss and agree on the logistics and specifics of capturing baselines, monitoring processes, what counts as evidence of impact, a plan to collect that evidence, and then 'closing the loop' by applying collected evidence to inform future resilience activities.

Within this discussion should be a discussion of their Theory of Change (ToC) that is guiding the assumption of the communication outreach. ToC describes *how and why* a desired change is expected to happen based on planned activities. A ToC is a roadmap between the goals that a communication program or change initiative seeks to accomplish, and how the activities or initiatives contribute to the achievement of these outcomes. ToCs indicate what has to happen to which community group, at which time, through which communication channels in order for a change to occur. Theories of change identify why activities are created and what they are supposed to accomplish. Evaluation occurs on the outcomes of the activities. It is important to note that not every CE activity should be evaluated.

A tiered approach to CE program evaluation is recommended where one 'set' of activities, as part of a CE program, are evaluated together. It is important to be realistic and start with evaluating one set. Again, the program 'set' of activities selected for evaluation should be discussed during Step 1.

Step 2 Mapping partners and agencies: Sources of data

One of the key findings of the current study was that in many communities, there are many different groups and organizations collecting different data sets, including surveys, interviews, web analytics and GIS data. Study participants reported that they wanted to make optimal use of existing resources and not replicate what other agencies were already doing. There was a feeling of a missed opportunity to share knowledge and resources and provide efficiencies. The same is true for sharing data that could be used for baselines or to generate insights into CE for preparedness and resilience. As part of any CE analysis of the current environment, consideration needs to be given to which organizations have which data sets, and if they are willing to share these data. This step can save time and money and contribute to stronger inter-agency and inter-organizational relationships in the emergency management sector.

Step 3 SMART objectives at the program level: A planning framework

Table 2 summarized the key attributes of resilience identified from the data that were aligned with the resilience measures from the ARC-D resilience framework [25]. These concepts were then translated into a specific, measurable, achievable, relevant, and

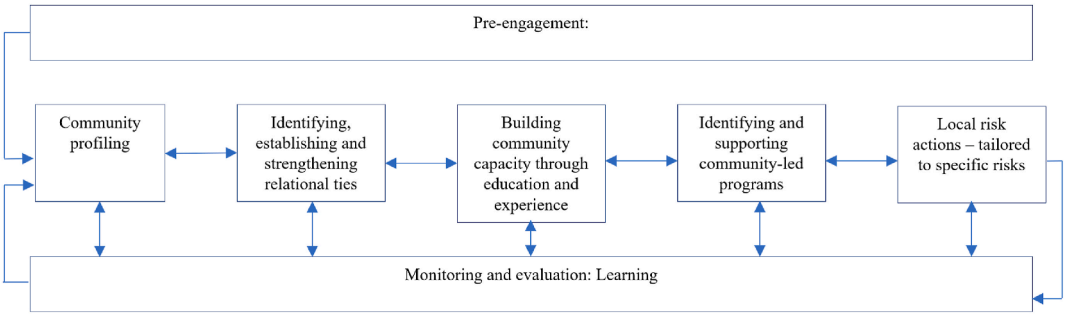

Fig. 1. Community Engagement System incorporating Pre-engagement Stage (adapted from [27]).

time-bound (SMART) objective to reflect a planning framework, and then applied within Johnston et al [27] community-centered engagement model.

The study findings suggest that resilience can mean different things to different communities and different things to different agencies and entities. Participants in this study seemed to conform mainly to the preparation model of resilience identified by Derakshan et al. [33], with acknowledgement of a social capital approach.

Resilience as a concept in emergency management therefore needs to be clarified, and the impact of preparation for resilience should be operationalized as a measure that can be tracked over time and applied to communities at risk. That is, the only way the state of resilience can be quantified is to first standardize community resilience and what it means in a specific context. Standardized measures are tailored to risks or contexts and would then allow communities to understand over time, the state of their resilience, and for agencies undertaking CE activities for preparation to understand the longer-term outcomes of their investment and efforts in the preparation aspect of this resilience.

Engaging to motivate communities to act is not a one-off engagement activity. Johnston and Lane [50] differentiate between *episodic* engagement as short-term bursts of activity, and *relational engagement* as a long-term program, noting that episodic engagement does not contribute to building relational capital. Relational engagement is sustained interaction, communication and participation over the long term, with outcomes that grow knowledge, positive attitudes, trust, and social capital [50].

Evaluation has traditionally been embedded within a process framework and therefore is process driven. However, understanding how CE contributes to higher level social outcomes requires a reimagining of how messy and complex environments (such as community settings), and the activities that need to be tailored and responsive to diverse social settings with outcomes (that require both individual and social units to know and behave differently in disaster settings) can be measured. Theoretically, uncoupling evaluation as an abstract process in disaster contexts, and aligning evaluation with engagement as a communication and relational framework at a system level, allows community preparedness and resilience activities to be evaluated at a higher engagement level as an outcome.

In Step 3, the responsible agency should identify two to four SMART objectives at the program level that represent indicators of preparedness. These objectives align with resilience outcomes and are operationalized to measure a component of this outcome primarily at impact level [40]. The target measures should be based on an improvement of the baseline measures taken, and be set before the program begins. Examples of SMART objectives developed by the researchers to support CE outcomes, can be found in Table 3.

Step 4 Which preparedness activities get evaluated?

As a resilience-building strategy, CE for preparedness must be conceptualized so that it reflects the local context and local community capacities, and tailored to meet the needs, expectations, and the existing capacity of the local community [52–54]. To make CE most effective, agencies need to evaluate the outcomes (see [55]) across a range of dimensions, such as preparation activity approach used by agencies, and the social capital approach that incorporates characteristics and situations of communities. Aligned with a tailored community approach is the need for agreed outcomes articulated by the community that can be integrated into communication planning (and the evaluation of these outcomes). Practitioners need to be careful about whose resilience is prioritized and that a more "reflective organizational discourse can build relationships with organizational stakeholders, and in turn contribute to a more resilient and fully functioning society" ([56], p. 21). Evaluation of engagement matters because it will allow practitioners and scholars to refine engagement theory and improve engagement practice – this improvement of practice might include striking the balance between physical and social capital approaches to resilience development.

This current study argues that community engagement, enacted through a planning framework operating as a (working) theory of change, accomplished through articulating explicit engagement goal/s, measurable objectives, and delivered through a program of engagement activities, which cumulatively contribute to the preparedness and resilience outcomes. What does this look like? Table 4 provides a summary of activities that organizations should take to accomplish Steps 1–4.

7. The approach in action

The finding that evaluation to measure the outcomes of community resilience-building activities was rarely undertaken has several implications. First, when evaluation is undertaken, both the strengths and the weaknesses of the community resilience building program are identified so program planners at a system level of engagement practice can learn what worked, and what didn't work. Those findings can also be shared with other agencies, practitioners, and the community, so these lessons can improve future practice, or can be avoided. When no evaluation takes place, not only are program planners unaware, more importantly, communities have no tangible evidence to inform their understanding of their level of preparedness, or what needs to be done to build resilience in the longer term. In addition, agencies are subject to management decisions relating to CE that are made on intuition, rather than evidence.

Theoretically, engagement provides a foundation to guide resilience activities for disaster preparation. However, the nature of single (one-off) or information only engagement activities pragmatically means that engagement rarely goes beyond low level outcomes [40]. Engaging communities for resilience building outcomes requires planned communication and resources – from both disaster agencies responsible for keeping communities safe, and from community members themselves. For CE to contribute to social and relational capital (and therefore to community resilience) [16,17,19–21], activities need to be organized as part of a longer-term CE program with program outcomes evaluated, reported and internalized into future CE practice. This paper introduced a pre-engagement approach as a four-step evaluation tool to support emergency management organizations and communities to measure the contribution of CE programs in supporting communities to become more resilient. This paper also positions CE within a planning ToC frame-

Table 3
Community engagement objectives aligned to outcomes.

Data	Operationalization of CE for preparedness resilience outcomes	Community engagement measure
Knowledge of risk	Risk Knowledge	**Baseline:** current (knowledge/accuracy/awareness) of risk
Accuracy of risk	Risk Accuracy	**Objectives:**
Awareness of risk	Risk Awareness	To increase risk knowledge/awareness in (local community) by x% by (date)
		To have x% of local residents accurately know their risks by (date)
Behavior	Motivation to act	**Baseline:** current disaster risk reduction: actions/behaviours/plans
Actions Motivation	Intention to act	**Objectives:**
Willingness	Behaviors	To have xx% of (local community) have a plan for xx risk by (date)
Shared responsibility		To have xx% of (community) take at least (xx) actions to prepare for (xx) risk by (date)
		To have xx% of (community) intend to (action) by (date)
Capability	Skills	**Baseline:** current perception of capacity/empowerment/capabilities (skills/resources)
Capacity	Application	**Objectives:**
Empowered	Empowerment	To have xx% of (community) undertake training in (action) by (date)
	Stewardship	To have xx% of (community) know specific response actions to (warning system) message by (date)
		To have xx% of (community) feel confident they know (topic) by (date)
		To have xx% of (community) feel confident they know (topic) by (date)
Learning journey (process)	Learning	**Baseline:** Number of residents who believe they have learnt from previous experiences
		Actions by agency to act on previous outcomes
		Objectives: To have xx% of (community)aware of preparedness actions to x risk by (date)
Adaptation	Flexibility	**Baseline:** Number of community houses and resources
	Adaptation	**Objectives**:
		To have xx% of (community facilities) adapted to x risk by (date)
Resources/Tools		**Baseline:** Knowledge of resources and tools
Economic		**Objectives:**
		To have xx% of (community) know where to access/how to xxx by (date)
		To have xx% or number of agencies join in community DRR activities by (date)
Planning	Organization	**Baseline:** Number of community members who have a disaster plan
	Planning	**Objectives:**
		To have xx% of (community) create a plan for preparedness by (date)
		To have xx% of (community) create an evacuation plan by (date)
Values	Social capital	**Baseline:** Number of social connections
Social capital	Relational capital	Identification of community leaders
Relational capital	Orientation to others	Identification of vulnerable groups
Social connection	Social connections	Participation rates
		Volunteering rates
		Objectives:
		To have xx% of (community) identify/respect/communicate with local community leaders by (date)
		To have xx% of (community) feel a strong sense of connection with their community by (date)

work, and conceptualized the pre-engagement approach as an antecedent to CE, and an essential step to achieving evidence-based CE for resilience outcomes. Furthermore, understanding how evaluation of preparedness CE for resilience contributes theoretically to extending and refining engagement theory.

Ryan et al. [31] provided a systematic review of 41 studies on the effect of CE techniques that have been used in a hazard preparedness context. The review suggested some positive results. First, CE techniques can be effective in generating increased preparedness. Second, face to face techniques were found to be more successful than mass media campaigns to create preparedness. The authors concluded that hazard preparedness agencies should engage communities in preparedness through a wide range of techniques that cumulatively work to change individual and community behaviors. While data reflecting the experiences and voices of the people who are tasked with creating community resilience to natural hazards in Australia are not unique, this paper argues that many CE practitioners are all struggling with similar issues. CE that builds resilience is much needed across the world as natural hazards increase in frequency and intensity.

Several limitations relevant to this study provide directions for future research. First, the sample was limited as it was drawn from the population of CE practitioners in the specified state, and provided a planning perspective of CE activities and outcomes for one risk - flooding. In addition, the findings may reflect perspectives of practitioners with limited resources, both in budgets and knowledge, to develop and implement their evaluation systems. Future research could draw from larger practitioner samples from a range of emergency management agencies and in multi-hazard contexts. Second, the perspective of this study was theoretically founded in communication engagement and focused on evaluating CE contributions to the social or community dimension of resilience. While we recognize that community resilience is influenced by a range of other phenomena beyond social – such as structural and economic

Table 4
Pre-engagement steps.

	Purpose	Practitioner Actions
Step 1: Discussion: Monitoring, baselines and outcomes/impact discussion/agreement	Outcomes from the previous year's activities are discussed to identify: • lessons learned or best practice •baselines that can be used in the upcoming year. Current year CE program is discussed to identify: •planned resilience activities comprising the CE program. •resources needed to implement and evaluate the CE program	•Identify outcomes from previous years' activities. •Identify lessons learned. •Identify baselines. •Discuss/agree on overall expectations of CE outcomes. •Identify/discuss resources
Step 2: Mapping and sharing partner data	To understand current and potential networks of relationships, agencies should contact/reach out across their networks to identify: •what kinds of data are being collected by other emergency management agencies, organizations or community groups. •opportunities to collaborate/share insights and networks	Questions to ask include but are not limited to: •How were the data gathered? •When were the data gathered? •What tools or instruments were used to gather the data? •Is the data raw or already analyzed? •What, if any, are the limitations of the data collection?
Step 3: Create SMART objectives (see examples in Table 3)	SMART objectives are planned outcomes of the CE program and serve as indicators of progress. For each SMART objective, identify: •a baseline (see step 1) •a targeted resilience behavioral or attitudinal outcome (see Table 2) •a specific group •a plan for collecting monitoring and evaluation data at certain periods (quarterly, semi-annually or annually). These data can be qualitative (descriptive) or quantitative (numeric).	•Create SMART objectives including the targeted outcome, the questions or sources of the data, and the dates for the data collection and analysis. •If the agency needs to collect data to inform the achievement of the SMART objectives than this is the step to identify what will count as data and how the data will be counted as evidence.
Step 4: Decide which activities are evaluated	A CE program will include several activities that contribute to an overall resilience outcome. It is recommended that combined outcomes from multiple activities are **evaluated** following a strategic planning framework, rather than singular or one-off activities. Single activities can be **monitored** for reporting purposes. Evaluation of program or suite of activities for resilience outcomes: i.e.: (see Table 2 for other indicators) •Contribution of activities to risk (knowledge/accuracy/awareness) •Motivation/intention/capacity to act •Motivation/intention/capacity to lead/support others •Social connection/orientation to others Monitoring metrics: •Number of people analytics/attending/visiting •Feedback (formal/informal)	Some questions to ask include: •Which groups of activities are best for reaching the target community groups/members? •How can we plan a series of activities that will build knowledge, positive attitudes and behaviors that support preparedness for resilience? •What should be the key messages of the series of activities?

[5,15], how a community responds to risk is central to its resilience. Future research is needed to examine how community resilience is fostered before, during and after disaster events, and there is an opportunity to understand longitudinally any differences in resilience levels longer term among different community profiles.

A final limitation is that councils and government agencies are neither mandating nor funding evaluation so there is little motivation for local agencies to go beyond routine singe event data collection and analysis. Future research should explore the impediments and challenges to enhanced monitoring and evaluation of engaging for resilience to identify best practice. Despite these limitations, this paper extends the premise that community resilience building activities would benefit from a stronger connection to engagement theory and more evaluation that allows government agencies to tailor social resilience development approaches. Evaluation could also drive more creativity in developing stronger practitioner - community connections and extend relationship-building efforts beyond segments of the community who already have some level of knowledge of their risk. Evaluation will provide communities with real evidence to support the outcomes of their contribution to their community and facilitate community development for community leaders and future leaders. CE driven by outcomes will become an effective tool in the drive to improve resilience to natural hazards.

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Compliance with ethical standards

This research received ethical approval from QUT's human ethics advisory board - QUT Ethics Approval Number 2021000283. The research was conducted following the Australian Government National Health and Medical Research ethical research protocols.

Research involving human participants

All participants received participant information sheets and provided voluntary (signed) informed consent to participate in this research.

Disclosure of potential conflicts of interest

There are no potential conflicts of interest to declare.

CRediT authorship contribution statement

Kim A. Johnston: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Validation, Visualization, Writing – original draft, Writing – review & editing. **Maureen Taylor:** Conceptualization, Data curation, Formal analysis, Methodology, Writing – original draft, Writing – review & editing. **Barbara Ryan:** Conceptualization, Data curation, Formal analysis, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

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