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Resilience for disaster risk management in a changing climate: Practitioners' frames and practices

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ABSTRACT

There is a growing use of resilience ideas within the disaster risk management literature and policy domain. However, few empirical studies have focused on how resilience ideas are conceptualized by practitioners, as they implement them in practice. Using Hajer's 'social-interactive discourse theory' this research contributes to the understanding of how practitioners frame, construct and make sense of resilience ideas in the context of changes in institutional arrangements for disaster risk management that explicitly include the resilience approach and climate change considerations. The case study involved the roll out of the Natural Disaster Resilience Program in Queensland, Australia, and the study involved three sites in Queensland. The methods used were observation of different activities and the physical sites, revision of documents related to the Natural Disaster Resilience Program and in-depth semi-structured interviews with key informants, all practitioners who had direct interaction with the program. The research findings show that practitioners construct the meaning of disaster resilience differently, and these are embedded in diverse storylines. Within these storylines, practitioners gave different interpretations and emphasis to the seven discourse categories that characterized their resilience discourse. Self-reliance emerged as one of the paramount discourse categories but we argue that caution needs to be used when promoting values of self-reliance. If the policy impetus is a focus on learning, research findings indicate it is also pertinent to move from experiential learning toward social learning. The results presented in this study provide helpful insights to inform policy design and implementation of resilience ideas in disaster risk management and climate change, and to inform theory.

1. Introduction

The relevance of exploring the disaster resilience discourse is rooted in various arguments. Firstly, ambiguity surrounds not only resilience conceptualisation in theory but also in regard to its applicability within practice in disaster risk management (DRM) (Brown, 2011). Secondly, more research is needed to explore how disaster resilience ideas have been translated by practitioners at sub-national levels (state and local levels in this case study in Queensland, Australia) in order to apply them more generally to practice. Likewise, even if discourse analysis (DA) is a useful approach to investigate practitioners' construction of disaster resilience, very few studies have been conducted based on DA. Thirdly, by conducting a DA not only the main features of the discourse were illuminated, but also how different perspectives or positions (storylines) exist (Hajer, 2000). Their discourse and storylines influence the practices developed by them when responding to a change in a policy domain (Brown, 2011; Gelcich et al., 2005; Schön and Rein, 1994). The paper analyses practitioners' engagement in the disaster resilience discourse associated with a top-down formal institutional arrangement, under the Natural Disaster Resilience Program (NDRP). The NDRP is part of the disaster policy domain in Queensland, Australia. Thus, practitioners involved in the implementation phase of this

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arrangement are actively generating discourses in giving meaning to the NDRP. Finally, unpacking and being aware of the different positions practitioners hold, opens up new possibilities for improving and further developing policy and practice (Gelcich et al., 2005; Somorin et al., 2012). Based on these arguments, this study contributes to theory and practice by exploring resilience ideas in a bottom-up manner, using a DA in which practitioners were directly asked what they understand about resilience ideas (rather than the researchers imposing a predefined way of understanding resilience ideas); and, how these storyline about resilience can be applied in DRM practice. Moreover, as Hajer (2000) has noted, discourse analyses are useful for the examination of multiple and conflicting concepts, ideas and narratives that society holds about an issue. This resonates with this research, as resilience, climate change and DRM are controversial issues.

The paper is organized in four sections. The first section is the introduction. The second section reviews how resilience is conceptualized in the literature, the role of DA in exploring the meaning portrayed in a discourse such as that about resilience, and a brief description of the NDRP. The third section describes the methodology used. Then the fourth section presents the analysis and discussion of the results, by describing the storylines that emerged from the case study, including the main arguments and the core discourse categories (main features) of the three storylines of the disaster resilience discourse. The conclusion follows.

2. Background

Within academia an increasing number of papers and books have focused attention on resilience. Resilience theory has also proliferated across many disciplines and fields such as DRM and climate change (Aldunce et al., 2014b; Walker and Cooper, 2011). In turn, there is an increase in the use of the resilience term in different media sources (Brown, 2011). Additionally, resilience appears to have strong policy traction, as it has been widely used in different policy arenas and discourses, and has become a regular term used in a multiplicity of financial institutions, policies, programs and documents from international to sub-national levels (DCS/QG, 2009a; UN/ISDR, 2007; World Bank, 2008). In the field of DRM and climate change the use of terms and idioms such as 'resilient communities', 'resilience livelihoods', 'building community resilience', 'disaster resilience' and 'resilient nations' have been included in documents as central elements (DCS/QG, 2009a; Twigg, 2007; UN/ISDR, 2007). Thus, as Norris et al. affirm (2008, p. 128), "the term is probably here to stay".

Regardless of its popularity, the resilience concept has been widely criticized (Brown, 2011; Moser, 2008; Walker and Cooper, 2011). These critiques particularly address its abstract and malleable in nature; it can be viewed as an imprecise policy term, being subject to manipulation to suit different interests, as well as lacking attention to issues of power and agency (Nelson et al., 2007; Walker and Cooper, 2011). Another relevant critique is that there is of resilience theory is that there is confusion, ambiguity, lack of substance and conceptual clarity (Bahadur et al., 2010; Brand and Jax, 2007; Cutter et al., 2008). This problem transcends practice, as some authors maintain that there is no clarity on how to apply resilience to practice (Djalante and Thomalla, 2011; Manyena, 2006; Moser, 2008). This implies that what disaster resilience entails and embraces, remains open for debate. In order to advance theory and especially its implications in practice, an approach such as DA is needed, which recognizes the importance of acknowledging multiple views. The following section describes the relevance of a discursive analytical framework and then briefly explores how resilience has been framed within DRM literature.

2.1. Discourses

Discourses can be understood as social constructions held by different actors who promote the importance of some aspects over others in a specific situation (Hajer, 2000). Consequently, studying discourses is helpful for exploring the construction of diverse and conflicting ideas, conceptualisations and narratives that actors in society hold, including practitioners in a policy domain (Dryzek, 1997). Nevertheless, generally, how people frame issues is not self-evident or explicitly expressed (Adams, 2004). Therefore, examination of discourses is helpful in detecting whether different practitioners or groups frame the same issues in diverse ways, and to make actors aware that divergent positions exist and what they embrace (Adams, 2004; Gelcich et al., 2005).

Discourses are context dependent; they are linked to a specific situation, constituted by an historical, cultural, environmental and political context (Hajer and Versteeg, 2005). In this sense, the meaning of the same policy can differ at the national and local level (Pressman and Wildavsky, 1973; Verloo, 2005), because of the different frames that bureaucrats and legislators hold, as a consequence of their different policy contexts (Schön and Rein, 1994). For example, different concepts and ideas are contested in searching for meaning and to inform interpretation during policy and program implementation (Hajer and Versteeg, 2005).

There have been a few DA applied to resilience in the context of disasters. Examples are Bohensky and Leitch's (2013) Australian study of the media representation of natural disasters from 2006 to 2010 and Brown's (2011) review of academic literature, media and international documents. Applying a DA methodology which analyzed either the discourse in the implementation phase of a policy or program at the local level, or where practitioners were asked directly through in-depth interviews allowed us to probe more deeply than previous studies have been able to do, into the underlying framing of resilience for those enacting policy directions. To make sense of the interview responses, we first briefly review how resilience has been applied in the DRM literature.

2.2. Resilience and disaster risk management in a changing climate

The resilience literature has been developed in three main disciplinary areas. Firstly, some authors suggest that resilience emerged in ancient thinking, and was first developed in mathematics and physics (Bodin and Wiman, 2004). Secondly, it can be traced to the 1940s to the fields of psychology and psychiatry with the research of Garmezy, Werner and Smith (Manyena, 2006). Thirdly, it has been developed in the ecology literature, emerging in the 1960s and 1970s from a series of studies carried out by Holling (1961), Lewontin (1969), May (1972), and Rosenzweig (1971), and especially influenced by Holling's (1973) seminal paper.

These three academic areas have influenced DRM. Mathematics and physics resilience has been helpful in describing the ability of a material or system to resist without breaking, and the speed at which it returns to equilibrium after a displacement (Aldunce et al., 2014a; Bodin and Wiman, 2004). The main contributions of the fields of psychology and psychiatry are that they have helped to elucidate the relationships between specific psychological factors and individual or collective resilience to adversity and on the potential for recovery after experiencing a disaster (Paton et al., 2001). Resilience here refers to the ability of individuals and communities to resist and return to baseline functioning after a stress, disaster or external shock (Adger, 2000; Norris et al., 2008; Pfefferbaum et al., 2005). The most significant contribution of the ecology, and more specifically social–ecological systems theory, is that it provides a framework for analysing, interpreting and

responding to disasters in the context of socio-nature systems, recognizing the complexity of coupled socio-nature environments and a systemic approach to disaster management (Adger et al., 2005; Berkes, 2007; Gunderson and Folke, 2005).

It is important to highlight that the cross-fertilisation between the three discipline groups that underpin resilience theory occurs when resilience ideas are incorporated into other fields and disciplines, such as DRM and climate change (IPCC, 2012; Moser, 2008, p. 2). Therefore, to conduct an analysis based on a clear demarcation of these three groups of literature is impossible (Moser, 2008, p. 2); and not all that useful. The aim of this analysis rather, is to understand the main contributions of resilience theory in the context of DRM (for reviews of the main contribution of resilience theory to the climate change literature refer to Aldunce et al., 2014b; IPCC, 2012; Moser, 2008). Consequently this is not a historical review (for reviews of definitions of disaster resilience refer to Aldunce et al., 2014a; Bahadur et al., 2010; Buckle, 2006; Djalante and Thomalla, 2011; Norris et al., 2008).

Even if the resilience concept has long been used in DRM literature and practice, over the last decade the concept has gained more attention (Brown, 2011; Godschalk, 2003; Moser, 2008), influenced by the adoption of the 'Hyogo framework for action 2005–2015: building resilience of nations and communities to disasters' (UN/ISDR, 2007). Briefly then, studies in disaster resilience include those on community resilience (Paton et al., 2001); psychological aspects of personal resilience to disaster (Paton et al., 2000); institutional resilience (Tompkins, 2005); urban resilience (Godschalk, 2003); social and community resilience (Tobin, 1999); economic resilience (Handmer and Hillman, 2004); resilience in policy (Barnett, 2001); the definition of a typology for resilience (Handmer and Dovers, 1996); and social–ecological resilience in DRM (Adger et al., 2005; Berkes, 2007; Renaud et al., 2010), among others.

Disaster resilience is mainly described as the 'capacity' of an actor, individual, community, social unit, organization, society or system to absorb, recover, cope, 'bounce back', mitigate, withstand or resist the impacts of hazards (Bruneau et al., 2003; Klein et al., 2003; Mileti, 1999; Timmerman, 1981; Wildavsky, 1991). Resilience also has been described as a process of self-learning and recovery (Klein et al., 2003; Paton et al., 2000), as a measure of how well societies can adapt (Paton, 2006) and the amount of disturbance a system can absorb (Klein et al., 2003; Paton, 2006).

Inspired by a systemic conceptualisation of resilience and especially of complex adaptive systems, resilience has moved from the core idea of 'resisting and recovering' into 'adapting'; and from 'stability' to 'change' (Comfort, 1999; Longstaff, 2005; Pelling, 2003). This evolution of the concept is about openness, adaptability and opportunities for betterment and innovation (Handmer and Dovers, 1996; IPCC, 2012; O'Brien et al., 2010, p. 499; Paton, 2006), qualities that suggest adaptability is not locked into specific strategies (Longstaff, 2005). For these opportunities to become real, learning is a key aspect, in the sense that disasters could give the opportunity for reviewing the capacity of people and the structure of organizations associated with DRM, based on what worked and what did not during past disasters (Aldunce et al., 2014a; UN/ISDR, 2007; Wildavsky, 1991).

Another relevant characteristic of the disaster resilience approach is the capacity to anticipate, prepare and plan in order to recover from the negative impacts of a hazard and to mitigate, prevent and minimize losses, suffering and social disruption (Bruneau et al., 2003; IPCC, 2012; Mileti, 1999).

Self-reliance has been also described as an important capacity of being resilient, interpreted as the ability to 'withstand' without becoming overly dependent on external help (Mileti, 1999). Furthermore, self-reliance can also be interpreted as self-organization, in which communities, social groups or systems are able to organize themselves without substantial assistance from outside, despite being affected by an external event (Klein et al., 2003; Mileti, 1999; UN/ISDR, 2007).

2.3. The Natural Disaster Resilience Program (NDRP)

In December 2009, the National Partnership Agreement on Natural Disaster Resilience (NPA) was agreed to the parties; the Commonwealth of Australia and the six states and two territories of the country (COAG, 2009b). The NPA replaced various Commonwealth Grant Programs: the former Bushfire Mitigation Program, the Natural Disaster Mitigation Program and the National Emergency Volunteer Support Fund (AGD/EMA/AG, 2009). The new agreement is an amalgamation of the replaced programs, aiming to "enhance Australia's resilience to natural disasters through mitigation works, measures and related activities that contribute to safer, sustainable communities better able to withstand the effects of disasters, particularly those arising from the impact of climate change" (AGD/EMA/AG, 2009). The parties recognize they (a) "have a mutual interest in reducing the impacts of, and increasing resilience to, natural disasters; and (b) "will work together and with other parties, such as volunteers, the private and non-government sectors and local government, to achieve those outcomes" (COAG, 2009a, p. 2).

The NPA was implemented at the state and territory level through the NDRP. The 'Queensland Implementation Plan' of the NDRP detailed various aspects (for more detailed information please refer to DCS/QG, 2009c, 2010a,b). For example, in regard to organizations and agencies eligible for funding, the NDRP states that these include local and state government agencies and relevant statutory authorities, government owned corporations and non-government organizations; and that eligible organizations are encouraged to apply in partnership with agencies of the private sector, NGOs and research organizations (for a description of the context of the study refer to Aldunce, 2013).

3. Methodology

The research process was designed in order to address the research question of how practitioners frame, construct and make sense of resilience ideas in the context of changes in institutional arrangements for disaster risk management that explicitly include the resilience approach and climate change considerations. The methodology used in this research is DA. Specifically, the social constructivism approach of Martin Hajer, called *social-interactive discourse theory* (Hajer, 2000) was used. Hajer's definition of *discourse* is "a specific ensemble of ideas, concepts, and categorisations that are produced, reproduced, and transformed in a particular set of practices and through which meaning is given to physical and social realities" (see Fig. 1) (Hajer, 2000, p. 44). Discourses present different *storyline*, which are defined as "narratives on social reality through which elements from many different domains are combined and that provide actors with a set of symbolic references that suggest a common understanding" (Hajer, 2000, p. 62).

Discourses are not self-evident, and researchers must construct these based on the interview and through documenting text evidence (Schön and Rein, 1994). This is done by looking for patterns, regularities and variations, expressed in different forms (Pyles and Harding, 2011; Verloo, 2005; Wodak, 2008). One core aspect in the study of discourses is that storylines express how an issue is perceived and what should be done (Dewulf et al., 2009; Fischer, 2003; Juhola et al., 2011; Rein and Schön, 1996). Therefore, the analysis is organized by aggregating emergent patterns into diagnosis (also called diagnostic, problem definition, and issue

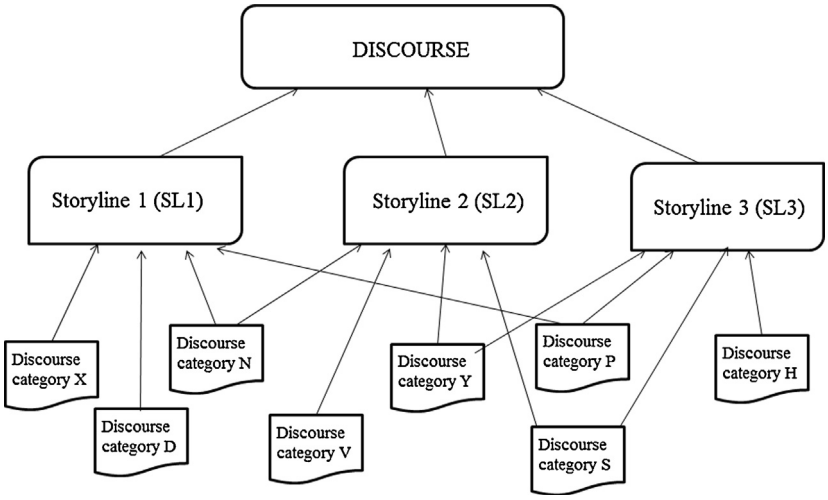

Fig. 1. Relation between discourse, storylines and discourse categories.

framing), and prescription (also named as prescriptive or prognostic framing, and prognosis) within the storylines.

The implementation of the NDRP was used to investigate practitioners' resilience discourses. The study was conducted at the state level in Queensland (Brisbane) and at two local sites: Charleville and Gold Coast, Australia. As in other studies (Mander, 2008; Somorin et al., 2012), discourses were identified during the interview analysis by first coding individual interviews, and then aggregating interviewees' codes, based on the views of those interviewed, as the storylines emerged. Discourses reflect qualitative, interpretative and inductive approaches to the data. Therefore, the methods used in this research were firstly, observation that was undertaken from November 2009 to February 2011, during fieldwork, at formal and informal meetings, and by visiting the physical settings. Secondly, revision of documents related to the NDRP, ten government documents that guide the implementation of the NDRP and more than 15 grant applications for funding to the program were analyzed. Thirdly, in-depth semi-structured interviews (thirty participants were interviewed, resulting in 27 analyzed interviews) with key informants, all of whom had direct interaction with the program, including: personnel from non-government, government, private and research agencies at the state and local levels, and that participated in different phases of the NDRP; design and development, or had applied for funds from the program.

To organize, analyze and integrate data, two computer software programs were used and combined: EndNote X3 and NVivo 9, in order to undertake a qualitative thematic analysis. For the thematic analysis an analytical coding is required, which is an inductive and interpretative decision process, where patterns emerged by looking for connections through juxtaposition (Bryman, 2008), rather than a prescribed or linear method of analysis (Pyles and Harding, 2011). We identified phrases or word clusters, and the thematic codes were derived from recurring phrases and word clusters and initially these were grouped according to respondents' use.

Despite some outstanding academic work in social constructivist's approaches, the value, application and utility of these approaches has been discussed within the global environmental change literature (for reviews of the main critiques of social constructivism refer to Jones, 2002; Metzner-Szigeth, 2009). One of the most salient elements of these critiques refers to an incompatibility between social constructivism and environmental concerns and activism (Woodgate and Redclift, 1998). While acknowledging that constructivism has limitations, we on the other hand agree with Jones (2002, p. 248), who states that some approaches to social constructivism "enable us to simultaneously take on board the material conditions of our existence and its symbolic meaning". In this realm, also as argued by Jones (2002), the constructivism perspective embraced in this research recognizes that knowledge cannot be divorced from social experience, that there are multiple realities and that it is necessary to understand the plurality of constructions and how these are related to different stakeholder's groups and their interests, as well as the influence of power relations.

4. The disaster resilience discourse: results and discussion

4.1. Storylines of the disaster resilience discourse

As in other DA, an absolute delineation of storylines does not exist. Rather, some arguments are shared by interviewees even though their overall narrative indicates they are from different storylines (Hajer and Versteeg, 2005). Nevertheless, the participants interviewed gave distinct emphases and connotations to arguments, and the regularities observed (discourse categories) resulted in sufficiently distinctive discursive structures to form clearly different storylines (Hajer and Versteeg, 2005). This section briefly introduces the three storylines that emerged from the case study, and then in Section 4.2 more detail for each storyline is given, by describing how the regularities and distinctions made by participants in each discourse category underpins each of the storylines. The three storylines are assigned narrative names (mechanistic/technocratic, community based, and sustainability) as has been previously described in the literature (see for example Bosomworth, 2012; Brown, 2011; Dryzek, 1997; Fischer, 2003; Gelcich et al., 2005).

4.1.1. Mechanistic/technocratic storyline (SL1)

The mechanistic-bureaucratic character of the mechanistic/technocratic storyline is reflected through its normative stance, giving emphasis to the role of norms and regulations. Participants explained that the problem is that DRM historically has focused on recovery and response; and that this has resulted in people not being well prepared. Based on these participants' opinions the resilience approach requires better preparation, ensure DRM plans and rules are in place, and disaster exercises (rehearsals) to be carried out. Interviewees assigned a central

role to government, for example, in educating people about DRM, so communities can be better prepared. This storyline is defined also as a technocratic-instrumentalist one. Participants argued that the key to being well prepared is to have information and knowledge, and the assumption here is that this is not currently the case.

4.1.2. Community-based storyline (SL2)

The narrative of the community-based storyline focused on the social dimensions of management by stressing the importance of community participation, 'self-reliance', and building social capital. Interviewees said, for example, that the problem is that communities are not taking sufficient responsibility for themselves and they argued that one of the main causes for the latter is based in governments and aid agencies that create dependency and take away people's initiative to do things for themselves. Interviewees also attributed blame to the modern lifestyle that results in increasing individualism, provoking lack of social connections and capacity to assist each other, loss of interest in community values as a whole and not having a shared societal vision, or a sense of place and belonging.

4.1.3. Sustainability storyline (SL3)

The sustainability storyline central value is that humans are part of nature. The interviewees' diagnostic frame is about the alienation of humans from nature, and they describe how people lose connection with it, fear nature and do not accept therefore that disasters can happen. Another central idea that emerged as part of their diagnostic perspective is that there is a human tendency to want to control nature and be risk averse. Consequently, their prescription is constructed as a need to accept that disasters can happen; to learn to live with change and to understand uncertainty as part of a 'nature' that includes humans.

4.2. Core features: discourse categories of disaster resilience storylines

Seven discourse categories emerged as core within the three storylines: preparedness/response, self-reliance, governance/co-management, experiential learning, surrounding environment, information/education/communication and social capital. Table 1 indicates the proportion of interviewees from each storyline who mentioned each category either in the diagnosis or prescription, based only on the categories recounted by the majority of the participants.

A description of each of the three storylines follows. This description is based on the main themes (discourse categories) used in the framing. This paper focuses only on the discussion of the first five categories. Social capital and co-management emerged as discourse categories of equal importance. These two themes are discussed more fully elsewhere (see Aldunce, 2013).

Table 1
Proportion of interviewees who mention each discourse category either in the diagnosis, prescription or in both.

Discourse category	Storyline		
	SL1	SL2	SL3
Preparedness/response	C	C	B
Information/education/communication	C	C	B
Self-reliance	B	C	C
Social capital	A	C	C
Governance/co-management	A	C	B
Surrounded environment	C	B	C
Experiential learning	A	B	C

Note: (A) is used when less than a third of interviewees of each storyline mentioned a specific category; (B) is used to indicate up to two thirds and (C) up to all interviewees.

4.2.1. The imperative of self-reliance and its complexity in practice

This discourse category is especially strong in SL2, which is consistent with the emphasis given within this coalition to social dimensions and the role of the community. This discourse category it was also central in SL3, in which self-reliance was framed as part of learning to live with change and uncertainty. In contrast, these aspects are less mentioned in SL1; instead, they draw on claims of government agencies driving process, with a strong role, and giving less attention to societal aspects.

It is not surprising that self-reliance emerged as a discourse category; rather, what is surprising is that it was so pronounced in the storylines. In searching for explanations we found that self-reliance is a central component not only in the academic literature (Djalante and Thomalla, 2011; Klein et al., 2003; Manyena, 2006) but in disaster risk frameworks and guiding documents (UN/ISDR, 2007). In regard to policy and governance, a fundamental argument among some analysts of resilience and why it has 'colonised' multiple governance domains worldwide, is because it readily resonates with neo-liberal ideologies, in which self-reliance is central (Brown and Westaway, 2011; Walker and Cooper, 2011). Australia is not an exception to this as has been stressed by Bardsley and Pech (2012) and Templeman and Bergin (2008). They also argue that governments (who are guided by political motives such as gaining votes) build up this dependency. This latter idea also concurs with the findings of this research study as stated by interviewees, especially from SL2.

> ... one of the fundamental factors decreasing community resilience to disasters is the government themselves... So it would be figureheads within the government that rather than empowering communities to stand up... they [government] need to show they're doing something. And doing something for them implies basically handing out money. Now that's contradictory to having a resilient community ... ((sn10) to protect interviewees' identity names were replaced by codes for all quotes).

Building up dependency can limit self-reliance, as has also been argued by Bohensky and Leitch (2013). Limiting self-reliance can be explained because when governments and other aid agencies step in during disasters, their activities can result in disempowering communities, even taking away the possibility of them protecting themselves, and this may unconsciously lead to decisions that increase their risk. This argument emerges strongly in SL2 and SL3.

> ... an over reliance on government. People don't take responsibility for their own safety and their own property enough; they rely on governments, local government or state government, in our case, to prepare for them and to do a lot of work. That's probably the biggest thing. (lg3)

We note the almost complete absence in practitioners' framing of key aspects that need special attention when the idea of self-reliance is applied to policy and practice. Firstly, caution needs to be paid to interpreting self-reliance strictly as 'do not wait for external help' because, in most situations it would be impossible for communities to respond based only on their immediate resources, and expecting them to do everything themselves could put communities in more danger, especially in severe disasters (Aldunce et al., 2013; Etkin and Dore, 2003). Thus, even if self-reliance should be promoted as a value, it is necessary to be aware that it has a limit and that in certain disasters the community will require external help. Related to the latter, apparently more clarification is required about governments not appearing to or intending to abandon the community, as was noted by one interviewee (sr2). Finally, the capacity of a community to be self-reliant depends on the severity of a disaster. To further discuss the

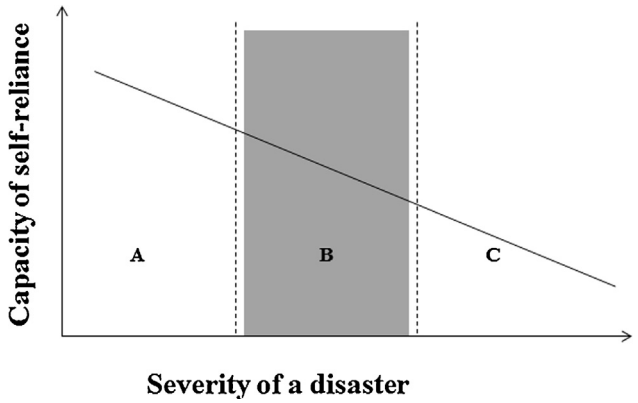

Fig. 2. Capacity of self-reliance versus severity of disasters. Where A, B and C represent disasters of small, medium and large magnitude respectively.

implications of this idea we developed a conceptual graphic that is displayed in Fig. 2.

The graphic shows there is likely to be a greater community capacity for self-reliance when responding to small disasters (A); however, in the presence of more severe events the community capacity to self-respond is usually overwhelmed and external help therefore is required (C). Nevertheless, the transitional gray area (B) indicates the importance of focusing the discussion in this zone. The limits (the broken lines) that separate the three areas (A, B and C) are not absolute. The limits need to be defined and negotiated between those affected by disasters and those who provide external support. Equally important to achieving agreement on the level of responsibility each group can assume, is the definition by communities on which activities they can take responsibility for. The alternative is top-down decision-making and responsibility, resulting in the likelihood of a less than satisfactory outcome.

Another result is that participants refer most often to self-reliance and taking responsibility for self, and have less to say or do not distinguish these from self-organization.

> ... to make communities more able to cope with disasters themselves ... there's been a real shift as you're probably aware, shifting the responsibility over to communities so therefore resilience has to increase. (sr5)

Even if these are similar terms, they could have different connotations so it was important to understand the differences. In the social–ecological system literature, self-organization is commonly used (Adger et al., 2011; Folke et al., 2005), and in DRM literature and policy documents it is common to find both terms; self-reliance and related terms such as self-responsibility and self-help; and self-organization, understood as self-management (Djalante and Thomalla, 2011; Moser, 2008; Tadele and Manyena, 2009; UN/ISDR, 2007). This theoretical nuance could lead to different implications in practice, and particularly for interviewees in this case study, who have ideas around communities taking more responsibility for themselves and not relying on government.

Here we reflect that the way some interviewees framed the problem of communities not being self-reliant, denotes a certain degree of arrogance and a somewhat naive position that assumes equal power and agency between various actors. Therefore, as has been argued by others (Tadele and Manyena, 2009; Twigg, 2007; Walker and Cooper, 2011), if devolution of responsibility is passed to the community, it has to be accompanied by efforts to strengthen their skills and capacities, and with appropriate institutional support and resources necessary. Literature on social contracts represents a relevant source from which ideas of self-reliance can be further discuss (Adger et al., 2013).

4.2.2. Focus on preparedness instead of response

This discourse category was mentioned by the vast majority of interviewees. This is not surprising as in academia, international frameworks and guiding documents the emphasis is on how crucial it is to prepare in order to build resilience to disasters; and preparedness is particularly linked to enabling better response and being able to quickly 'bounce back' (Tadele and Manyena, 2009; Tompkins, 2005; Twigg, 2007). In regard to the diagnosis, participants from SL1 drew on claims that a key causal factor is the sustained emphasis given to response and recovery, instead of preparation and mitigation. This is also reflected in the literature (Handmer and Dovers, 2007) but despite being an accepted idea, changing practices in this area lag behind, according to the interviewees. Importantly, they emphasized that this is expressed by, for example, not having plans in place and people not being prepared. Even if interviewees from SL2 have similar views, they based their arguments on a different perspective: that people have a lack of understanding of how to prepare and that they do not take steps to protect themselves as a consequence.

The concomitant prescription tells a story in which the three storylines merge around the idea of giving more emphasis to prevention and preparedness, as manifest in actions such as having plans and response mechanisms in place, in preparing kits and in agencies coordinating ahead.

> What we're really talking about here if we're looking at kind of prevention preparedness, response, recovery ... and I would agree with this, is that we're really looking at probably the prevention and the preparedness side of things when we're talking about community resilience. (sn10)

The intent of this prescription entails responding more effectively to minimize the negative impacts of disasters, to take the pressure away from immediate response so agencies are not overwhelmed, and to bounce back. To bounce back from disasters is a key idea when describing resilience within the DRM literature (Aldunce et al., 2014a; McEntire et al., 2002; Mileti, 1999; Timmerman, 1981; Wildavsky, 1985) and was commonly mentioned by participants. SL1 and SL2 especially emphasize bouncing back quickly to a comparable stage in terms of business continuity, emotional recovery and the physical environment, all in order to achieve stability and a sense of normality.

> It should be helping the community to get through the difficult times, and better preparing them so that the impacts from disasters and different events don't disrupt them for too long, it's really helping them keep a sense of normality as much as possible ... [also] government stability and all those sorts of things, I guess stability is an element throughout all those sorts of things. (sg11)

Preparation, as a key aspect underpinning resilience, dominates SL1 and SL2, but with the distinction being that, in SL1, governments are at the core of preparation and in SL2 it is communities. This is in line with each storyline rationale.

Throughout SL1 participants recounted that the key is for communities to know how to prepare and what to do during a disaster, and therefore they conferred a more pivotal role on government agencies in conducting disaster exercises and training, and developing evacuation plans. By contrast, SL2 participants assigned more relevance to communities developing skills and having resources to respond better and cope themselves. Within the three storylines, five participants explicitly stressed the relevance of adapting, preparing ahead and looking forward.

> ... [people] to take accountability for the fact that a disaster may occur, that they have the means to become more adapted to it or to prepare ahead of time for it coming. (sn10)

Triangulation of the data confirmed the relevance given to preparation for building community resilience to disasters; and this was constantly included in the conversations at meetings during the field work. This theme it is also one of the three program priorities for both rounds of the NDRP (NDRP09-10, NDRP10-11): "Enhance community preparedness for natural events through community education and awareness raising" (DCS/QG, 2009b, 2010a,b). Therefore, it could be expected that all the applicants would have had to prepare a response to this concept, emphasizing again how the framing of their different perspectives is made explicit in how they interpret what the concept means.

4.2.3. Information, education and communication deficit

The arguments given by respondents concur with the literature, framework and guiding documents in assigning a pivotal role to information and education as an enabler for building disaster resilience (Djalante and Thomalla, 2011; Norris et al., 2008; UN/ISDR, 2007). Information and education are cross-cutting issues that intertwine with a multiplicity of aspects such as preparedness, warning, training, awareness and being proactivity.

> The values, they are more I think in trying to get good participation from communities in understanding their risks and owning those risks . . . I think people can cope a lot better if they are well educated or well trained in knowing what the events mean and the impacts that they might have and how they might respond to those afterwards. (sr2)

Whilst the interviewees viewed information and education as crucial, in practice this is not happening as well as it could, with consequent implications for exposure and effective preparation and response. What also captured our attention is that even if it is a recurrent critical claim in the literature and in policy documents (Handmer and Dovers, 2007; UN/ISDR, 2007), still an unresolved issue in the field (Mileti, 1999; UN/ISDR, 2007). SL2 and SL3 agree that an information asymmetry exists, in the sense that they believe governments do not share or give honest information about the real risk, for example, the magnitude of a cyclone, or its impacts and consequences. The following quote from an interviewee illustrates this idea:

> We can provide the underlying information; make it simple for people to actually go . . . It's criminal that it's not happening . . . and the problem is, there is a massive information asymmetry. Local government and insurance know exactly what's going on. The idiots who are buying the properties [do not, and] we've got to reach out. (sn4)

This asymmetry of information could result in undermining confidence among practitioners, causing confusion and possibly putting them at unnecessary risk; this is a concern shared by some participants and reflected in the literature (Handmer and Dovers, 2007; O'Brien et al., 2010). Policies and practices should promote the delivery of accurate and useful information that is simple enough to be understood by the general public, thereby sharing the information about risk. Within the framework of the NDRP, some voluntary organizations had applied for projects to address this shortcoming, for example, by delivering information to them in more accessible formats that are easier to understand and locating this information where different segments of the population can find them, such as on web sites.

The subordinate prognostic frame shared by the three storylines (SL1, SL2 and SL3) indicates a core narrative with the imperative of improving education campaigns and information dissemination. Some interviewees said that in their experience the general public does not have the appropriate knowledge to deal with disasters. However, in SL1 the emphasis is on having good warning systems and risk assessment and in government delivering information and educating communities. The latter idea again reflects the underlying rhetoric of SL1 that involves top-down and command-and-control approaches, in which the role of information and education is fundamental to supporting rational choices and enabling better decisions to be made.

In our analysis of the interviews we note the emphasis and use of the terms 'information', 'education' and 'communication'. Arguments such as "government failing to communicate everyone's role" and "educate the community" reveal a rationale in which efforts are concentrated on delivering uni-directional (top-down) information (data), and these are not associated with reciprocal communication. Consequently, information does not transform to knowledge because it is not meaningful to the community. It could also be that the information is not what the community is interested in, and that their viewpoints have not been considered; for example, first establishing what information they need and why. Within the resilience literature, communication has been defined as "the creation of common meanings and understandings, and the provision of opportunities for members to articulate needs, views, and attitudes" (Norris et al., 2008, p. 140). This emphasises the role of information and the need to transform it to meaningful understanding and this forming the basis for education, and enhanced communication overall.

4.2.4. Controlling the environment or living with nature

These findings concur with the literature in jointly considering the natural and constructed environment as central to framing disaster resilience (Berkes, 2007; Djalante and Thomalla, 2011; O'Brien et al., 2010). However, interviewees held opposing positions in regard to the role of infrastructure and in their conceptualisation of the natural environment in building resilience to disaster. This led to extremely distinctive prescriptions, which in turn have different implications. At one extreme, the way in which SL1 rests on solutions that focus on 'hardening up' infrastructure with the aim of constructing a safe environment, even if it is recognized as an ideal, runs the risk that in practice funding and attention will focus on infrastructure and the social aspects may be neglected. In contrast at the other extreme, results emerging from SL3 concur with arguments pointed out by others (Bahadur et al., 2010; Berkes, 2007; Bosomworth, 2012; Eriksen et al., 2011; O'Brien et al., 2010), that rather than focusing on the constructed environment, this storyline stresses the importance of conceptualizing the world as a coupled social-environment system when framing disaster resilience.

Framing throughout SL3 fosters moving away from imagining humans alienated from nature, to the idea of living with nature, as the next quote shows:

> What decreases our resilience to a certain extent though is that . . . we don't accept that there will be change. We want things just to be the same . . . We're not God, we can create our own environment up to a certain point but we don't control that. (sp13)

In this, the interviewee reflects, as does Adams (2009), for example, that humans must accept that disasters are part of nature. One of the major implications of this framing, noted by a few interviewees and argued by some authors (Handmer and Dovers, 1996; O'Brien et al., 2010), is that by diminishing the apathy to disasters and consequently accepting that disasters and change happen, opens up the possibility of framing them as opportunities for improvement and innovation.

4.2.5. An opportunity to exploit experiential and social learning

The least mentioned discourse category that emerged from the data is experiential learning; however, it was still discussed by more than half of the participants. This differs from the literature

that assigns a central role to experiential learning in building disaster resilience (Berkes, 2007; Godschalk, 2003; O'Brien et al., 2010). Individuals learn through experience about how to conduct themselves during a disaster, and in turn this helps by raising consciousness and awareness of risk (Gopalakrishnan and Okada, 2007; O'Brien et al., 2010; Tompkins, 2005). Throughout SL1 and SL2, interviewees told stories in which they allege that part of the problem is that some individuals have not experienced disasters because they are immigrants, itinerants, tourists and or young people, and consequently they do not know how to act during a disaster. A convergent claim (which confirms the cited literature above), comes from the three storylines, that exposure to recurrent disasters helps people to be better prepared, and be more adaptable. An analogy with immunizing children from disease (paralleling the idea of being better prepared and enabling growth) through vaccination (similar to being exposed to disasters) surfaced here.

> ... they are the ones who are more resilient because they have been to that–to that situation several times. Not only three or four times, but in their lifetime. So in other words, they become more immune... boost their capability like if you vaccination. (lr1)

Armitage et al. (2008, p. 3) defined experiential learning as "a process of creating knowledge through the transformation of experience, learning-by-doing". In turn, social learning has been defined as "learning as a process of iterative reflection that occurs when we share our experiences, ideas and environments with others" (Keen et al., 2005, p. 9). What distinguishes these two kinds of learning is that social learning gives special emphasis to individuals *sharing* experiences. Therefore, we named the discourse category 'experiential learning' and not 'social learning', based on the fact that interviewees gave more attention to individual learning and only a little to group learning or sharing experiences. This concurs with DRM theory and practice, in which experiential learning has dominated; social learning has received less attention, and is seldom incorporated in governance processes (Birkmann et al., 2010; Lettieri et al., 2009; Nelson et al., 2008; O'Brien et al., 2010). Interestingly, one interviewee explicitly noted that people are not good at learning from past programs or from "locations next door", nor are they good at sharing knowledge, and s/he further stated that experiential learning is hard to translate into shared understanding:

> ... we're also really not good at learning from past programs or projects. It was one of the real problems with the mitigation program that the resilience program replaced ... in practice what we did was we'd run out and we'd do a specific project in a specific location and then immediately next door they wouldn't even learn from what had been done there. (sg8)

In the DRM literature and policy documents the concept of learning has been applied in a broad range of situations, such as learning lessons from mass disasters and learning in policy cycles. Many examples of this can be found in the literature (Birkmann et al., 2010; Corbacioglu and Kapucu, 2006; Godschalk, 2003; Lavell, 2009; Moore et al., 2009; Tompkins et al., 2008; UN/ISDR, 2007) and undoubtedly they have been useful in improving DRM in practice and theory. Nevertheless, often these kinds of efforts are carried out by external agencies such as research, governmental or international organizations, resulting in these efforts not always being sufficiently disseminated and discussed among local practitioners. The implication of this is that there is an opportunity for improving DRM if learning is framed as social learning, contrasting with the view of most interviewees. This can lead to changed practices, and to improved and updated institutions (Armitage et al., 2008; Folke et al., 2005; Walker and Westley, 2011), ultimately resulting in decreased risk after every disaster (Aldunce et al., 2014a).

Within the DRM literature, disasters have been conceptualized as opportunities for learning and change (Birkmann et al., 2010) because a shock can lead to re-evaluating a situation. Disaster resilience ideas reinforce this conceptualisation, as many authors emphasize that a disaster should be considered a catalyst for development and growth (Gaillard, 2010; Paton, 2006), as well as for innovation and change (O'Brien et al., 2010; Paton, 2006), "by shifting from established patterns to more beneficial ones" (Brown, 2011, p. 4). Thus, as stressed by O'Brien et al. (2010, p. 499) disasters could be understood as opportunities not only for "doing it better", but also for "doing it differently". Results from the case study show a small number who framed disasters as opportunities for 'doing it better', and even fewer participants (only two) saw it as an opportunity for 'doing it differently'. Nevertheless, even if this is an attractive idea, it could be constrained in practice, as learning (of any sort) does not receive much emphasis in current DRM (Handmer and Dovers, 2007). Our study findings suggest that, as Collins and Ison (2009) note, there is legitimacy and certain urgency in giving more attention to the epistemologies that underlie social learning.

5. Conclusions

The DA conducted in this research study helped to elucidate the resilience discourse and the alternative storylines which emerged among disaster management practitioners, which provided empirical evidence to progress the discussion and development of resilience theory (Section 4). Further, in describing and analysing these findings, we are hopeful of affecting the design of policies and the implementation of resilience ideas in practice.

This research shows that self-reliance is central within the disaster resilience practitioner discourse. Several implications follow from the interpretive empirical analysis in this respect (see Section 4.2.1), that can be helpful in building resilience to disasters. One of these implications is that promoting self-reliance directs attention toward social aspects of DRM complementing engineering measures and physical components, but this positive connotation can be diluted if those implementing DRM are unable to provide clarification, guidance and a space for discussion among practitioners and citizens about what it really means. For example, there is an important difference between the conceptualisation among participants of self-reliance as self-responsibility versus self-organization as self-management. If, as the results of this research showed, the intention is that communities should take more responsibility as part of their disaster readiness, attention needs to be paid to the tension that emerges between these two conceptualisations. Therefore, if devolution of responsibility to the community is to occur, this has to be nourished with efforts to strengthen communities' skills and capacities; and supported with resources and institutional assistance so that communities are empowered to self-organize. This would be an important first step even before asking communities to be self-responsible. Critically, it is important to recognize the potential danger embedded in promoting values of self-reliance, if this is understood strictly as 'not waiting for external help'. Such a scenario is particularly fraught when it is imposed in a top-down manner and communities have not participated in the definition of the concept to make it meaningful as part of their social context.

If the impetus is a focus on learning in order to build resilience to disasters, as emerged from the research findings (Section 4.2.5), it is also pertinent to move from experiential learning toward social learning. This is because building resilience is underpinned by the integration of a diversity of experiences, which are more likely to be found outside of our immediate networks, and by the

inclusion of more diverse social actors. What is needed is an effort to break down the barriers that separate different agents and groups, in other words, breaking down the silo effect, and facilitating a context of more equal opportunities wherein participants can express ideas.

In regard to aspects related to education, information and communication (Section 4.2.3), important implications emerged from this study that can constitute enablers for, or alternatively barriers to, building resilience to disasters. The perception that people do not have the information, or are not sufficiently educated on how to prepare and respond to disasters, is underpinned by a portrayal of communities as passive victims that need information. Reflecting on why people do not have the appropriate knowledge still remains one of the main constraints for DRM, which may be rooted in the fact that efforts are concentrated on delivering information in a top-down manner. This could result in information not progressing to local knowledge (making meaning of information in a local context), and conversely, what is crucial is to promote the creation of common meanings, achieved through diverse practitioners having the opportunity of communicating their views. Caution also needs to be paid to including the understanding and promotion of knowledge beyond that associated with expert knowledge and quantifiable information. If there is too much focus in the latter, this can result in disempowering community members (associated with non-expert knowledge, and unable to easily quantify their local knowledge), creating tension between different social actors, and ultimately tending to exclude other sources of knowledge that are not immediately demonstrable or readily quantifiable.

Finally, in regard to the role of the surrounding environment, the case study reveals that there are opposite positions in regard to the relation of resilience to the constructed or the natural environment, and this is relevant as it can lead to different policy options (Sections 4.1.3 and 4.2.4). Framing solutions for building resilience that focuses on 'hardening up' infrastructure and physically constructing a safer environment, even though important, requires a wider societal discussion to acknowledge its limitations and the overall fallacy of building a 'safe' environment. The immediate discussion can more usefully focus on the limitations to what is possible in practice, acknowledging that to expect to control the environment could divert attention from the imperative of fostering social issues for building resilience. Most of the respondents in this study did not conceptualize the world as a coupled social-environment system. Such a conception engenders a rhetoric in which humans are part of nature. This conceptualisation is advantageous to progressing the more general DRM discourse, because it results in an acceptance that disasters and change happen, and in promoting the necessity to learn to live with nature, so requiring each citizen to be active in responding to issues of disaster and risk. All this acquires special relevance in a changing climate where change, uncertainty and complexity are escalating.

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