Working Paper: Community Resilience and Engagement

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Project Groundwater is working with communities in nine areas of the Chiltern Hills and Berkshire Downs, supporting them to be more resilient to groundwater flooding. Yet community resilience as a concept is contested, it is accused of being vague, ambiguous and there is an ongoing academic and policy debate as to what resilience means in practice. This paper has reviewed and synthesised a series of community resilience papers across a number of disciplines and fields (including disaster and natural hazards, health and community development) with the intent to stimulate a discussion and debate as to what 'community resilience' means to us within the Project Groundwater Partnership. We suggest a common and greater understanding of what we mean by community resilience will help inform how we increase resilience in practice and fully evaluate our social innovations. After setting the national policy context of resilience, the paper examines the emergence of resilience from the physical sciences in the 1970s through to the specific consideration of 'community resilience' in the last decade. 'Community' is itself a contested term with different definitions, from place-based people, businesses, infrastructure, and institutions, to 'the public'. Resilience is defined as either an outcome or, alternatively, a process that leads to the outcome. If the latter, then that would require more emphasis on the agency of communities, and the innovative ways we support and empower communities. The paper highlights how resilience is context specific, that we need to recognise and further understand the nature of the partnership's groundwater flooding stressor, arguably the least understood within the flood resilience policy arena. We must also consider the form of the stressor together with the heterogeneous characteristics of our communities to facilitate community-based resilience actions. There are a number of 'factors', be that community capitals or capacities, being explored in the literature and considered in policy evaluation frameworks. These require further consideration and untangling to understand which are useful to the partnership in order to operationalise community resilience. The paper also considers the current challenges of 'technocratic' authorities *and* communities and how any shift in responsibilities under novel resilience policy should also be sustainably resourced. Finally, we explore how resilience in our communities brings a concurrent need for engagement. We capture key principles and some practical examples of innovative collaborative engagement. We finally propose that Project Groundwater's challenges are as much social as technical, and that we need to recognise and understand this in order to create and maximise the social value of the project.

Contents

1. Introduction

Project Groundwater – helping communities become more resilient

Project Groundwater is a community-focused partnership led by Buckinghamshire Council, part of Defra's Flood and Coastal Resilience Innovation Programme. The programme has tasked the Project Groundwater partnership (along with twenty-four other different projects across England) to work locally, to help communities become more resilient to the effects of flooding and climate change through innovative actions and solutions (Environment Agency, 2022a). Resilience is framed by the Environment Agency's National Strategy "in terms of the capacity of people and places to plan for, better protect, respond to, and recover from flooding…..whilst all the time adapting to climate change" (EA, 2020, p25). For Project Groundwater, the partnership is working with communities in nine areas of the Chiltern Hills and Berkshire Downs supporting them to be more resilient to groundwater flooding (Project Groundwater, 2022).

Yet 'resilience' as a concept is somewhat novel in the flood risk management policy arena. The UK Government has followed international policy guidelines and guidance documents, which have increasingly used the concept of resilience. However, despite this increased use, "community" and "resilience" brings together two contested terms, defined in multiple and often contradictory ways. In the wider academic literature, resilience is increasingly used (even fashionable), but the characterisation and meaning are also seen as increasingly vague, ill-defined, or even ambiguous (Chmutina et al., 2016; Imperiale and Vanclay, 2016). Davoudi (2012) proposes that "it is not quite clear what resilience means, beyond the simple assumption that it is good to be resilient" (in Imperiale and Vanclay, 2016, p205). What can be viewed as more progressive interpretations incorporating adaptation and transformation, i.e. 'bouncing forward', can also be used uncritically, as a versatile and loose umbrella term and are even seen to be at risk of being cliched (Chmutina et al., 2016; Imperiale and Vanclay, 2016; Mulligan et al., 2016). Furthermore, many articulations and understandings of resilience fundamentally fail to adequately address its social dimensions and practical use in the real social world. They are accused of being too weak to provide "practice with the tools and methodologies needed to address, engage and strengthen local communities" (Mitchell, 2013; Hutter and Kuhlicke, 2013 in Imperiale and Vanclay, 2016, p205) and leave potential gaps in the wider implementation of resilience strategies (Mulligan et al., 2016). Consequently, there is an ongoing academic and policy debate as to what 'community resilience' means in practice.

Project Groundwater is tasked with helping communities through innovative actions to become more resilient to groundwater flooding. But what does 'community resilience' look like and how do we achieve this? Some see community resilience as an outcome, or others argue that resilience is better seen as an ability or process to adapt (Norris et al., 2008 in Ntontis et al., 2018). There are arguably implications if resilience is represented or conceptualised differently across members of the project partnership, wider stakeholders and, not least, by the communities concerned. Different definitions and conceptualisations lead to different assumptions on what the outcomes of community resilience might look like, and therefore we might differ on the innovative practices and processes to achieve or foster

this. More so, is community resilience something that can be measured and monitored, then how do we know if communities have become 'more' resilient?

Project Groundwater is being implemented at a time of significant policy evolution for flood risk management. This paper has been written to stimulate discussion, debate and reflection on what 'community resilience' means to us within the Project Groundwater partnership. We first investigate how resilience has emerged in the broader international and national policy context. We then explore the concept by reviewing and distilling the common elements of community resilience from the academic literature. We then revisit and compare the framing in the UK and England's policy documents against this literature on community resilience, attempting to untangle factors and processes seen to enhance resilience. We finally briefly capture the present position on resilience in practice and we explore how we might have a different conversation about resilience, with an immediate focus on community engagement.

Methodology

The working paper resulted from a rapid review methodology to synthesize academic and grey literature that was published in the past decade, between 2012 and 2022 (in English only). Articles were selected through screening abstracts, which were theoretical or conceptual, review papers or reporting on research in a particular context. A total of 49 publications were included in the review, from within and outside of the UK (including France, Italy, Poland, Sweden, the Netherlands and the US). All papers explored aspects of community resilience (search terms 'community' AND 'resilience'). Few papers (8) explicitly focused on flood resilience, although Environment Agency policy and commissioned reports gave context to the working paper's discussion points. Several of the papers' authors were from the field of disaster resilience and natural hazards, but the review also encompassed community development, applied social psychology, land-use, rural studies, health, local government and politics. Papers were used to demonstrate the complexity of 'community resilience', the degree of divergence between disciplines, research and policy, and to attempt to clarify the concept (for which the review papers were particularly helpful).

2. How do we define ‘community resilience’?

The international and national policy context to ‘resilience’ and ‘community resilience’

Across the last two decades, the notion of resilience has increasingly become a central guiding principle or goal at an international and domestic level of policymaking (Chmutina et al., 2016, Ntontis et al., 2018). The unpredictability and uncertainty of climate change, coupled with increased urbanization, poverty, conflict and globalization have posed significant risks and growing costs (Adekola et al., 2020). The incorporation of resilience into international agreements and frameworks is attributed to an increase in disasters, economic and social crises that have threatened and are thought to increasingly threaten and destabilise vulnerable areas (Baxter, 2019, 2019; Imperiale and Vanclay, 2016). Resilience now dominates multiple policy discourses and sets out how to prepare for, or ‘bounce back’ from the threat of terrorism, global financial shocks, in addition to natural disasters and climate change (e.g. the United Nations Framework Convention on Climate Change (UN 2017), the Sustainable Development Goals (SDG) of the 2030 Agenda (UN 2016), and the Sendai Framework for Disaster Risk Reduction (UNISDR 2015)) (Baxter, 2019; Haase et al., 2021; Mulligan et al., 2016 et al.; Imperiale and Vanclay, 2016).

The Intergovernmental Panel on Climate Change (IPCC) defines resilience as ‘‘the capacity of social, economic, and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity, and structure, while also maintaining the capacity for adaptation, learning, and transformation’’ (IPCC 2014, p. 1772 in Baxter, 2019 and Deeming, 2015). Whilst climate change hazards can have dramatic impacts on the natural and built environments, the social consequences, and the importance of the role of communities have been increasingly recognised, particularly in disaster policy frameworks (Imperiale and Vanclay, 2016). Disasters are understood to be first and foremost local (UN-ISDR, 2007), complex events and processes that are directly experienced on the frontline by local communities, who also must deal with the aftermath, consequences and tragedy (Buckle, 2005 in Imperiale and Vanclay, 2016). The United Nations in particular have driven the need for policies on the effective participation of locally affected communities in the decision-making processes of emergency management and recovery operations (Imperiale and Vanclay, 2016). The UN see this as the empowerment of local communities, a recognition of their agency in the process as well as a means to spread support for increased local ownership of risk (Imperiale and Vanclay, 2016; Baxter, 2019). Resilience thinking also emphasises the process of learning (Adekola et al., 2020), an understanding of how to learn from past disasters is seen as crucial for communities “to empower their ability to react positively and reduce their future vulnerability to hazards” (Dynes, 1998; Perry, 1998; Brockhaus et al., 2013 in Imperiale and Vanclay, 2016). Hence, rather than just considering the needs and vulnerabilities of communities, an appreciation of the knowledge and abilities of local communities has switched the policy focus from ‘disaster-prone’ to ‘disaster-resilient’ communities (Coles and Buckle, 2004 in Imperiale and Vanclay, 2016).

The influence of such international agreements has driven and shaped multiple nation's strategies on resilience, several nations have adopted national strategies to specifically build community resilience, including the UK. The Cabinet Office has led and co-ordinated the nation's approach and understanding of resilience (Bulley, 2013). As with international discourses, the resilience agenda has been seen within the UK as a proactive response to a 'fast changing and complex world' (Cabinet Office, 2010 in Chmutina et al., 2016). Resilience policy responses were initially mobilised due to security concerns (Chmutina et al., 2016), the 2004 Civil Contingencies Act then led to resilience as defining the nation's approach to securing lives and infrastructure from *both* 'man-made' and natural threats (Coaffee and Rogers, 2008; Lentzos and Rose, 2009 in Bulley, 2013).

Although the concept of resilience had become widely adopted in broader UK policy instruments, it has only more recently been taken up in flood risk management policy in England. In the build up to the revision of Defra and EA policy and strategy, at the Met Office's launch of the UK Climate Projections in 2018, the Secretary of State for Defra (then Michael Gove) stated that as "the risk of flooding and coastal erosion increases, we need a new long-term approach" and that flood strategy and policies should "explore new philosophies around flood and coast management" (EA, 2019). Emma Howard Boyd, Chair of the Environment Agency subsequently delivered her message (2019), still stressing that "we need to move away from talking about flood "defence". We cannot win a war against water. We cannot expect to build our way out of future climate risks with infinitely high walls and barriers". She projected forward:

> "there should be consistent standards for flood and coastal *resilience* in England. To explore and develop such standards, the Environment Agency wants to work with partners to develop a national suite of tools that can be used in combination *to deliver resilience for communities.* This could include traditional defences, natural flood management, ensuring new development is safe from flood risk, adapting property….and *giving communities control, and choices, about how they respond and adapt to a range of climate futures"* (emphasis added).

The Draft National Flood and Coastal Erosion Risk Management (FCERM) Strategy for England (2019) accordingly called for transformational action on resilience and adaptation. Hence, from the original move from 'defence' to turn of the century 'risk management', Defra has continued the policy direction to the present focus on 'resilience'. Over the past decade, there has already been a change in England's flood risk management policy emphasis on communities, non-governmental agencies and risk management authorities urged to 'work together' (EA, 2021). The new philosophies (again, arguably not new, but the development of an existing trend) focus on sharing responsibility:

> "This Strategy will not be effectively delivered by risk management authorities working on their own. We all need to take action now so that we are ready for what the future will bring. We need individuals, communities, the third sector, businesses, farmers, land managers and infrastructure providers to contribute to planning and adapting to future flooding and coastal change" (EA, 2020, p10).

The Final National Flood and Coastal Erosion Risk Management Strategy's (EA, 2020) call for the nation to embrace a broad range of resilience actions thus follows a significant and ongoing change in England's civil protection policy and practice. The Final EA Strategy "calls for the nation to embrace a

broad range of resilience actions including better protection to flooding and coastal change" (p25). The EA's Strategy (2020) frames resilience in terms of:

> "the capacity of people and places to plan for, better protect, respond to, and recover from flooding and coastal change" (p25).

'Resilience' is seen to signal a move from asset-focused flooding and the reliance on traditional, engineered defences to a wider resilience approach to be achieved through a broader range of actions (EA, 2022b). Yet as a report commissioned for Defra stated, there is no one agreed definition of resilience and its conceptualisation and its application varies" (Twigger-Ross et al., 2020). The policy emphasis is largely on resilience as actions, but also calls for working together and joint responsibilities with communities. Twigger Ross et al. (2020) also thought it important to consider how to move "from the rhetoric to the practice of what resilience might look like in the context of FCERM in England" (p7).

In the following section, we briefly examine the emergence of the concept of resilience in the 1970s, we trace through the evolution of the concept to the specific consideration of 'community resilience'. We capture and discuss where and reasons why we might lack clarity as to what resilience means in order for us all to discuss a stronger definition together as a partnership for Project Groundwater.

Resilience and community resilience in the literature

The origins of the contemporary resilience concept have been traced back to the physical sciences in the 1970s, to Holling (1973), who originally defined resilience at a system's level "to absorb changes of state variables, driving variables, and parameters, and still persist" (in Haase et al., 2021, p1099). Initial understandings of resilience then evolved from the system *resisting* any disturbance, to how quickly the system could return, rebound or bounce back to a previous state, form or normal operation following a stress or disturbance (Haase et al., 2021 and Imperiale and Vanclay, 2016). The third main conceptualisation, the ecological systems approach, places an emphasis on change, and sees resilience as an ability to learn, transform and adapt to a disruption or disturbance. Rather than return to the same state of vulnerability and face further exposure, the system is seen to have the flexibility to transition from one state to another form to survive, an ability in effect to 'bounce forward' rather than 'bounce back' (Adekola et al., 2020, Haase et al., 2021). Ideally, this should be proactive change, before and not requiring a disaster catalyst (Adekola et al., 2020).

We have reviewed the more technical origins of the concept, but it is particularly interesting to examine the turn in attention and further evolution of the concept of resilience to 'socioecological approaches', which place more emphasis on human systems (Matarrita-Cascante et al., 2017). The 'socio' in the early socio-ecological considerations were thought to be loosely defined, as earlier disciplinary involvement remained with environmental scientists and resource economists (rather than with, for example, sociologists, psychologists and scholars involved with community development) (Mulligan et al., 2016). Natural scientists focus more on structural properties of a system (Blythe 2015, in Berkes and Ross, 2016). Hence as the understanding of resilience first transferred from the natural to the social world, we did not benefit from the use of significant social theories and concepts. Earlier scholars did not have the ability to capture and analyse, for example, values, beliefs, equity, human agency and power relationships. It did not enable a deeper understanding of place and culture specific social processes and

relationships. Instead, community resilience requires greater understanding using social science concepts and a greater diversity of research methods (Berkes and Ross, 2016). For instance, we now understand that notions such as trust and reciprocity enable resilience within a place-based community (Imperiale and Vanclay, 2016; Mulligan et al., 2016).

Might we still lack sufficient emphasis on the 'socio' when approaching flood resilience?

Academics, policy makers and practitioners continue to debate the broader definitions of resilience. The social-ecological approach to resilience has more recently (in the last decade or so) filtered across many disciplines and fields, for example disaster management, urban design, planning and health. These different fields and disciplines apply resilience across multiple scales, they explore different dimensions or facets (e.g. across the biophysical, sociocultural, and economic) and have different perspectives on resilience. For example, some authors, particularly within security or disaster management, have focused on resilience in cities (Bulley, 2013). Those in the built environment consider how the environment can be designed, planned, constructed and managed for resilience, to adapt to existing and future, emergent threats, cross cutting physical, environmental, economic, institutional to also embrace social perspectives (Chmutina et al., 2016).

In the last ten years we have seen a growing and specific focus on 'social resilience', which places emphasis on understanding the response of human systems to change (Wilson, 2012 in Matarrita-Cascante et al., 2017). It is against this backdrop that the specific consideration of 'communities' has also emerged as a sub-field of social resilience. As authors have reviewed this more recent development of 'community resilience', the complexities of trying to conceptualise what this is have become more informed, yet also further entangled and confused. Matarrita-Cascante et al. (2017) analysed aspects of 'community resilience' from a community development perspective, which they explained was a "daunting task" from both a theoretical and a methodological standpoint (p106). The development of community resilience as a term (notion or concept), they conclude is still in development, it requires conceptual clarification and further understanding. The authors' concern is if at an academic level the conceptualisation is confused, then ongoing research and contributions to knowledge can lead to misinterpretations.

In the following sections we begin to analyse 'community' and 'resilience' from a flood resilience perspective, firstly exploring whether this is an end state or process and secondly, the importance of 'context' in defining and operationalising community resilience for ourselves.

'Community'?

In order to understand 'community resilience', we first need to understand what we mean by 'community' (Imperiale and Vanclay, 2016). 'Community' is also a contested term, with many different definitions (Deeming, 2015; Imperiale and Vanclay, 2016; Mulligan et al., 2016). Mulligan et al. (2016) describes how sociologists in particular "have agonized over the multiple meanings associated with the word community for decades" (p349). For Project Groundwater "supporting communities to be more resilient to groundwater flooding" sits at the heart of the programme (Project Groundwater, 2023). As the programme is working with communities in up to nine high risk flood areas of the Chiltern Hills and Berkshire Downs, seeking "to understand the challenges from flooding that local people face", then 'community' appears to relate to local people and flood groups, in a geographically determined location, defined by the area at risk to groundwater flooding?

When we examine 'community' in the literature in the context of resilience, there are entanglements in the definition across scales and place (Matarrita-Cascante et al., 2017). Different fields and disciplines apply resilience across multiple scales. Authors in disaster management, preparedness and recovery have a broad definition of 'community', focusing on how the built, natural and economic environments, as well as social elements, influence each other. From a disaster studies perspective, resilience can be focused on the ability or capacity of social units (including organizations as well as communities) to be strengthened and adapted to the environment (Haase et al., 2021). This is again normally within defined geographical boundaries or 'place-based' with a shared fate or exposure to the specific hazard in question (Adekola et al., 2020; Norris et al., 2008 in Imperiale and Vanclay, 2016). In the community development literature, authors (e.g. Coles and Buckle, 2004) focus on the local, voluntary and self-organizing nature of communities. These are seen as people, who have certain skills, resources and organizational capacities to be able to provide support and services to other people at risk, both during and beyond the immediate disaster response (in Imperiale and Vanclay, 2016).

Over a decade ago, Twigger-Ross et al (2011) noted that the term 'community' has been considered by policymakers in emergency response as self-evident and unproblematic, and synonymous with 'the public' (in Fagan-Watson and Burchell, 2015, p5). In the current EA strategy, 'community' is arguably still not precisely defined and cuts across different disciplinary perspectives. 'Enhancing community resilience' is a resilience action in the strategy, relating to 'ready to respond'. This is illustrated through examples of actions, such as community groups and volunteers setting up local flood groups and the training and support of flood wardens based in local communities (EA, 2020, p48). The word 'community' is also used in the context of being consulted with, for example, as to whether flood management activities are acceptable or unacceptable to a local community (e.g. high flood walls and using glass panels for defences) (EA, 2020, p35 and 43) and how partnership funding gives "communities a bigger say in the flood and coastal risk solutions being developed in their local places" (EA 2020, p21). Community is also used in relation to actions or encouragement to engage. (E.g. the strategy evidences risk management authorities working together with the community on solutions such as Sandscaping, community interest companies to raise funds, community led nature-based solutions to achieve a climate resilience place and fostering community ownership of an action plan). Hence the definition of community appears more akin to the community development literature overall, as locally elected members represent local community views, local community representatives as well as 'members' of the local

community are evidenced in relation to Cumbria (EA, 2020, p49) and where community groups have "a key role in communicating risk and helping risk management authorities promote shared ownership of the actions local people need to take" (p96).

> "Community resilience should recognise the value of local volunteers and community groups in supporting local resilience forums and working with risk management authorities. For instance, volunteer flood wardens are often the eyes and ears in a community working with the Environment Agency and local authorities. It is important that risk management authorities support the training and development of volunteer flood wardens. Local flood groups can also promote positive action through community led flood plans that help with preparing and responding to as well as recovering from flooding. Third sector organisations, such as the National Flood Forum, can also offer advice to support local flood groups" (EA, 2020, p100).

Yet to note further disciplinary ambiguity in the definition of 'communities'. Communities are positioned with "place" in the above, with partnership funding giving communities a bigger say "in their local places" (EA, 2020, p21). One of the three core ambitions of the strategy is "climate resilient places" (EA, 2020, p8). The Strategy states that it recognises that local people will define their place in different ways, be that a county, city, town or village or it could mean a river catchment, a tidal estuary or part of the coast. In the vast majority of place statements, place relates to 'in a place', in relation to location, spatial scale and geographical features. Yet, the strategy also notes that we "need to recognise the emotional connections people have to the places in which they live and work and how this influences their engagement with risk management authorities on planning for resilience" (EA, 2020, p44). The strategy also sets out a "flexible approach to places" and "considers a 'place' to include the people, businesses, infrastructure and the environments in which we all live and work" (EA, 2020, p26) and "looking out to 2100, we will need to help places plan and adapt to flooding" (EA, 2020, p25). The EA's three versions of place sit with geographer's perspectives, Freeman and Morgan (2017) defining natural scientists' focus on location and features, humanists for whom place is a locality or 'community' that has meaning for people (e.g. a 'sense of place') and social scientist's collective of human-environment interactions (socio-economic and/or or political) at a variety of scales (Freeman and Morgan, 2017 in Geographical Association, 2023). This brings us back to a disaster studies perspective on community resilience, as focused on the ability or capacity of social units (including organizations as well as communities) to be strengthened and adapted to the environment (e.g. from Haase et al., 2021).

'Place-based' communities are also further perceived as having a sense of identity and linked by a common bond (Adekola et al., 2020; Bulley, 2013). Yet Mulligan (2015) and South et al. (2018) draw attention to the cross-cultural aspects of community resilience. There can be delicate mixes of sub-communities (Mulligan, 2015). Different cultures and diverse or marginalised groups can have differing needs and resilience pathways (South et al., 2018). So geographically defined or place-based community does not necessarily equate to shared identity and social bonds. Using the word simplistically and uncritically can mean sub communities feel excluded (Mulligan et al., 2016) Mulligan et al. (2016) also highlight that little attention has been focused beyond 'real' communities, that people can also belong simultaneously to virtual communities. Online tools can provide a sense of neighbourhood belonging in an online world that is not bounded by geography (Dahal et al., 2021). Studies have shown how peer to peer networks were important in coping with a disaster. These

online spaces supported collaboration, it allowed the sharing of information, allowed for access to resources and built a sense of shared responsibility (ibid). Our discussions tend to focus on top-down, agency led social media efforts. This research is from a crisis and disaster recovery perspective, but we can draw on understandings of peer-to-peer agency and impact in relief efforts. As Mulligan et al. (2016) reflect, at a policy and planning level we should elevate our somewhat "simplistic thinking about where and how capacities for resilience might be enhanced" (p352).

There are key reasons to be clear on our own definition of 'community'. How we define 'community' defines who we work with, why and how we operationalise resilience. It also defines how we see innovation. For example, South et al. (2018) from the health-based literature, see a place-based approach to community resilience as involving intersectoral action and community engagement with the ultimate goal to create supportive local environments. For Project Groundwater, are we viewing communities as those at risk, namely for communities to take on more responsibilities and ownership of their risk? Or are we including local institutions when we say 'communities', including namely Buckinghamshire Council and other key partners. Hence, are we enhancing our ability or capacity as 'a partnership' to become more resilient? Whatever our definition of 'community', it is also important to note the links across individual, community and the broader system resilience, notably governance activity. This interplay and the support available ultimately affect community's resilience capacity (South et al., 2018).

What do we mean by or how do we define 'community'?
Does 'community' include institutions (and government agencies)?

Change - in what form, and to an end state, or as a process?

Resilience so far is theoretically defined at a system's level, about an ability to absorb stress and maintain original form or functionality, or bounce back to particular state, and/or the ability to learn and adapt, to change to another state (Chmutina et al., 2016). Some believe that resilience involves all three of these elements. Planning is a field that is felt to have made most progress to bring community and resilience together in a more sophisticated and meaningful way (Mulligan et al., 2016). For example, Hillier (2015) sees three thematic aspects to resilience. Communities first seek to protect their status quo, maintaining their original function and identity. Secondly, communities seek to adapt and adjust according to the crisis. Then thirdly, communities have a capacity to creatively transform and 'steer away' from an undesirable trajectory in conditions of uncertainty and change. Other authors (e.g. Matarrita-Cascante et al., 2017 et al) start from the position that community resilience *needs to be* discussed from a position of change, and such change should be considerable, causing crisis and disorganisation.

Resilience has also generally been defined as either the desired outcome, *or* as the process that leads to the desired outcome (Kaplan, 1999 in Chmutina et al., 2016). Most academics, see resilience as an *ability* to 'anticipate' the event, 'proactively react', 'manage', 'co-operate', 'respond' during and after the

event to mitigate effects, then 'transform' and/or 'adapt' *(*Chmutina et al., 2016*).* Resilience can be defined as a need for action, a 'process', emerging from the need to respond to the stressor or disruption leading to significant modifications to structures, functioning and identity of communities. In other definitions, we also see various community factors, such as 'abilities' and 'capacities. A resilient community is thus one that has the ability to overcome stress, it is not an end state, i.e., a stress-free condition (Matarrita-Cascante et al., 2017). To note, this ability is not meant as only reacting to a stressor, resilience can also be about pre-emptive responses (Matarrita-Cascante et al., 2017).

Twigger-Ross et al. (2020) highlight that in the UK policy context, the term is used on its own as resilience 'to something', e.g. flooding, climate change, or 'of something', e.g. communities, infrastructure. 'Resilience' is also used with other terms, and this is where we see "community resilience" (e.g. Cabinet Office - CO, 2018; Defra, 2014), along with other resilience combinations, such as "infrastructure resilience" (NIC, 2018), "flood resilience" (Defra, 2016) and "resilient places" (EA, 2019). For flooding, Twigger-Ross et al. (2020) note resilience is typically used to refer to properties (Defra, 2016), infrastructure (NIC, 2018) and more generally to places (EA, 2019). For example, participants in a flood resilience workshop were focused on the resilience *of* particular systems, e.g. energy, water or telecoms (Twigger-Ross et al. 2020, p22). In the latest National Strategy, the EA state that the implementation of "actions and their outputs, outcomes and impact should lead to a change in the underlying context (the resilience of a place or community)" (EA, 2022b, p24). It is particularly notable within the EA's reports addressing the development of resilience indicators, whereby "monitoring trends over time will allow us to drive the implementation of effective *resilience actions* and enhance *the resilience of* people and places to flooding" (EA 2022b, p25).

If our own definition of resilience is seen as a process (ability/capacity) rather than end state, then this places more emphasis on the ways and abilities required by communities to steer away from the stressed state (and the form of innovative actions to support this process). If so, do we also feel effective resilience actions sit only with the authorities? Does the policy direction to enhance the resilience '*of* people and places' perhaps reduce the agency of a community?

Do we see resilience as absorbing (defending), bouncing back to normal or adapting and transforming? Or perhaps all three? And is resilience an end state or process, or both?

The importance of context

Many of the conclusions and recommendations from research in the resilience literature are driven from the authors' particular contexts (Haase et al., 2021). Thus, we also need to understand the importance of our own context in conceptualising community resilience (Matarrita-Cascante et al., 2021). We have already seen from international policy that resilience is deployed as a concept across many different

contexts in which notably, the stressor takes many forms. The type of stressor can be human-derived (e.g. economic downturns, conflict and violence, terrorism) or natural stressors (e.g. climate change, volcanic eruptions, earthquakes). These different stressors have very different consequences, the change is in different forms and happens at different speeds. The stressor thus defines very varied responses that communities should engage in to steer away from the stressed state. To note, much of the resilience literature is disaster based, with stressors such as hurricanes and earthquakes causing much more profound, overt and rapid effects on communities (Matarrita-Cascante et al., 2021; Shaw, 2012). The scale of the event is thought to be critical in determining the nature of resilience, and large-scale events are singled out in particular in the literature (Adekola et al., 2020). Yet, other forms of change emerge in different forms and paces, each of which requires its own understanding (Shaw, 2012). If community resilience is a 'notion' that seeks to explain a community's ability to respond to shock and stressors, then we need to understand the nature of the stressors and then the ways and abilities required to steer away from the stressed state. To also note that communities can be subject to more than one stressor, for example, to flood (with the need for an immediate response) and also to a downturn in economic activity (a prolonged event). We need to consider the implications of how more than one stressor effects a community's response.

A community's (when we have defined 'community' to our satisfaction) characteristics and vulnerabilities will also impact its resilience or ability to be resilient (Comfort et al. 2010). Again, from disaster scholarship, we learn community population size and density can have an impact on resilience (Haase et al., 2021). Researchers have only more recently begun to seek further understanding as to how the resilience of small communities might differ from the resilience of large communities (e.g. Jerolleman 2020 in Haase et al., 2021), in rural versus urban contexts (Haase et al., 2021) and across different physical geographies (Hegger et al., 2016).

Is there is an argument that flood risk needs to be understood through its own community resilience framework? But should we be cautious in uncritically adopting a framework that does not consider the different form and pace of groundwater flooding and the specific response required, as well as taking into account the characteristics of specific communities?

There has been a quite rapid diffusion of the notion of resilience in the UK, from the Cabinet Office to Defra, and therefore from reactions to terrorist events to managing flooding. This is not a simple transition of 'resilience' given the very different contexts. Due to the complexity of the nature of community resilience, research findings also cast doubt as to whether policymakers will be able to develop a unified policy solution even within a field (such as flood and coastal erosion), that is appropriate for all communities; "there is no such thing as a "one-size-fts-all" resilience intervention" (Haase et al., 2021, p1114). Joseph (2013) argued that "resilience does not really mean very much and whatever meaning it does have changes depending on the context" (in Chmutina et al., 2016, p 71). Whilst we can share common meaning, the vulnerabilities and various resilience capacities and processes that impact a community's

ability to react and adapt to an event are complex, but they are also context specific. The partnership's groundwater flooding stressor is arguably the least understood within flood resilience policy. We need to recognise and further understand the nature of this stressor and the characteristics of our communities (vulnerabilities and strengths) to facilitate community-based resilience actions. We turn now to understand more about the factors that can lead to enhanced community resilience.

Untangling factors and processes to enhance 'community resilience'

To recap, we can summarise community resilience as an end state, or we can follow the literature and consider the actions the partnership can take, with resilience as a notion to explain a community's ability to respond to shock or a stressor. To do this, we need to understand the context, including both nature of the particular stressor and the community's characteristics, be that vulnerabilities or strengths. Finally, we need to identify and understand the factors that lead or 'steer away' from the stressed state and can lead to resilience, or as Ross (2013) states from the disaster management context, which "imbue a community with the strength needed to respond, cope, and recover from a disaster event" (in Haase et al., 2021, p1106).

Identifying the Factors that Lead to Community Resilience

A number of scholars have identified, labelled and described different factors, then used these to develop and use frameworks to both operationalise and attempt to measure resilience in communities. For example, authors have identified and utilised 'capitals' (e.g. social, economic, natural, and cultural) or 'resources' (e.g. natural, built, human, cultural, social, political, and financial resources), 'strengths' (people–place connections, values and beliefs, knowledge, skills and learning, social networks, engaged governance including collaborative institutions) and 'capacities' (economic development, social capital, information and communication, and community competence). Although the emphasis might vary, these factors are ultimately very similar, even if the terminology differs (Haase et al., 2021, Matarrita-Cascante et al., 2017). These can be seen as protective factors or social determinants that operate at the community level, which influence communities' capacity to deal with adversity (South et al., 2018) – or the particular stressor. To note, these factors are only 'indicators' of resilience, but their presence in a community could potentially result in increased resilience and conversely, their absence potentially means delayed recovery or prolonged dysfunction (Matarrita-Cascante et al., 2017).

For our Partnership, it is useful to understand the entanglement of factors being used in the flood related literature and policy development. Much of Defra and EA's policy development in the past two years on resilience has been focused on identifying indicators. This has included the Defra Evidence Review of the Concept of Flood Resilience and the 'Guidelines for development of indicators, indicator systems and provider challenges' (Becker et al., 2015; Defra, 2018; Twigger-Ross et al., 2020). The Defra commissioned Twigger-Ross et al. (2020) review concluded that the resilience literature lacks sufficient

theorising and empirical testing to enable predictions about the combination of factors that could increase or decrease aspects of resilience. However, it identified several frameworks that could provide a systematic approach to assessing and supporting the development of resilience in the context of natural disasters and flooding specifically. (Only one framework identified was noted to focus specifically on resilience to flooding.) The report focused on the broader concept of resilience, and across the frameworks identified, the community dimensions or elements differed (e.g. 'social', 'human', people' and 'community'). Social and community was frequently seen as a 'type' of resilience, (together with housing, environmental and institutional e.g. Cutter et al., 2008, 2010, 2014), or a capital (human or social alongside physical, natural and financial, e.g. Keating et al., 2017). In some frameworks, these factors confusingly overlap. For example, core 'capacities' includes social 'capital', community capital has also been used as a sub theme of coping capacity (Parsons et al., 2016, 2017). Out of the frameworks reviewed, only the emBRACE framework was developed as specifically building resilience amongst *communities* (in Europe). This framework looked at communities across the interrelated domains of resources and capacities, actions and learnings.

Twigger-Ross et al (2020) noted the overall government commitment to the number of homes to be better protected, therefore only reflecting (arguably) one aspect of resilience. The Twigger-Ross et al. (2020) report stressed the need for a multidimensional approach to resilience, covering learning and adaptation as well as protection, response, and recovery. It was felt that a capacities approach most suited the multidimensional nature of resilience and provided clarity and guidance on the nature and approach to resilience. However, Defra and the EA's current development of resilience indicators is shaping under the headings of "placemaking, protect, respond and recover" and "components" or "capitals" of "social/community, economic, physical, natural and institutional capacity" (EA, 2022b). The EA (2022) sees the line of sight to resilience as the impact of a series of actions promoted in the FCERM Strategy and the Innovation Programme to reduce flood risk, or reduce the consequence of events. This, they feel, then enhances the five capitals (including social/community). 'Social capital' is particularly interesting for the partnership's consideration of community resilience, which is variously defined across the frameworks, but drawing on South et al. (2018) it is "the strength of social networks, norms of reciprocity within communities and trust in people and institutions" (p3).

It is important to understand how these factors are fed by different fields of study, researching across varying contexts, requiring different mechanisms to achieve different goals. We feel it is important to highlight the current ambiguity in the wider resilience field and then within flood resilience specifically. As we are tasked with helping communities through innovative actions to become more resilient to groundwater flooding, then our discussion on how we define community resilience influences which factors we feel are relevant. We (the authors of the report) have observed, as did South et al. (2018) that many studies detail the existing conceptual frameworks, and then develop another. This presents a challenge. Yet if we look to untangle the various factors and consider which are useful to the Partnership (depending on our definition of community resilience), it could help us consider what this means in terms of operationalising and building community resilience. Imperiale and Vanclay (2016) further urge that we should look beyond a set of community capacities, assets or capitals and instead see resilience as a "complex of social processes that allow local communities to self-organize and enact positive collective action for community survival and wellbeing" (p207).

Untangling community resilience from other community ideas

To try and further make sense of how we can isolate factors and operationalise resilience, we will also attempt to untangle community resilience from other different but highly interrelated community-level ideas in the literature. Some of these other community ideas are useful, but sometimes they are used loosely, are ill-defined or even misused. Matarrita-Cascante et al. (2017) set out to provide conceptual distinctions across important notions being discussed in the literature, which are associated with their own field of community development. We take and adapt Matarrita-Cascante et al.'s (2017) framework to start to trace how the factors are interrelated in our field, to further understand our policy drivers and to get a deeper understanding of how these ideas could potentially be operationalised.

Community capacity and 'capacity building' - Again a reminder, the FCERM Strategy defines resilience as "the *capacity* of people and places to plan for, better protect, respond to and recover from flooding and coastal change" (EA, 2020, p25). The strategy further defines "resilience capacity" as the capacity of a place *or* community to make the best land use and development choices, protect people and places, prepare and respond to and recover from flooding and coastal erosion, while all the time adapting to climate change" (EA, 2022b). Again, this appears to reflect actions by authorities. Conversely, community capacity is a factor prominent in the public health literature, most often used in the context of disadvantaged or disempowered communities mobilising resources to solve local problems. In the public health literature, community capacity is not used in the context of change. However, community capacity is argued to be relevant for community resilience, as there is a commonality in the need for a mobilisation of local resources as critical in facing both problems and change; "a community cannot have resilience without community capacity" (Matarrita-Cascante et al., 2017, p115). Both resilience and capacity use notions of the need for engagement, developing and using community resources for the community's well-being (Magis, 2010 in Matarrita-Cascante et al., 2017). Hence this would arguably steer us to the need for engagement, developing and using community resources, but perhaps focusing attention on more innovative approaches to protect, prepare and respond to groundwater flooding, in the context of adapting to climate change.

Community vulnerability - The concept of 'flood disadvantage' draws our attention to the physical and social vulnerability of communities (and at the individual level), noting the differing sensitivities and uneven abilities to respond to flooding and risk agendas (Sayers et al., 2017; O'Hare and White, 2017 in EA, 2022b). Further understanding of flood disadvantage is seen as a "prerequisite to delivering a socially just (i.e. fair) approach to prioritising flood risk management efforts" (Sayers et al., 2017). The EA report on measuring resilience (2022b) note Sayers et al (2017) Neighbourhood Flood Vulnerability Index (NFVI) which seeks to identify where social vulnerability and flood vulnerability (exposure) coincide to create flood disadvantage. The report concludes that flood disadvantage and social vulnerability should be considered when developing resilience indicators, particularly to ensure 'respond' and 'recover' aspects of resilience are considered. 'Community vulnerability' is popular in the disaster-risk literature, examining a community's predisposition to be negatively impacted by stressors (as a function of hazards, exposure, sensitivity, impacts and adaptive capacity). Matarrita-Cascante et al. (2017) also recognise that there are useful conceptual connections to be made in identifying community vulnerability, to then advance an approach to community resilience. However, to note, the EA's report currently lacks a focus on the 'adaptive capacity' and 'agency' elements of community vulnerability, as follows.

Adaptive capacity - Adaptive capacity is the most conceptually developed term in the literature, used in both the biological and social sciences and receiving a lot of attention in relation to climate change. Community adaptability is the ability and readiness of the community collectively to respond to change to allow it to move forward. There are clear commonalties of change and process between resilience and adaptability. Adaptability has indeed been referred to as the potential for actors to become resilient or confusingly, with a further entanglement of terminology, the capacity of actors to influence resilience (Matarrita-Cascante et al., 2017). The difference being that adaptability is seen as latent, whereas we see resilience in the context of a stressor or after a crisis.

Community agency - Community agency (from the social sciences) - focuses on communities not being powerless, but active agents in their own locality. This notion focuses on social processes, attitudes, and behaviour, whereby communication and cooperation sit at the heart of seeking a collective good. Matarrita-Cascante et al. (2010) have highlighted that community resilience refers to a community's ability to overcome stress, hence community agency should be seen as an ongoing process to achieve resilient communities (in Matarrita-Cascante et al., 2017). They argue community agency is only a part of, but nevertheless, perhaps the most important part of community resilience. Another related concept lacking from flood policy, is "empowerment", how strategies are required to empower communities' agency (or capacity) to take collective action (South et al., 2018).

Hence, we have a highly confusing level of terminology, with an entanglement of ideas across different literatures and an observed tendency to use such terms and ideas in a loose and imprecise manner. To add to this, Matarrita-Cascante et al. (2017) also highlight that it is not always clear how the various factors are associated or how they contribute to resilience. Fundamentally, a better understanding is still required on the main determinants of community resilience, how they overlap and interrelate (South et al., 2018). They also highlight that the literature is predominantly theoretical, and it is hard to operationalise. Twigger-Ross et al (2020) also concluded that in relation to flood and coastal erosion in England (and Wales) that an approach to resilience needs "a clear definition and set of component parts. This will enable a common language to develop and avoid misunderstandings…..Once this is in place, it should be possible to map out what will be needed" (p33). As well as seeking a clearer definition or common language, we would also suggest the partnership can also seek our own deeper understanding of the factors or key determinants of community resilience.

There is a current entanglement of resilience factors. Do we need to consider and isolate those that are useful, that consider the different form and pace of groundwater flooding and the specific response required, as well as taking into account the characteristics of our communities? Can we seek a deeper understanding of factors or determinants of community resilience?

3. How can we innovate to learn how to operationalise and enhance community resilience?

We have raised a number of discussion points across section 2 to help us come to our own clear definition and start to understand the component parts of community resilience. We turn now to make sense of the current institutional landscape in which we operationalise resilience, capturing some documented issues. We then turn to collaborative innovation and engagement with communities, to explore how to enhance and empower community resilience. Four initial practical examples of innovative collaborative engagement are included.

The current position and issues with community resilience

Resilience as emergency response

The Cabinet Office still has a central role in the UK for identifying risks and in providing guidance for emergencies and coordinating an emergency response at a national level (Twigger Ross et al., 2020). The Cabinet Office (2012) defines 'resilience' as "the ability of the community, services, and of infrastructure to detect, prevent, and, if necessary, to withstand, handle and recover from disruptive challenges". Hence much of the focus in England (and the UK) has indeed been on emergency responses and a system for engagement between the required stakeholders (Bulley, 2013; Chmutina et al., 2016). The Civil Contingencies Secretariat at the Cabinet office liaise with Local Resilience Forums, which requires multi-agency cooperation and integration based on police areas. Category 1 responders (e.g. local authorities, government agencies, emergency services and health services) and Category 2 'responders' (e.g. utilities and transport) coordinate and prepare for the causes and consequences of various forms of threatening events. The Ministry of Housing, Communities and Local Government also has a recovery team and resilience advisors, whose role is to provide advice and support for both resilience and recovery nationally to local authorities. Public Health England (PHE) also plays a key role, and considers resilience to involve anticipation, response and adaptation to shocks and stress (Twigger Ross et al., 2020, p44).

Work with 'communities' also emerges from the Cabinet Office. The UK Civil Protection Lexicon further defines community resilience as: "communities and individuals harnessing local resources and expertise to help themselves in an emergency, in a way that complements the response of the emergency services" (Cabinet Office, 2013). It is the Cabinet Office work on community resilience, through the Local Resilience Forum (LRF) standards of resilience, that currently provide the most detailed practical guidance on communities for local authorities (and also wider membership of the Local Resilience Forums). Work with communities is focused on providing or sign-posting risk information and actively promoting community resilience behaviours and action (Cabinet Office, 2020). Hence although we now see policies promoting broader notions of resilience, Chmutina et al. (2016) allege that "once the implementation of resilience reaches local level, its focus shifts to emergency and immediate response"

(p76), to that we could add that this is often centred on information and knowledge provision. Good practice is seen, for example, as clearly defined roles for community and voluntary networks for information, preparing, responding and recovering from emergencies (Cabinet Office, 2020).

Technocratic authorities and communities

One of the broader challenges to overcome in transforming to a resilience approach, is changing the way communities, flood authorities and other institutions ('experts') work together. There is a large gap in communication with a lack of 'capacity' or issues observed on both sides of this relationship. Previous research has highlighted the continued technocratic response to disasters. That is, we have relied on the technical expertise of engineers, whose preferred response has typically centred on infrastructure (e.g. Adekola et al., 2020, Chmutina et al., 2016, Mehring et al., 2021). Mehring et al. (2021) observe that flood authorities "remain held within the grip of top-down centralist decision-making" and quotes a respondent in their research "that flood risk management continues to be something that is being "done" to flood communities rather than "with" them" (p114). Scott-Bottom and Roe (2020) describe how water management, including flood events, is often seen as a technical problem and consequently dealt with using engineering practices. This includes engagement with stakeholders and communities, as most community or stakeholder engagement practices within the built environment are not collaborative in nature. Instead they are often perceived as a tick box exercise, carried out at certain, stationary points during a project's lifecycle (Cooke and Koathari, 2001; Fitton and Moncaster, 2019). There are a number of reasons why engagement practices are not truly collaborative. This type of 'project task' is often allocated less resources and budget than the more technical aspects (Correia et al., 1998). There is also the issue that project teams do not like the uncertainty of engaging with stakeholders and communities when they do not have a fully formed design or concept (Hunt and Taylor, 2009; Whatmore and Landstrom, 2011). There is a perception that project teams do not want to promise something that will not be delivered (McEwan, 2011). A final reason is because of the professional perception of knowledge. Some professional teams see the stakeholder and community 'lay' knowledge as inferior to their 'expert' knowledge. This often results in communities only being able to influence peripheral aspects of a project (Few et al, 2007; Fitton et al, 2016; Mehring et al, 2018).

Chmutina et al. (2016) conclude that "national and local government talk to each other and among themselves but do not really engage with the community-based individuals who are expected to facilitate resilience measures" (p78). Communities encounter a series of barriers when trying to engage flood authorities, they must push to be heard, for their knowledge and experience to become part of the decision-making process (ibid). Even though the Environment Agency have recently deployed Engagement Officers, Mehring et al. (2021) argue that the constructions of 'engagement' still differ and cause discord between flood communities and flood authorities. Previous research has highlighted differences between traditional 'expert' assessment and local assessment issues and factors shaping the impact of an event (Neville and Weinthal 2016 and Wisner et al. 2012 in Adekola et al., 2020). When community concerns, their experience and expertise are not heard, it can lead to disagreement about the assessment of the hazard and potential mitigation measures. In addition, not enough information is shared for community members and groups to make informed decisions on resilience

measures (Chmutina et al., 2016). In emergency situations, there have typically been one-way information flows from state bodies to the public, with little opportunity for two-way flow and discussion of implications with either members of the community or organisations, with no discussion of messages or implications (Mehring et al., 2021). Top down, technocratic decisions and one-way flows of information have implications for transparency and can lead to a break down in trust between communities and authorities (Adekola et al., 2020, Mehring et al., 2021). This means less chance for learning between the stakeholders, ultimately less resilience building, including in the emergency context and evidence of a less effective emergency response (Twigger-Ross et al. 2011; 2014 in Fagon-Watson and Burchell, 2015).

From the flood authority's perspective, even when concerted efforts have been made towards effective information sharing with the public during an emergency response (e.g. using Twitter), the actions are not always effective. There is a feeling that there is a lack of awareness among the general population, that the "general public has a passive attitude and can demonstrate signs of 'dependency' when it comes to experiencing a natural hazard related emergency" (Chmutina et al., 2016, p76). It is alleged that it is not only flood authorities that have a tendency to hold on to a technocratic old way of working, but some communities also view flood risk management through a technocratic lens, feeling that the 'powers that be' are contracted to stop the flooding (Geaves and Penning-Rowsell, 2015 in Mehring et al., 2021). However, back in the early days of the transition to resilience, Pelling (2003) questioned "why should the vulnerable, many of whom have to expend their resources, time and energy just getting by, be expected to plan for future uncertainties and risk? For many individuals and households this is a non-question – they simply cannot" (in Bulley, 2013 p271). The possibility of floods does not always rate highly on a priority list dominated by immediate economic worries, particularly amongst the most vulnerable in our society (Bulley, 2013). Furthermore, options typically advanced by flood risk managers have traditionally been weighted towards protection, through engineered solutions and physical barriers, this being the measure communities are most familiar with.

Is resilience an undebated answer….?

There is a consensus amongst authorities that education on resilience should begin at school level in order to increase the societal attitude and response to overall resilience (Chmutina et al., 2016). Conversely, authors have raised concerns when 'reifying' resilience (Chmutina et al., 2016). For example, Mulligan et al. (2016) view resilience as deployed in an "overwhelmingly positive way" increasingly as a "pervasive normative concept within governance and management circles, where it is often used to try to foster a sense of security and/or an entrepreneurial stance of flexibility and adaptability" (p349). Hence policy makers are accused of taking what is a concept or idea and making it real and unquestioned. Chmutina et al. (2016) have adopted an approach of ethical scepticism, to examine which attitudes and practices are motivated by a 'resilient' approach and to question what happens when institutions in general – and the State in particular – adopts the resilience paradigm. The authors further argue that "the rhetoric of community level response masks, in reality, a centralised control, with only few governmental policies pointing out the role of the community in acting on a specific hazards/ threat" (p72). The authors quote Joseph (2013) that the resilience agenda "puts local people 'in the driving

seat' when in reality the direction of the journey has already been decided" (p72). As an example, when government policy documents urge householders to undertake property resilience and other measures, then it is often unclear what measures should be used and who will finance them. Whilst individuals and communities are urged to create resilience strategies, there are, for example, little policy measures to require property developers to "design in resistance/resilience measures when they knowingly build in flood prone areas" (Chmutina et al., 2016, p75). Hickman (2018) claims more fundamentally that framing problems through the lens of resilience turns our attention to "developing coping strategies for unwanted situations rather than a focus on addressing the root cause of the problem around exposure to hazards and associated vulnerabilities" (in Adekola et al., 2020). Instead, it is argued, the focus should be on reducing community vulnerability and exposure through the empowerment of policies and regulations, the wider pursuit of an equitable society structure with much needed additional resources (Adekola et al., 2020). Berkes and Ross (2016) take the middle ground, that resilience thinking should not automatically inform political decision-making or replace political processes (including fighting poverty), instead resilience 'building' could "be thought of as a natural ally of political processes" that moves us towards the empowerment of communities (p191).

There are broader trends of shifting responsibilities between governments and communities. The Cabinet Office's shift to resilience coincided with the Government's 'Big Society' initiative, a broader drive for 'localism', but which also focused on "active citizenship as a tool for building resilient neighbourhoods" (Cabinet Office 2010 in Chmutina et al., 2016). With this, there has been a move from being protected to 'resilience' (Hegger et al., 2016). There has been a shift to broader actor involvement because investments are needed by private parties, due to cuts in government spending (Hegger et al., 2016). Hegger et al. (2016) also observe that this trend in shifting responsibilities is "often latent" and that we need an open, societal debate about this – what forms of resilience are desirable, what levels of risk are considered acceptable and who is responsible for these risks, the individual or society as a whole? The authors believe the outcome of this debate should be more clearly defined roles for citizens laid down in policy documents and even law (Hegger et al., 2016). We (the authors) would also suggest that communities should be able to contest this shift in responsibilities. Chmutina et al. (2016) also raise concerns with the implementation of the resilience agenda moving to the local level, which is an exercise in coordination requiring oversight, cooperation and leadership. However, this is not fully devolved to local authorities.

Resilience as under-resourced

Chmutina et al. (2016) also reflect on how the Big Society initiative was introduced simultaneously with the Government's reductions in public expenditure and service provision. Thus, developing the necessary partnerships with communities has not been an easy task from the outset, with local authorities lacking capacity or capability to undertake a desired level of engagement (Chmutina et al., 2016). Many policies emphasise the importance of local authorities, whilst also cutting sources of funding. As Shaw (2012) stresses, if a 'resilient local authority' should be innovative in managing risks, with strategic leadership that enhances community involvement of civil society, then to do so they require funding (in Chmutina et al., 2016, p76). Resources play a key role in bridging, for example to ensure actors have

the appropriate skills and private actors are compensated for letting their land be used (Hegger et al., 2016).

Hence as well as confusion in terminology, there are politics and values laden in the concept of resilience. There are challenges in communicating innovative measures to build resilience, but also the shift in responsibilities between government and communities through resilience policy changes. Instead "a resilience approach needs to create a different conversation with people" (Twigger-Ross et al., 2020). Resilience fundamentally poses questions about who could be included and who unwittingly excluded from any communities under consideration in the project. The approach to resilience, from the risk management authority perspective Twigger-Ross et al (2020) note, requires "a change in philosophy as well as in processes and procedures" within authorities (p48). Whilst we consider innovation with generous funding from the Innovation Programme, the scaling up of innovation beyond Project Groundwater needs to be sustainable and effective long term.

Having a different conversation about resilience

If community engagement is important to social innovation and community resilience, but current engagement practices and processes are not collaborative, then what do innovative, collaborative engagement methods look like? What methods and principals could Project Groundwater seek to pilot and potentially adopt?

Innovation'?

In a paper that aims to define and operationalise community resilience, we feel we should first touch on the definition of 'innovation'. Crosby et al. (2017) pull on common-sense terms, seeing innovation as embracing new ways of thinking about problems and solutions to do new things in new ways. Furthermore, new and creative ideas should "break with established practices and common wisdoms in a particular context" (Sørensen and Torfing 2011 in Crosby et al., 2017, p391). The concept of 'social innovation' has also been on the rise in response to the domination of business models and narrow economic outlooks – shifting the focus from a technical problem to solving a social problem (Van der Have and Rubalcaba, 2016). Sharp and Carter (2020) explain that flooding is actually a social event and when disaster events strike, people become increasingly sociable as they have a growing need for comfort and human connection. Therefore, it is only logical that social innovation and innovative community engagement techniques are becoming prominent in response to the need to overcome the focus on engineering, technical problems within the water industry. Innovative examples of community engagement all centre around collaboration and a partnership between the 'experts' or professionals and the communities involved.

Echabard et al. (2020) describe social innovation as the process of developing effective solutions to issues in support of social progress. It is a process through which social change, grounded in local reality, is created. Social innovation is generated through collaborative engagement (Echaubard et al. 2020). It is about generating ideas using a diverse group of people with different perspectives to discuss problems and possible solutions (Radulescu et al. 2020). Collaborative engagement is key for social innovation. Social innovation can manifest itself in novel technological ideas or simple non technological solutions. Along with collaborative engagement techniques, social innovation creates the ideas and solutions that create social value (Echaubard et al. 2020, van der have and Rublacaba, 2016). Scholars also discuss the notion of 'collaborative innovation', particularly when at the local level, also means involving communities, "who also have valuable experiences, ideas, and resources to help

Example 1: 'After the Flood', Leeds Waterfront Event, UK

'After the Flood' was a production staged in June 2016, at the annual Leeds Waterfront Festival. It was in response to the flood event, six months earlier on Boxing Day 2015 when a major flood event was declared on the River Aire. Passing festival-goers, of all ages, could opt into the live role play experience at any time during a four-hour period on afternoons during the festival. The premise of the production was that groups of spectators embarked on a riverside tour in the vicinity of Leeds Station, which took them across two bridges and back to their starting point. At six stopping points along the route, spectators would discover actors who presented short scenes. These sequences were designed to illustrate a different, proactive response to flooding. For instance, in the first scene, a character inspired by a grassroots flood response co-ordinator addressed spectators as if they were volunteers responding to a call he had posted on Facebook. In another scene, an "Agency Man" explained the need to juggle many different practical and political pressures, when planning new flood defence schemes. In another scene, which alluded to the more serious flood damage, a family restaurant was represented by a doll's house, which looked very small and vulnerable against the flow of the actual River Aire, which was positioned as a backdrop to the scene. An actor playing the daughter of the restaurant's owners encouraged spectators to don rubber gloves and help relay tiny, flood-damaged items, from hand-to-hand, between the doll's house and a small, yellow skip. Another scene saw "the Gardener" use a potted plant and a watering-can to demonstrate a simple point about how permeable landscaping absorbs water. Gesturing upstream, the Gardener spoke about how "soft engineering" methods such as tree-planting, if applied in greener, upland areas, might in future mitigate the amount of water flowing downstream into the city (Scott-Bottom and Roe, 2020).

This method demonstrates how the traditionally 'engineering led' problem of flooding was conceptualised into a more social problem, thus making it more relatable and tangible to the public. The event and the educational information disseminated through the production was delivered in such a way that got communities involved and made them part of the discussion. It used a medium that engaged them and developed a rapport.

spur innovation" (Crosby et al., 2017, p394). This can also build social capital and empower communities, enabling a stronger understanding of the complexity of societal issues (ibid).

Legitimate resilience through collaborative and social innovation

Technical needs and considerations have often overshowed the ethical and social considerations of flood management (Scott-Bottom and Roe, 2020). Yet flood resilience is only seen to be legitimate if governments shift from steering exclusively in a top-down fashion, to involve other actors in decision making (Hegger et al., 2016). At a fundamental level, Bergon and Friedman (2015) explain how communities can become empowered by receiving information. By increasing their knowledge and understanding of risk, including flooding, communities are able to better understand how to protect themselves and what steps they need to take to do this (Bergon and Friedman, 2015). Klein et al. (2019) support the Community-Based Disaster Risk Reduction (CB-DRR) theory which advocates building capacity at local level through bottom-up processes, empowerment, and localised strategies, facilitated by a collaborative approach between communities and stakeholders, local and national Government and professional organisations.

As well as empowering communities and developing their resilience to risks, collaborative community engagement brings many other benefits to projects such as Project Groundwater. Collaboration makes communities feel they are involved and listened to, which facilitates the development of a relationship built on trust and transparency. ,Opposition to a project is costly in terms of budget and time as well as reputation (Ledoux et al., 2005). Also, if project teams are able to detect areas of opposition early by engaging with communities, these can be mitigated quickly before they escalate, avoiding costly delays (Mehring et al., 2018). Gaining buy-in from communities early can help provide a smooth transition through the project lifecycle (ICE and Useful Projects, 2020).

Given the status of the project, we focus initially on why and how we can innovate in community engagement. Moving beyond information provision, the literature identifies a number of key elements or purposes to engagement. There is a need for:

1. Better integration and understanding of scientific *and* local expertise and knowledge of flood risk, drawing on local experiential knowledge and the experience of flood events.

We need to note the importance of knowledge of local factors in shaping the impact of events (Adekola et al., 2020), a respondent in Mehring's (2021) research exclaims "no-one knows more about the effects of flooding than those directly affected". Mehring (2021) sees this as the development of a shared understanding of the local flooding situation through combining knowledge and experience (Mehring et al., 2020). This can also be seen as broader collaboration and learning (Adekola et al., 2020).

2. Communities becoming more effective agents in the decision-making process.

Twigger-Ross (2017) advises that options should be developed for action with local community members, to enable them to immediately interrogate and challenge these options and any implications. Another potential approach is seen as 'co-production', that is to approach citizens as equal partners to co-

produce resilience measures (Hegger et al., 2016). For example, Scott-Bottom and Roe (2015) introduce the notion of hydro-citizenship. This is where communities are proactive stewards of their local water environments, be it a river or waterway. Hydro-citizenship is facilitated by collaboration with industry experts to develop trust and a good relationship in which communities are engaged and invested to take responsibility for their space. A high degree of public participation, with open and transparent and mechanisms in place to ensure equity brings legitimacy to the decision-making process (Hegger et al., 2016).

3. An assessment of current local resilience capacities of communities for managing flood risks and impacts, as well as weaknesses that may need to be addressed.

Underpinning the above, flood authorities need to understand a community's connectivity to flooding. Strong social capacity can provide a flood community with the skills and resources to fundamentally engage, to anticipate, respond, recover and adapt to a flood event (Kuhlicke et al., 2011 in Mehring et al., 2021). Twigger-Ross (2017) believes that as the key interface with communities, practitioners are often best placed to identify where resilience capacities either exist or are lacking. However, practitioners need to be empowered in identifying resilience capacities and to develop strategies to work with communities to build them (Twigger-Ross, 2017). This could involve place-based data collection exercises to assess capacities and qualities, determining gaps and priority needs, either led by or certainly closely engaging concerned communities (Twigger Ross, 2017 also see Pathfinder projects.) Mehring et al. (2021) draws on 'social capital' in order to make sense of a community's potential response to engagement.

4. An understanding that communities are not heterogenous.

Again, co-creation or co-production requires the capacity to communicate, learn and negotiate (Mehring et al., 2021). There are many facets to what constitutes 'good' engagement, but these facets are also then dependent on how individual flood communities are constructed (Mehring et al., 2021). We have discussed how difficult it is to define 'community'. From a practical perspective, it is also important to appreciate that communities are not heterogeneous (Dempsey, 2010) be that due to the characteristics of the people, their experiences or the place. A failure to appreciate this complexity "will result in engagement processes which are, at best, challenging, and at worst, create a breakdown in communication and relationships" (Barnes and Schmitz, 2016 in Mehring et al., 2021). Whilst most respondents involved in Mehring's research wanted to be involved in flood risk management, their perceptions of how to be involved varied. Communities expected a level of protection from authorities. Yet this 'contractual' relationship (Geaves and Penning-Rowsell, 2015) can change over time through experience and involvement to hybrid or fully collaborative communities. Thus, certain engagement "approaches made to the collaborative groups, seeking equitable partnership working, will fall flat if offered to the contractual groups, who are seeking readymade solutions. On the other hand approaching a collaborative group with a readymade solution will be seen as stealth issue advocacy (Thaler and Levin-Keitel, 2016) and will result in a breakdown in trust creating fault lines (Löschner et al., 2016) within the fledgling partnership" ((in Mehring et al., 2021, p113). The hybrid communities that seek some kind of blend of collaboration and contractual responses, complicate the form of engagement required further.

Cox et al. (2019) explain how young people are often most impacted by disaster events due to their age, their stage of development, their access to power and their financial resources. However, they propose that young people can be seen as important agents of change in Disaster Risk Reduction (DRR) due to their age and their future roles as leaders and innovators. Cox et al. (2019) also describe how engaging young people can also be important in starting the multiplier effect. They explain that by engaging young people, they will subsequently be an advocate and encourage engagement of older generations including family, as well as friends.

Example 2: Broadland Futures Initiative (BFI)

The Broadland Futures Initiative (BFI) is a partnership for future flood risk management in the Broadland area, Norfolk UK. The main goal of the initiative was to agree a framework for future flood risk management that better copes with the changing climate and rising sea level. The BFI worked in partnership with local communities and other stakeholders to identify a way forward. The process was democratic, with local politicians making the core decisions in order to agree a framework for future flood risk management. The decisions made needed to be acceptable for the local communities, for the environment, and also be technically possible and affordable. In order to involve as many stakeholders and local communities as possible, a range of engagement methods were employed from a virtual village hall event (due to the pandemic) to an online survey and a specifically develop young person's survey. Due to the coronavirus pandemic restricting face to face collaboration, the BFI, in collaboration with Jacobs, created a virtual exhibition space that stakeholders and communities could access to see plans and proposals and to share their feedback (Broads Authority, 2023e).

This method demonstrates how it is possible to engage virtually when face to face opportunities are limited. The creation of a virtual exhibition space ensured that information exchange, and subsequently collaboration, was still possible. The creation of a separate survey for young people is important as this can often be a hard-to-reach group and engaged in tokenistic ways (Cox et al. 2019).

As Nye et al. (2011) state "it is clear, flood authority engagement with flood communities can not only come in one size and shape. It can't be a tick box process; one size does not fit all" (in Mehring et al., 2021, p113). This also requires the building trust and new relationships between 'experts' and communities, which takes time and requires perseverance (Twigger-Ross, 2017; Johansson et al., 2013 in Mehring et al., 2021). Practitioners need to understand the new approach and what it means for their role, to develop skills through experience and active learning processes (Twigger-Ross, 2017).

Collaborative innovation using social media and technology

The innovative approach of marrying engagement with social media and technology development is a move away from the more traditional community engagement methods that tend to be face to face and more of an information exchange. Sharp and Carter (2020) describe how social media can be a useful tool to engage with communities, especially in response to a flood event. Not only does social media help people keep in touch with loved ones during an event, and provide a degree of comfort, but it also helps to gather and disseminate information, identify and organise volunteers, and enhance a sense of community and social support. Sharp and Carter (2020) also explain how social media can be fundamental to a community's resilience to events such as flooding. Using social media, communities are able to react and organise a response to a flood event in reasonably quick time. Social media also allows the dissemination of information, education and fosters a sense of togetherness which can also help communities cope with a flood event. However, caution should be taken when using social media for such purposes. Not everyone has access to social media and therefore it cannot be used as substitute for other methods of engagement. There is a risk of excluding already hard to reach groups if this is used as a primary method of engagement. Social media can also hinder engagement and harm community resilience through fake news and false information and these aspects need to be considered when using social media for these purposes (Sharp and Carter, 2020).

Example 3: 'Hello Lamp Post'

Hello Lamp Post uses technology to help people interact with the built environment. Through this interaction, data and insights are collected which helps to inform the future planning and design of cities. The proposed outputs from using the Hello Lamp Post technology are citizen-centric insight reports, informed decision making and empowered communities. The initiative works by signage attracting attention. A person is then able to send a message via Whatsapp, SMS or Facebook messenger to start the conversation. They are then able to answers questions or share their thoughts on a particular topic. There are examples of this being used in Bristol UK, Sydney Australia, Austin Texas, London UK and Belfast, Northern Ireland. Hello Lamp Post was used in Southwark, London between October 2020 and February 2021 to engage on, amongst other things, flooding and air pollution. In total there were 944 conversations, 714 players and 2,193 interactions (https://www.hellolamppost.co.uk/).

This method demonstrates the collaborative approach to future planning and design of public spaces. The insights are gathered before work has begun on any proposals allowing local communities the opportunity to shape and influence their local environments as well as providing the opportunity for social innovation (Sharp and Carter, 2020).

Arevian et al. (2018) champion the Community Partnered Participatory Response (CPPR) theory for developing new technologies. The CPPR approach emphasises equal power sharing between communities and those developing the new technology, be it interactive games or apps, creating a culture of trust, respect and two-way knowledge exchange – that is everything that is considered necessary for collaborative engagement. A key part of collaborative technology development is power sharing and this is difficult to do when developing apps or interactive games. Normally, the developers have the expert knowledge and therefore hold the share of power (Arevian et al. 2018). However, through a CPPR approach, the community or 'lay' knowledge is used to enhance the 'expert' knowledge (Few et al, 2007; Fitton et al, 2016; Mehring et al, 2018). This results in shared ownership and buy-in from the stakeholders and communities involved (Arevian et al. 2018).

Example 4: Rivercraft Gaming Technology

The Environment Agency has partnered with Microsoft to develop a new version of the popular game Minecraft, called Rivercraft. The new version is designed to educate students about the impact of climate change induced flood events on local communities through interactive play and decision-making. The game has three modes: Managing the flood, flood prevention and the local environment (Aqua Tech, 2023).

Social value

Social value is a complex and subjective term (Fitton, 2015). However, in a broad sense, Social Value UK (SVUK) define social value as the assessment of … *"the relative importance that people place on the changes they experience in their lives"* (Social Value UK, 2021). In the case of Project Groundwater, this will be the changes enacted by the project that communities will experience. Social value is derived from an understanding of what local communities want and need from a project (Fitton and Moncaster, 2019). Social value cannot be articulated, preserved or created if communities are not involved, as it is dependent on their situation, and their wants, needs and desires (O'Brien and Wolf, 2010). It is therefore necessary that project teams do not assume they understand what communities want but take the time to engage and fully understand the context (NIC, 2020).

Collaborative and innovative engagement not only allow communities the opportunity to shape and co-create a project, but it fosters community resilience and allows social innovation to flourish. The result of this approach is social value. Social value helps projects to meet the needs of communities. Social innovation and collaborative engagement allows communities to shape and influence the outcome of projects that maximise social value. This means the end result is a project that is technically successful and meets technical needs, but it is also 'socially' successful as it meets social needs as well (Fitton and Moncaster, 2021).

4. Conclusion: drawing out implications for Project Groundwater

'Community resilience' is a highly complex and multidimensional concept, academics have yet to reach a consensus on what resilience means, it continues to be discussed and developed across several different disciplines (South et al., 2018). In policy and practice, the concept is often used loosely, we lack a common definition or frameworks to operationalise and measure community resilience. Mulligan et al., 2016 was working with planning policies and practices on community resilience, which he viewed as having "rather simplistic, one-dimensional understandings of both 'community' and 'resilience'" (p349). Rather than merely being used to give policies more public appeal, he sought to "retrieve a workable interpretation of resilience from the wreckage of widespread misuse and abuse". We are not this disparaging, but certainly a more transparent, clearer yet nuanced understanding of both of the terms 'community' and 'resilience' would make the concept of 'community resilience' more useful. We have identified useful advancements in the literature, the importance of context and contextualising community resilience, to identify the factors or determinants of groundwater flood resilience, but also to consider vulnerability and diversity affecting pathways to resilience.

The paper's aim was not to provide a conceptual clarification, but instead to highlight that 'community resilience' in our policy field is in development and to raise a discussion about what community resilience means to the Partnership. We have raised the following questions, but encourage more questions as well in seeking our own interpretation of community resilience:

Might we still lack sufficient emphasis on the 'socio' when approaching flood resilience?

What do we mean by or how do we define 'community'?

Does 'community' include institutions (and government agencies)?

Do we see resilience as absorbing (defending), bouncing back to normal or adapting and transforming? Or perhaps all three? And is resilience an end state or process, or both?

Is there is an argument that flood risk needs to be understood through its own community resilience framework? But should we be cautious in uncritically adopting a framework that does not consider the different form and pace of groundwater flooding and the specific response required, as well as taking into account the characteristics of specific communities?

There is a current entanglement of resilience factors. Do we need to consider and isolate those that are useful, that consider the different form and pace of groundwater flooding and the specific response required, as well as taking into account the characteristics of our communities? Can we seek a deeper understanding of factors or determinants of community resilience?

As well as seeking a clearer definition, the partnership can also seek a deeper understanding of the key determinants of community resilience. Ongoing qualitative case studies in particular could help contextualise our understanding of community resilience, exploring capacity and vulnerability at a much finer grain, that larger scale studies miss or overlook (South et al., 2018). Participatory research methods also allow communities to explore and identify resilience factors that are important to themselves, they can help empower communities and build joint action through the design of the research, data collection and in the interpretation of the results (South et al., 2018). South et al. (2018) also highlight that research is currently lacking within marginalized communities (which, as we have noted, is not necessarily defined by a geographical boundary or place-based approach) – "ensuring community voices are heard, including from those groups who are seldom heard, is critical" (p28).

With a greater understanding of the common elements and mechanisms to 'increase' resilience, we suggest we will gain further clarity on what increasing resilience means to Project Groundwater. Crucially, this will also inform how we capture innovation and inform evolving national strategies on community resilience. As we lack a precise definition of community resilience, then likewise, there is little consensus on methodologies to measure community resilience (South et al., 2018). Due to the complexity of the nature of community resilience, research findings also cast doubt as to whether policymakers will be able to develop a unified policy solution even within a field (such as flood and coastal erosion), that is appropriate for all communities; "there is no such thing as a "one-size-fts-all" resilience intervention" (Haase et al., 2021, p1114). We need to recognise "the enormity of the task or developing validated measures and agreeing common terms" (South et al., 2018, p16). We are part of an important learning network, to develop a national level approach to indicators. Discussing and developing a clearer partnership conceptualization (and deeper understanding) will help us to determine the focus for measurement, to innovate regarding evaluation and input at a national level as to which factors or components of community resilience should and could be measured.

Crucially, we could help to inform 'how', how this is linked to actions to strengthen flood resilience, also considering the system level, with collaboration across sectors and with civil society. Traditional models of managing and planning, 'command and control', from technocratic engineering perspectives are recognised as being inadequate. We need to view Project Groundwater problems as social as well as technical. As Project Groundwater moves beyond an engineering field led 'response' to groundwater flooding, we need to capture the innovative process that reflects building community capacity and adaptability (or whichever terminology and dimensions or factors we decide to employ). If resilience is something embedded and to be harnessed within communities, then at a practical level, how do we understand and recognise this as social processes and dynamics, to engage with and enhance the resilience in the community (Imperiale and Vanclay, 2016, p205)?

We have included community engagement in this paper because it is a means to enhancing community resilience. We need to listen to stakeholders and communities to understand them and their needs and consequently create and maximise social value. We need to develop collaborative approaches to encourage social innovation. We need to use innovative engagement methods, be that with technology or not, but to move away from the traditional engagement approach and methods. The challenge again is to also account for the differing groups, and the distribution of resilience capacity and pathways within and across a place-based community (following South et al., 2018). Finally, we also need to consider scaling up in the context of limited resources when the funding stops. Or alternatively making the case for community resilience to be more adequately resourced.

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