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Co-developing best bets for participatory disaster risk management in a postcolonial harmscape

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ABSTRACT

The conditions that characterize marginal and informal settlements in the Global South make the environmental hazards resulting from the current Climate Crisis more dangerous, giving rise to multifaceted risks that can be characterized as Anthropocene harmscapes. As such settlements are home to a large and growing population, this is an increasingly widespread problem that, if not addressed, could result in deaths, unrest and increasing numbers of climate refugees. Recognizing that neither climate change nor informality are going to disappear, it is essential to find practicable, contextualized and locally appropriate ways of mitigating and coping with climate change-exacerbated risks such as water scarcity, floods and fires. This paper describes a co-research process intended to enable residents of at-risk settlements to mobilize their own knowledges and experiences to identify and articulate strategies with a realistic potential for practical implementation. It demonstrates how this process yielded suggestions for actions that operate at a range of scales, from small changes to everyday practices that can be accomplished by individuals and households to infrastructural improvements that need cooperation and resourcing from local or national authorities. It also demonstrates some of the limitations of decolonial approaches that uniquely prioritize local knowledges when attempting to address challenges with global origins.

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Introduction

The Global South faces a complex set of development and sustainability challenges driven by the intersecting dynamics of the Climate Crisis, increasing urbanization and deep social inequalities. With climate change now a leading human security risk (UNDP, 2022) these dynamics can be linked to historical pathways of extractive and racialist coloniality, industrialization and the dominance of market economies in the 'developed' world; historical inequalities that are the roots from which contemporary inequalities and injustices have grown. It is widely recognized that the impacts of climate change are being more immediately and more deeply felt in regions of the Global South compared to those regions that are most responsible for historic greenhouse gas emissions (Eckersley, 2016; Fattah & Walters, 2024; Ngcamu, 2023).

In this context, there have been recent calls for researchers and practitioners working in the fields of climate science, resilience and adaptation to pay more attention to the voices of the urban subaltern and those living in informal and marginal settlements in the postcolonial South (Black et al., 2024; Fattah & Walters, 2024; Finn & Cobbinah, 2023). Whilst this may be partially achieved by 'turning to the voices, stories, arts and narratives of communities who are made vulnerable' (Fattah & Walters, 2024, p. 629), Finn and Cobbinah (2023) additionally recognize that hearing the voices of the marginalized will not, in itself, resolve the challenges they face. Instead, they suggest that approaches need to be multi-scalar, enrolling multiple knowledges and being sensitive to the loci and limits of power. As Fattah and Walters (2024) suggest, what is needed is a wholesale

> rethinking of the agenda for climate change research in cities in the Global South from the perspective of epistemic justice – countering the injustice brought about by ignoring or mis-interpreting the voices and knowledges of particular groups in society … focus on engaging with them in ways that can contribute to their empowerment for broader societal climate action … requires dismantling of barriers created by colonial structures of knowledge production and an epistemological shift towards co-production of knowledge. (p. 628)

Similarly, Finn and Cobbinah (2023) advocate for a

> multiscalar response approach to climate change that draws on the strengths of informal settlements, local and national governments and the international community. The confluence of urban

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> informality and climate change prompts a multi-scalar renegotiation in the relations between citizens and states. (p. 408)

In the following, we describe one attempt to develop such an approach. The processes we describe were developed and implemented in a multi-partner, international project funded by the UK's Global Challenges Research Fund. The project, *Water and Fire*, set out to mobilize local knowledges of three environmental hazards (drought, flooding and fire) affecting three different settlements in the Cape Flats region of South Africa (Delft, Sweet Home Farm and Overcome Heights). It proceeded from an understanding of different degrees of informality and marginalization as inherent but complex ways of urban being, rather than as 'cancerous growth[s]' (Finn & Cobbinah, p. 417) on the urban body – that is, something to work with(in) rather than something 'requiring elimination, treatment or control by city authorities' (Finn & Cobbinah 2023). Following Finn and Cobbinah (2023), we view informality as 'central to urban space and history, essential yet often piecemeal to livelihood generation and reflective of structural, historical processes' (p. 407).

Importantly, the project design also proceeded from a belief that those living with the daily impacts of climate change and those in positions of authority in these regions can contribute to addressing the Climate Crisis but only as part of a global collaboration with multiple stakeholders. Our approach is grounded in a complex ecological understanding (Smith & Wilson, 2024) of the realities of the climate stressed places in which we worked. That is, the conditions of the present are historically and geographically contingent, emerging from the political and environmental pathways of the region – in this case, several hundred years of coloniality, apartheid and post-apartheid efforts at reconciliation and reparation; complex histories of land ownership and land use; and a changing climate. These combine to create locally-specific 'harmscapes' (Berg & Shearing, 2018; Wilson et al., 2023) which can limit the affordances for change or horizons for action of residents in the settlements where we worked.

As a consequence, the project aimed to capture both the energy and provisionality / temporariness of subaltern[s] experiences to provide practicable, actionable responses to the realities on the ground through community-driven articulation of best bets – priorities for actions that stand a chance of reducing the problem towards a positive impact, rather than (often) imagined or even imposed prescriptions for solutions. Going beyond 'blue sky thinking' where creative ideas are not necessarily grounded in reality or cognisant of practical constraints we sought to co-create concrete, actionable disaster resilience activities for the situation at hand. Building on the lived reality of township residents we tested a range of methods of inquiry intended to draw on resident's individual and collective ideas through democratic processes of engagement intended to produce something different to unrealistic development interventions. Instead, we sought to develop what we termed 'best bets' grounded in the realism of informal life and unregulated township residential circumstances, so to reduce the impacts of specific and recurring problems of fires, floods and water shortages. To this end, a central aim of the 'best bets' approach was to generate development knowledge that is locally-actionable. In other words, the approach sought to produce knowledge shaped by residents, enabling them to act independently within their communities or in collaboration with their municipality and other stakeholders. This aim follows core principles of activist participatory research (Freire, 1970) and community-based participatory research (Minkler & Wallerstein, 2003; Wallerstein & Duran, 2018). Our paper proceeds as follows. First, we describe the global context of climate change unfolding within increasingly urbanized and unequal spaces. After providing an overview of the *Water and Fire* project, we describe the three specific contexts in which our research unfolded. Following this, we focus on the processes that led to the development and articulation of locally-appropriate best bets for mitigating and coping with a particular environmental hazard in each of these contexts. We describe the processes we used to facilitate engagement with representatives of the local authorities and others with control or influence over resource and support allocation. Finally, we reflect on the successes and limitations of our approach.

A global context of climate change, urbanization and inequality

The impacts of the Climate Crisis are particularly acute in areas with specific vulnerabilities to environmental shocks (Solecki et al., 2018). These are often areas experiencing rapid urbanization (Nagendra et al., 2018) and where large fractions of the subaltern populations reside. Such places are at great risk of climate-change induced harm and are

> characterized by high concentrations of socio-economic and spatial inequality, deteriorating quality of urban environment, climate vulnerability, and enormous deficiencies in access to services and shelter with large numbers of residents living in informal or squatter settlements. (Fattah & Walters, 2024, p. 625)

In many cases, the locations of these settlements make them more vulnerable, as the urban poor/subaltern commonly occupy land that is sufficiently unattractive for occupation by more established urban dwellers, sufficiently unproductive that it has not been put to work for agricultural or industrial purposes or protected conservation areas. Additionally, they are likely to experience migration pressures, as destinations for people escaping acute and longer-term disasters that render more rural, remote areas effectively unliveable. Many such places lack adequate infrastructures for services such as clean water, sanitation, energy and communication; in many rapidly urbanizing African contexts, authorities direct their limited resources to those closest to accepted and expected norms of city life and, overwhelmed with the challenges associated with normalizing deeply informal areas, effectively ignore the growth and persistence of such settlements, relying on residents themselves to cope and 'make do' through what Davis (2006) calls 'miracles of improvisation' (p. 175). Add to this insecure land tenure and an absence of either private means or public support, and it is not surprising that such locales are increasingly vulnerable to climate hazards such as flooding, drought and fire.

However, it is important to recognize the opportunities that are inherent in such spaces. Indeed, they may be 'conceptualised through the dynamic "make-do" … an adaptive, provisional livelihood strategy … difficult to grasp because of its very informal nature' (Charman et al., 2020). There is thus in the precarity of informality and marginality an energy, fluidity and liveliness that may be absent from the more ordered, rule bound structures of the urban formal. Unfortunately, the creativity and innovation that may arise in such circumstances is largely absent from what Mahony and Hulme (2018) refer to as 'the epistemic geographies of climate science' (p. 628), which have grown out of the same colonialist roots as the Climate Crisis itself (Mahony & Hulme, 2018; Sultana, 2022). Combining scientific world views and claims to objectivity emerging from the European Enlightenment, climate science, environmental risk management and disaster recovery have tended to value, prioritize and even recognize 'only a handful of actors as legitimate knowledge producers' to such an extent that 'all other voices and views are excluded' (Fattah & Walters, 2024, p. 628). As a consequence, there has been a significant and persistent disjuncture between adaptation and mitigation planning informed by climate science and the capacity of local populations, authorities and communities to implement context-specific, practicable and locally-appropriate actions (Olazabal et al., 2021). Fostering multicultural knowledge systems that challenge existing dominant cultural frameworks and structural power realities require deeper exploration (Beck & Purchell, 2013).

Water and Fire project overview

Bai et al. (2018) suggest that subaltern groups adopt a range of strategies and actions to adapt to climate change. Indeed, residents in many urban regions have already been adapting to changing weather patterns (Seballos, 2012), regardless of the levels of support or infrastructure to assist them in doing so. Such adaptations may not be obvious, however, as they form part of the repertoire of everyday coping and survival strategies – the ordinary make-do that characterizes the precarity and provisionality of the colloquial 'make a plan' ethos of South African life in marginal and informal settlements (Hulme et al., 2016) in much of the Global South. The *Water and Fire* project aimed to enable residents in three climate-stressed settlements in the Cape Flats region of South Africa to identify, share and articulate the adaptation and mitigation strategies they are already creating, and to propose interventions that are urgently needed but impossible for them to create or implement without state support. As such it sought to mobilize existing local knowledges whilst generating new learnings from community-driven suggestions for future improvements, in the form of best bets.

The *Water and Fire* project was grounded in the day-to-day realities of life in township settlements which represent home for millions of South Africans. As such it deliberately emphasized persistent and localized hazards rather than acute and extensive catastrophes, exploring lived experiences of, and responses to normalized conditions of water scarcity, repeated shack fires and ever more frequent flooding. In so doing it foregrounded the ordinary, everyday impacts of global heating (Wilson et al., 2024) and its relevance to the lives of the South African and global majority who occupy and endure conditions of localized harmscapes.

The approach to community learning and development in relation to climate resilience that we describe below can be conceptualized using Deleuze's (1994) understanding of learning as the result of one of three types of synthesis. The first two are passive syntheses, in which learning occurs through exposure to repetition in action or from memory. Such learnings are more likely to produce and follow lines of articulation, in which familiar actions and responses become more deeply embedded. The third type of synthesis involves a rupture, an escape from the repetitions of the past and a line of flight into novel configurations and actions. Within this perspective, we developed and implemented processes intended to facilitate community learning to mobilize and synthesize a plurality of knowledges derived from individual and household experiences. Specifically, we worked with community-based co-researchers using a sequence of quantitative and qualitative methods to create multimedia texts that were then used to collectively interrogate resilience challenges, foster ideas and develop locally derived, transformative adaptation strategies for disaster preparation and response. Through these processes, we sought to answer three overarching questions:

1. What can the people who live within persistent harmscapes characterized by flood, fire and water scarcity reveal about the challenges they face?
2. Can engagement in guided community-based research and facilitated discussion generate ideas that go beyond developing a 'wish list' of hopes and dreams to devise specific, locally-dependent and actionable best bets for proactive / reactive responses for 'improvement' rather than 'solutions', achievable both by residents alone and in co-production with the local state/outside actors?
3. Could the texts produced in co-research and facilitated discussion be used to guide the dialogue between settlement residents and those with control of resources as a first step towards developing just and multi-scalar approaches to dealing with the realities of living in climate-sensitive conditions?

Co-research sites

Our research took place in the Cape Flats area of the Cape Town metropolitan region in South Africa. This is a low lying, sandy, haphazardly and commonly informally settled flood plain geographically dislocated from economic and social opportunities and home to large numbers of the urban subaltern.

As noted by Fattah and Walters (2024), the majority of climate research in the Global South has focused on megacities such as Nairobi and Accra. With their huge populations, these cities house a large fraction of those exposed to climate-change exacerbated environmental hazards. However, their status as megacities also makes them unrepresentative, in that such regions generally have more in common with each other than with their hinterlands or smaller cities and towns in the same countries. In contrast, there has been less

attention paid to smaller cities such as Cape Town and their component urban settlements which are more culturally and contextually embedded in their regions and also often have fewer resources, different economies, poorer infrastructure and less global visibility (Birkmann et al., 2016; Simon et al., 2021).

The arguments made for paying more attention to smaller cities and regional areas can equally be applied (and indeed expanded) in relation to marginal(ized) and informal peri-urban settlements. As Finn and Cobbinah (2023) note,

> Informality is a multi-faceted term (Okyere and Kita, 2015) and represents several different urban structures and relations such as informal land tenure arrangements and housing systems, informal settlements and economic activities, and informal 'paralegal' governance structures. (p. 406)

Our research unfolds in three settlements that effectively span the spectrum of marginal and informal urban life in the Cape Flats region of Cape Town. At one end of the spectrum, Delft is a largely formal if poor settlement, while at the other end, Sweet Home Farm is deeply informal. These places are 'urban locations with low climate change adaptation capacity and widespread poverty, contributing to limited community and individual climate change management choices and resilience' (p. 407) and thus important spaces in which to understand emergent and needed adaptation and mitigation strategies.

The Cape Flats is a low-lying sandy plain to the east of the Cape Town city centre and suburbs that serves as the epicentre of historically racially segregated, economically marginalized communities with over 800 formal and informally built settlements colloquially known as 'townships'. (Jürgens et al., 2013). Since democracy in 1994, these locations have become the epicentre of Cape Town's urban population growth and densification via inbound relocation of rural and international migrants seeking enhanced economic prospects in the city. Originally a biologically diverse heathland, the habitat of the Cape Flats now reflects a low-lying, exposed, urban sprawl of informal settlements (representing 11.2% of households in Cape Town (StatsSA, 2022)) mixed within formal, planned neighbourhoods built for residents forcibly removed from Cape Town suburbs in the 1960s. Unemployment and social dysfunction is predominant in the area, with interpersonal crime rates of murder, attempted murder, robbery and common assault some of the highest in South Africa and the world (Lamb, 2018). The region's climate, similar to that of the Mediterranean in its cold, rainy winters and hot, dry, windy summers supports recurring seasonal flooding and fires, alongside sporadic low rainfall years that have exacerbated water shortages. Local service delivery in the Cape Flats, and across Cape Town is greatly stretched, particularly for supporting preparation and responses to emerging environmental hazards. These localities thus represent an important, embedded opportunity to inquire and take forward practical household and community measures for preparing, surviving and recovering from critical events.

Within the Cape Flats, we selected three communities (two informal settlements and one township of largely formal housing) based on prior research networks and public records of local experience of three climate driven disasters of fire, flooding and water shortages.

Overcome Heights / runaway fires

While sporadically informally occupied for many years beforehand, as a consequence of a rapid influx of in-migration and settlement, Overcome Heights was formally recognized in 2005 and last recorded with 18,498 residents in approximately 5235 households (Huegel, 2013). It is an economically marginalized area with cross-cutting chronic issues of overpopulation, informal housing, hunger and poverty that are directly linked to the high rate of formal unemployment, gang-related conflict and xenophobic violence (Jensen et al., 2011; Schneidermann et al., 2020). The site is deeply affected by fire disasters; for example in October 2018 more than 800 people were left homeless in a single overnight fire event (Chiguvare, 2018). Fire events are exacerbated by high densities of informally built dwellings made from reclaimed materials sourced from the nearby landfill site. Infilling has occupied virtually all public space (aside from essential access points), and precludes development of roads or firebreaks, which, when combined with the methods and materials used to construct dwellings (shacks), illegal electricity connections and common usage of candles and paraffin stoves greatly increases local fire risks (Harte et al., 2009; Strydom & Savage, 2016).

Sweet Home Farm / localized flooding

Sweet Home Farm is an informal settlement in Philippi East, established in 1992 on neglected national and local government-owned land atop a seasonal wetland used as a dumping site for builders' rubble (Pharoah, 2013). The majority of its 17,000 residents live in informal, self-built structures made from corrugated iron and recycled timber. The area has limited access to reticulated water, sanitation and poor, or non-existent drainage. While there are plumbed communal toilets in the settlement these are largely dysfunctional due to vandalism and maintenance deficiencies. Regular seasonal flooding is induced by winter rainfall events creating upwelling of water from beneath the ground and localized ponding exacerbated by high population densities occupying all available space. Underlying municipal infrastructure such as stormwater channels and drains are undermined by ongoing blockages and contamination from accumulated litter and household waste (Drivdal, 2015).

Delft / water shortages

Delft was established in 1989 approximately 30 km northeast of the Cape Town city centre (Terwin, 2016). Unlike the other research sites, Delft is a planned settlement of detached formal housing, although now commonly infilled with semi-detached houses and pockets of informal dwellings built in backyards and on public open space. The 2011 Census estimated the population of Delft to be around 152,030 people comprising a mixture of largely low income and impoverished residents (Booysen, 2005) enduring 40% local unemployment

levels. Cape Towns's 'Day Zero' water shortage crisis of 2016–2018 resulted in the local government strategy of fast-tracking ongoing installation of water management devices to individual water meters in formal housing as areas including Delft to ration daily water usage to 350 litres per day per household. For some, the installation of these devices has been perceived as a punitive strategy imposed by the municipality targeted at the poor (Millington & Scheba, 2020; Wilson & Periera, 2012). For informal dwellings in Delft (such as backyarders and those on the periphery of the settlement) access to water is only possible from a limited number of community water standpipes spread throughout the settlement.

Exploring localized climate resilience challenges

All research activities were approved by the University of Stirling General University Ethics Panel and the University of Cape Town Institutional Review Board. The CCT Research Office further granted permission for the study. In this context the field research process was led by a local research NGO, The Sustainable Livelihoods Foundation (SLF) who worked with community-based co-researchers (collectively 'the research team') to explore localized climate resilience challenges using a series of methods applied iteratively in each settlement. The co-researchers were selected through attendance of prior public events on this research and subsequent engagement during household surveys where their interest in engaging was requested. These methods are described in more detail elsewhere (Black et al., 2025). A mixed-modality of participatory methods were engaged to reduce potential for researcher-participant power imbalances, counter language barriers (isiXhosa, Afrikaans and English), and encourage qualitative responses deeply grounded in co-researcher lived experience. Here, we provide a brief summary to explain the co-created texts that were subsequently developed in this process. Through initial household surveys, Ncube et al. (2023) built a baseline of understanding of demographics, facilities and disaster experience in each site. Following this, over a two year period we facilitated digital storytelling (Gubrium et al., 2014; Holmes & McEwen, 2020), community mapping (Grasseni, 2012) and photovoice (Wang, 1999; Wang & Burris, 1997). These multimodal methods were selected for their published practical ability in supporting co-creation of research outputs across diverse research settings, and to draw upon lived experience of the co-researchers in accessible ways such as accommodating local languages and disability. These processes saw community-based researchers create multimedia texts including photographs, drawings, annotated aerial photographs, hand-drawn maps and written text that shared their experiences of specific disasters. Co-researchers had complete autonomy and chose to share stories including loss of life and homes, the task of rebuilding and recovery, to the bureaucratic experience of disaster response with emergency and government authorities – as well as the ongoing, everyday, ordinary experiences of preparation, mitigation and coping. The mapping processes revealed local knowledges of recent historical concentrations of hazard risk and impact.

These processes also enabled the community-based researchers to share their localized, place-based knowledge with the SLF team, by walking through the physical spaces in which they experienced environmental hazards and disasters. This highlighted how many parts of the settlements have become persistent harmscapes, effectively remaining in a disaster-like state – such as traipsing through various quagmires of pooled water and household waste throughout Sweet Home Farm or standing with persistent queues of women with buckets and containers seeking water access at communal taps in Delft. This sharing of physical, lived realities was also enabled through the photovoice process, which took the research team into both communal and intimate spaces through sharing of photographs in workshop contexts.

Some of the digital texts produced in these processes are described elsewhere (Black et al., 2025; Mpofu-Mketwa et al., 2023; Wilson et al., 2023). Collectively, they illustrated local, place-based and embodied knowledges of each resilience challenge, and it was from these texts and the experiences they evoke that the best bets were formulated in largely democratic ways (Piper et al., 2024).

Consensus processes for arriving at best bets for improving climate-challenge resilience

The consensus process for arriving at the best bets involved two key stages of input, described below.

Stage 1: formulation of community-derived 'best-bets'

Following the visual methods and documentation processes described above, the visual research outputs and multimodal texts that had been produced for each site and environmental hazard type were collated, reviewed and collectively analysed by the community-based researchers with facilitation support from the SLF team. Findings across the various methods and communities demonstrated universal personal, household and community-wide experiences of environmental disaster, with many residents having endured multiple disaster types, or repeating impacts of the same disasters (e.g. seasonal flooding events). All three research sites revealed distinct vulnerability to climate impacts and subsequent shocks. These shocks were worsened by service delivery challenges, and widespread informality – particularly in informal dwellings. The interactive, participatory analysis process has been described in detail elsewhere by Black et al. (2025). In summary, it comprised four distinct phases of appraisal and selection which involved (i) identifying problems and solutions through iterative thematic analysis; (ii) selecting representative visual materials for exhibition at engagement events; (iii) triangulation of solutions-oriented data to develop community-derived best bets; (iv) unpacking these best bets into more detailed potential interventions.

As a result, a collective list of 17 community-derived best bets was developed (Overcome Heights x 5; Delft x 6 and Sweet Home Farm x 6) that were considered by co-researchers to be essential for improving resilience both before and after fire, flooding and water shortage events (See Figure 1 and Annex 1). These included (for example) prioritizing the ongoing development and maintenance of public spaces and services, embracing climate activism, enhancing solid waste

Figure 1. Study area; Cape Town, South Africa (Map created with QGIS (v.3.26.0) using data from OpenStreetMap contributors & MapTiler).

management practices, and promoting socially positive behaviour. In disaster management response, the best bets proposed by the community-based co-researchers included refining emergency response processes, supporting higher building standards in rebuilding damaged accommodation, and the formation of local committees for neighbourhood management to bolster community cohesion and combat criminality. The practical manifestation of the best bets thus confirmed the longstanding perspective of the NGO-based researchers and others (Fattah & Walters, 2024; Olazabal et al., 2021) that township residents operate with both individual and collective agency.

The community-derived best bets comprised both individual and collective (community-driven) disaster coping strategies. We observed how even the most informal and economically marginalized settings demonstrated agency with street-based WhatsApp emergency communication groups to coordinate emergency response in a fire, through to collective understanding that includes acceptance that one's own home may have to be demolished to create a firebreak that will ultimately prevent other's houses from burning down.

Stage 2: sharing and refining the best bets

The previous section describes how an initial set of 17 community-derived best bets was arrived at through a series of communal learning processes aimed at achieving consensus among affected community members about priorities for resilience actions in response to floods, fires and water scarcity. However, it is important to realize that:

> … informal settlement residents need to work in tandem with municipal, national, regional and international approaches to both climate change and informality. … a bottom-up incremental approach alone is not sufficient in the face of precarious urban informality, climate change and the ongoing relationship between the two. (Finn & Cobbinah, 2023, p. 419)

Thus, following the initial articulation of the community-derived best bets, the project team invited representatives of the City of Cape Town (CCT), emergency services, civil society representatives, local academic institutions and additional residents of the three research communities for discussion in a series of engagement workshops (one in each research setting) where these community-defined interventions and the research that underpinned them were presented and reviewed in interactive sessions (Piper et al., 2024). These knowledge sharing events were coordinated by the research team and facilitated by the community-based researchers (in both English and local predominant languages) and with a view to driving discussion and gaining input on the best bets in ways that could infuse them into existing policy and formal disaster management practices. These events included opportunity for feedback and debate to give disaster response officials

and political representatives an opportunity to consider disaster management interventions proposed by those most at risk, and how they could be practically supported. In parallel, the 'community-derived' best bets were also shared with the wider 'Water and Fire' research consortium at the collaborating institutions to integrate their understandings as academics with different insights on the research topic.

By integrating the perspectives shared at the knowledge exchange sessions and by the wider research consortium, the SLF team and community-based researchers worked together to finally arrive at eighteen best bets across the three disaster themes. This was accomplished by merging two pairs of interventions featured in the community-derived collection that were similar in nature (condensing 17 to 15) and adding three new best bets based on the collective learning across all sites and the inputs of the key stakeholders and academic partners. While going beyond specific community input, the additional best bets emerged as an outcome of the research team working across all three sites, and also throughout the stakeholder and power hierarchy. The insights gleaned from this approach gave the researchers both insight and agency in ways that went beyond any one community or disaster experience. These were developed alongside community derived best bets, and collectively decided upon within all engagement sessions to be added to the broader findings. Care was taken to distinguish these from community determined best bets as 'researcher derived'. The eighteen best bets were then differentiated into eight infrastructural (e.g. utilities, housing and roads) and ten socio-political (human related and behavioural) outcomes.

These 'final' versions of the best bets are illustrated in Figure 2. Presenting the best bets as short, easily interpreted, colour coded (for fire [red], flood [blue] and water scarcity [yellow]) direct-action statements was intended to both quickly and concisely convey key messages to officials and others in decision-making positions – many of whom do not personally reside in such living conditions and who could otherwise be detached from the impacts of their decisions. The colour coding also revealed the disaster origin of the recommendation, which, at a quick glance would frame the context of the recommendation to the reader. A full list including corresponding justifications and allocation of responsibilities to enable their fulfilment is included in Annex 1.

Co-production indaba

The 18 final best bets (including the posters and individual icons) were presented at a 'Co-production Towards Urban Resilience Indaba[1]' event, held in the Cape Flats township of Philippi on 28th September 2022. In addition to the community-based researchers from Overcome Heights, Sweet Home Farm and Delft, and the SLF research team, this event was attended by officials from the CCT, provincial government, civil society, community representatives and members of the wider 'Water and Fire' research consortium. On this occasion, all three environmental disasters were considered together in plenary sessions. As part of the co-production event, the 18 best bets were delineated into environmental hazard profiles and discussed at round tables, with one table dedicated to each hazard/research site. The round table discussions, which were recorded, enabled an interrogation of the 18 best bets with emphasis placed on the inputs of attending government officials. The 18 overarching best bets were not changed at the indaba event, but they were closely examined and deliberated to expand accompanying intervention strategies. At the conclusion of the indaba event, a summary document and accompanying video (https://www.youtube.com/watch?v=zIhZz2xhr68) was shared with all attendees.

Discussion: best bets as a tool for bolstering disaster resilience

It is important to acknowledge that the agency that was uncovered and the subsequent best bets are underpinned by individual and collective disaster trauma that result from living in these Anthropocene harmscapes (Berg & Shearing, 2018) that go beyond general environmental degradation to focus on the tangible, localized, and often irreversible damage created by industrialization and human consumption. Such harmscapes are not just polluted environments; they are landscapes where the very systems that support life – like soil, water, and air – have been fundamentally reconfigured to the point of being hazardous (Wilson et al., 2023). The field research methods revealed both the impacts of immediate damage and loss from shock events, but also longer-term impacts of living with uncertainty due to disasters. For example, Zimasile shared his story of a fire event taking place in Overcome Heights while he was away in the rural Eastern Cape, and how he rushed back to find his house burned to the ground with neighbours already rebuilding on land annexed from his property. Chevon recounted her experience of a ferocious fire that caused the deaths of her neighbours and friends and their (and emergency authority's) futile attempts to rescue them.

After sharing their digital stories with CCT officials the co-researchers learned of the challenges faced by emergency responders that exacerbate these issues such as the nature of deep informality and lack of state control over public space, including how limited road access in informal settlements and commonplace public violence against emergency services constrains their ability to protect life and property. In this way the nature of challenges is shown to require a multi-scalar response that draws from households through to government actions (Finn & Cobbinah, 2023). Similarly, the digital stories were also effective in showcasing the importance of community responses to disasters – from positive impacts such as persons opening their homes for disaster victims and creating feeding schemes, to the challenges of looting during and after disaster events. These individual story contributions were shared (and continue to be shared) with policy and decision makers who may otherwise never visit a township and create an opportunity to deepen contextual understanding of these disaster challenges.

Through the use of local geography, community mapping demonstrated the intense localization of fire and flooding disasters where direct impacts varied from street to street. This contrasted with water shortages felt by collective households across the whole of the Delft community. Collective

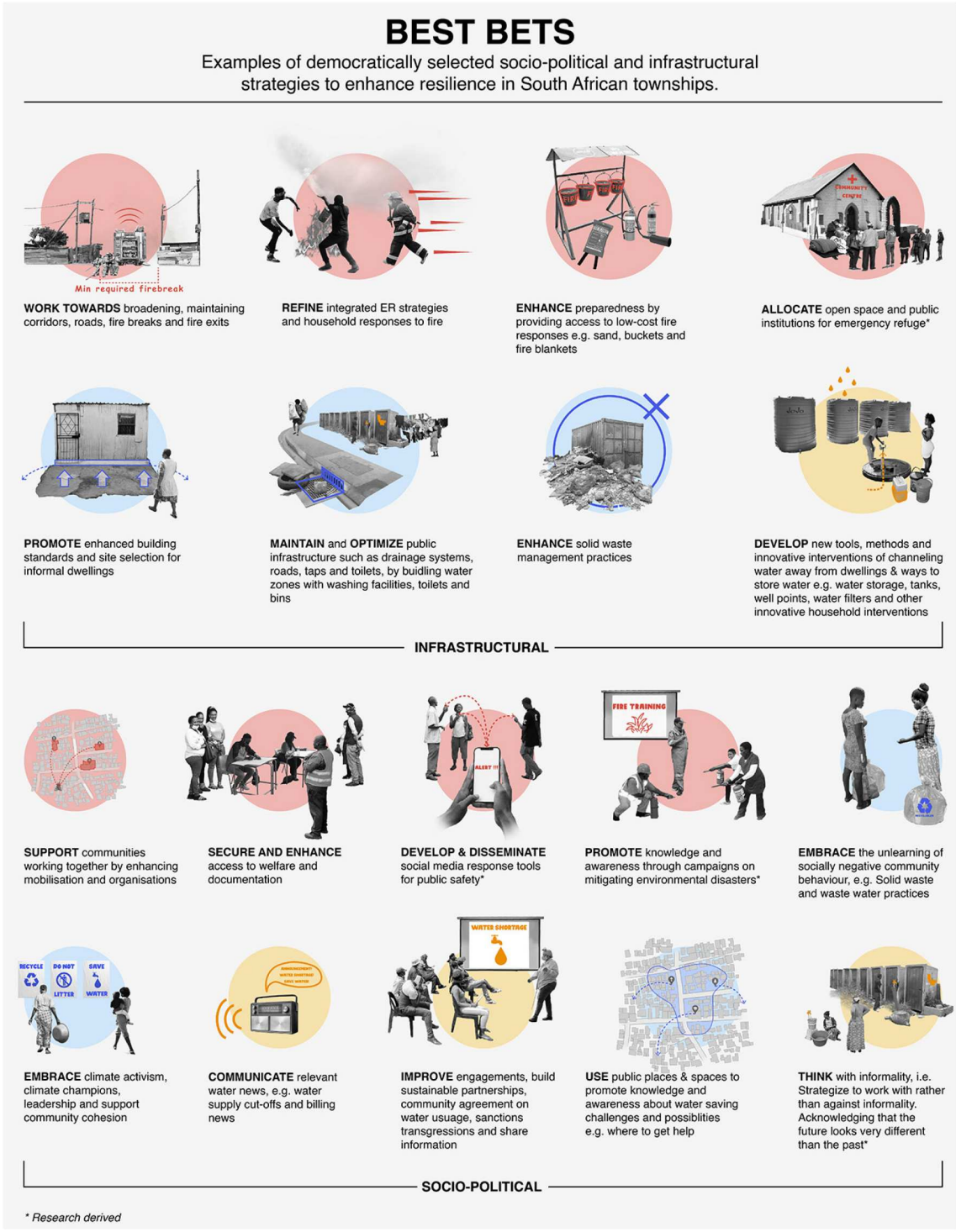

Figure 2. A graphical summary of the best bets, used to communicate key points succinctly to representatives of local government, disaster response, emergency services and NGOs (note have corrected figure numbers as were incorrect on draft).

community mapping processes using aerial photography in Sweet Home Farm and Overcome Heights also revealed how, over time these events impacted the community in immediate location, impact and scale. Street scale mapping of where disasters happened unpacked the important detail found in neighbourhoods as potential harmscapes through which useful local geographies such as the location of water points that sustained households at the peak of the drought, to the locations and usefulness of safe open spaces to seek refuge during floods/fires, were identified. Understood at scale, these details bring important socio-spatial understandings and value for disaster management planning. They reveal the complex origins and interdependence of aspects of each localized harmscape, including the Global Climate crisis and histories of colonialism and post-colonial change, the high value of land, and work-arounds that stand in for inadequate or absent infrastructure. Together, they demonstrate that in such conditions, simple 'solutions' are unlikely to be realized,

further supporting the value of disaster management planning that focuses on best bests that depend on existing rather than effectively out-of-reach capacities and agency. The photovoice process demonstrated the agency of research participants in recognizing and resolving local development challenges. While participants highlighted much local level evidence of their development challenges, the process also showcased their efforts of resilience, including emergency drainage and levee building to divert floodwaters away from property, through to proactive household water saving strategies such as water storage and conservation measures in managing water shortages.

The deep grounding that underpinned the development of the best bets acknowledges the subaltern economic and social context. Both the best bets and engagement outcomes with the local authorities demonstrate the 'tremendous and dynamic potential to self-organise and respond to structural neglect' in the process of forging new types of multi-scalar relationships (Finn & Cobbinah, 2023, p. 609), despite their blend of both actionable and unachievable development recommendations, which nevertheless can be seen to accurately represent the needs of the community. The best bets were deliberately structured to be deeply practical and also to define clearly the roles of community members and local government / emergency authorities without allowing authorities to abdicate their mandated developmental roles. The collective workshopping process with both residents and relevant authorities clearly determined, for each disaster (1) What interventions were needed (2) Why these was required (3) Responsibilities for addressing these, and (4) Potential interventions required. These are laid out in Annex 1 of this paper. The collective process sought to gain consensus of stakeholder roles, mandate responsibilities and remove any ambiguity from stakeholders.

At present, not all of the best bets are currently achievable – for example it is highly unlikely that CCT can reduce population densities in local flooding zones nor clear permanent firebreaks through informal residential dwellings. Yet others such as enhancing communication processes and improving on solid waste management practices remain very achievable activities for local authorities and residents. The best bets process was thus largely pragmatic in determining what could be achieved from a bottom-up perspective built around community participation and acknowledging the limits imposed by the local harmscape. Finding this 'sweet spot' which includes what residents can do by themselves, and in reasonable, simple co-operation with the authorities reflects local agency without becoming overwhelmed with generalist 'blue sky thinking' that might produce idealistic, but impractical goals (e.g. 'new houses for everyone'). This is important, as frameworks such as Cape Town's Resilience Strategy – while worthy – remain insufficiently built upwards from township household perspectives and are rather directed downwards from institutional frameworks and can miss the required 'plurality of perspectives' (Fattah & Walters 2022, p. 629) emanating from the lived context. An important future priority for local authorities is considering how they can better achieve best bets falling within their mandate, but also to set community expectations about what is not achievable. The current potential mismatch in expectations may go some way towards the common experience of public violence directed at emergency services trying to do their jobs (Khoza et al., 2022) which potentially reflects community frustration at both top-down approaches, but could also mirror potentially unrealistic expectations of service delivery in informal settlement contexts.

An additional benefit of broadening the gaze to include the urban subaltern perspective (Fattah & Walters, 2022), many of the best bets demonstrated that activities towards disaster resilience such as solid waste management and effective communications are seen by residents as a shared responsibility. Considering the ongoing marginalization (and often criminalization) of the poor by the South African state, community willingness to contribute to solutions is notable and should be embraced as part of a transition to reconfiguring power balances and social inequities (Swilling & Annecke, 2012) and in encouraging governance processes both within and beyond formal governments (Fattah & Walters, 2024). This is not to diffuse the responsibility of local government, for matters of service delivery were (rightly) called out as deficient in various cases – such as how neglecting proactive measures such as addressing leaking pipes and taps, and irregular street cleansing and maintenance brings about cumulative longer-term problems for disaster management. Indeed, it is hard to overstate the importance of effective local government service delivery via ordinary, everyday actions, oriented towards the mundane rather than the moment of crisis or catastrophe, in the face of climate change induced risks and hazards (Wilson et al., 2024).

Whilst making important recommendations, the best bets were potentially limited by a challenge that could not be resolved without external support, in that the community-based researchers could not have been expected to be subject matter experts in disaster management, policy or local government processes. In addition, powerful pedagogies exerted by place and context tend to reinforce lines of articulation that limit what can be imagined or envisioned (Wilson et al., 2023). As Finn and Cobbinah (2023) note,

> Informality within contexts of precarity cannot merely rely on approaches of 'bottom-up' ingenuity, because despite the resilience and fortitude of people living within many contexts of informal urbanisation, their actions did not create the conditions they face, and their agency alone often cannot extract them sufficiently from it … . (p. 419)

The three additional best bets suggested by the NGO-based researchers were an attempt to address this. These additional best bets were informed by the researchers' own engagement in literature and policy and cross-community experience and included (1) enhancing public campaigning on resilience (drawing on known City channels), (2) development of social media response tools to enhance efficiency in preparing for and responding to disaster events, and (3) the need of officials to 'think with informality' to better recognize that the domains of informal settlements and the informal economy require a unique range of strategies and processes in order to 'make do' and which shape what is possible in times of extra or unusual stress. With agreement for their incorporation the collective 18 best bets represented a valuable combination of embedded community experience alongside expert knowledge.

The finalized best bets were thus intended to best represent the rich, embodied experiences and suggestions of Cape

Town's potentially overlooked subaltern. It is acknowledged that the inclusion of additional NGO researcher inputs alongside summarizing of the best bets into a shorthand form of colour-coded icons and action statements risks potentially 'translating' as something that could be seen as less faithful to these voices. That said, the contextual experience that underpinned the action driven statements represented a pragmatic approach for sharing across the hierarchy of city officials and managers. In the context of Anthropocene harmscapes, stakeholders and policy engagement roles in co-developing the best bets attest to the value of participatory community organizing and active social citizenship (Beck & Purchell, 2013). Compared to more 'traditional' methods of working through political structures and bodies, the best bets clearly state the development requirements and reduce the potential for delay and miscommunication of community development and service delivery needs (Ntwana & Naidoo, 2024). The value of this approach was evidenced when sharing, refining and presenting the finalized best bets at stakeholder engagements and at the final indaba, which allowed for rapid dissemination of the intentions and details of the best bets, while fostering horizontal dialogue between co-researchers and government officials where structural, geographic, cultural and class differences can otherwise impede engagement and discussion. This was widely acknowledged in feedback from these events; as described in more detail by Piper et al. (2024).

> They [City officials] also need to come to the ground and educate us, and we also to educate them – it works both ways, we can help each other. (Co-researcher Delft, August 2022)

> I think with greater participation in meetings with the City [local government] in calling for ministers and other powerful politicians to sit with them, I think you'll find that people become more confident in the way they engage with powerful structures. (Govt Official – Stakeholder Engagement Event, Delft, June 2022)

Charman et al. (2020) describe many contexts in which the state is purposefully arbitrary, exercising its power over township residents in a brutal and indecipherable fashion. Despite reported local political challenges (as discussed in Ntwana & Naidoo, 2024), our experience of CCT's attitude and attempts to deal with the climate-change exacerbated harmscapes emerging in the various sites we researched is far from this position. As evidenced by City officials' willingness to engage with our project and their shocked responses to some of the stories presented by the community-based researchers at the local engagement events and the indaba, the state appears to be genuinely seeking to improve climate resilience in both marginal and core regions of the City. The indaba concluded with considerable promise for future enhanced working relationships between stakeholders and disaster resilience measures.

Post-indaba various CCT individuals continued to engage with SLF and co-researchers on the best bets in considering departmental strategies. This said, within 12 months a new CCT programme was announced to pilot a fireproof shack painting programme in Overcome Heights (Bezuidenhout, 2023), representing a considerable diversion from the project 0achievements. Painting of informal dwellings with vermiculite was not an evidenced best bet emerging from the study, and despite having no links to the research or co-researchers whatsoever was publicly announced to the media and thrust upon the local community as a direct response to local fire risks. As such, despite the research investment, engagement and evidence-led development of the best bets, CCT's subsequent actions reveal the challenges of working with a bureaucracy that appears vastly disjointed and disconnected to its responsibilities for community development. This outcome confirms Fattah & Walters (2023) assertion that the most challenging responses to climate change are not scientific, but social, political even. In building on potential future best bet initiatives, analysis of power dynamics (Schipper et al., 2019) through the co-production of in-depth maps of stakeholders and relations, intersections and interdependencies may serve to inform who the stakeholders in local political economies are, and how they can champion and implement initiatives so as to avoid such disconnected outcomes.

Conclusion

Fattah and Walters (2024) recently put forward what they described as a

> methodological rather than an empirical argument for an epistemologically just approach to engaging with those left behind through a methodological shift towards co-producing climate knowledge with marginalized communities and their actual lived contexts. (p. 626)

The above sets out one attempt to respond to this call. We have described the findings of a multimodal process through which community-based researchers generated a range of multimedia texts exploring and interrogating experiences of and place-based, contextualized learnings from three specific climate-change exacerbated environmental hazards. Drawing on a range of mixed methods that supported local language, disability and context, the process was able to authentically draw qualitatively on local lived-experience. Formulated into the best bets, the project created actionable outcomes inclusive of resident local knowledge and lived experience of place-specific harmscapes, as opposed to external interventions that ignore local knowledge and agency. Our processes are examples of 'immersive engagement with the lived experiences of diverse population groups in diverse cities including the urban subaltern whose voices continue to remain largely invisible' (p. 628). They are a powerful illustration of why '[c]limate change adaptation policies and programmes must be informed by the urban poor's everyday practices of living in climate-changed cities' if we are collectively to produce 'actionable climate knowledge' (ibid.) and thus begin to address the unjust and unequal local impacts of climate change. Together, the texts generated in these processes formed repeated series that coalesced into persuasive assemblages of local knowledges in which the flow of desire for change is palpable.

Schipper et al. (2019) suggest that there is a 'need to contextualize power in relation to sustainability transitions in the Global South and for power-sensitive actionable knowledge' (p. 3). Our co-creation of best bets instead of development solutions attempts to address this need by acknowledging that the precarious living conditions endured by economically

marginalized township residents cannot be solved by this engagement. Whilst the development responsibilities of the state remain, our approach allowed the practical experience and knowledge of the residents to support resilience efforts. Despite such knowledge potentially laying outside of formal and official technical frameworks, it could reflect practical steps forward for resilience building both within, and beyond the research sites themselves.

Charman et al. (2020) note how urban planning and management responses in South Africa frequently neglects informality, characterizing it largely as a periphery, or even a nuisance. We have put forward one way in which such spaces can be made central, instead of peripheral, to climate resilience planning processes, one which recognizes that 'the relationship between climate change and urban informality requires both "top-down" and "bottom-up" interventions, which should not be seen as mutually exclusive' (p. 409). Our approach aligns with the contention (Pieterse, 2015) that the residents of informal and marginalized settlements inevitably find answers (if not solutions) to immediate, pressing needs 'amidst emergency' (p. 313); and that experimental methodologies that contribute to 'processes of subjectification' (ibid.) are required as a result.

As Finn & Cobbinah note, '[t]he global scale of climate change requires international treaties, but it is vital that policy and theory attend to all scales of the crisis' (p. 413). We hope that the process underpinning the development of the best bets laid out above (drawing on methods laid out in Black et al., 2025) goes some way to helping others (especially the subaltern, or those requiring different language, power, and translation contexts) attend to different scales of this crisis.

Note

1. 'Indaba' – a South African term for conducting an important discussion.

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