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The Challenge of Engaging Communities on Hidden Risks: Co-developing a Framework for Adaptive Participatory Storytelling Approaches (APSA)

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The transdisciplinary Drought Risk and You (DRY) project aimed to interweave storytelling and science as a way of increasing the different voices and types of knowledge (specialist, local) within drought risk decision-making in the UK. This paper critically reflects on our emergent process of drawing across different methodologies to create Adaptive Participatory Storytelling Approaches (APSA). APSA enable more tailoring to people and setting than existing methods, recognizing the specificity of local risk contexts and communities, and in terms of social dynamics, cultural values and local knowledge. APSA are situated, storytelling methodologies applied in the social sciences and

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arts/humanities, giving strong attention to meaningful participation and sustainable co-production in both process and outputs. The paper offers other researchers and practitioners insights into working with APSA as a suite of creative storytelling options prioritizing methodological principles of active listening and adapting. APSA require creative thinking along multiple spectra, including how to balance different axes in APSA including: topic (drought risk)-focused with topic (drought risk)-peripheral or oblique, participant-led with researcher-led, and visualization-led with audio-led. We reflect on the challenges, opportunities and values of co-working with APSA, and offer a flexible framework for its application and iterative evaluation embedded through the process. We propose this as a starting point for other transdisciplinary projects to tackle themes that prove difficult for communities to connect with during community-engaged research, in this case, hidden risks like drought and climate change. This is timely given the power and mounting popularity of storytelling for behavior change, research insight and policy, and the need to capture and share different knowledges for climate resilience.

Keywords: Drought risk; storytelling; coproduction; participation; transdisciplinary; adaptation; agency.

1. Introduction — The Challenge

Drought is a diffuse, hidden and complex risk that is set to increase within the Anthropocene (Van Loon *et al.* 2016). Although seemingly a consequence of natural climatic variability, droughts are highly influenced by human water uses and values (Taylor *et al.* 2016), and hence can be considered a socially and culturally constructed risk (Anderson, 2014). Many reasons contribute to a lack of drought risk awareness among UK publics, providing a significant challenge for statutory organizations (water companies, environmental regulators) working to communicate risk, the need for preparedness, and for research into public perceptions of risk.

There is limited connection between drought memory, local knowledge and resilience. Britain is perceived as green and wet with unlimited water supply and water is a relatively cheap utility. Issues occur in citizen engagement through the hiddenness of drought (the dealing with absence or loss of water rather than presence/excess). Perceived drought risk is often subject to cognitive dissonance; in the UK, many stakeholders have much stronger connection with flood hazard. Additionally, all droughts differ in terms of their severity, duration and spatial extent making it challenging for the lay public and communities to identify signs of impending drought unless their activities sensitize them to its impacts. The last major UK drought to lead to significant water rationing was in 1976 (Marsh *et al.* 2007; Rodda and Marsh 2011). Hence, memories of this drought and its restrictions are locked up in older people, and not necessarily shared. Additionally, for many, the 1975/76 drought is remembered as a positive event, entangled with nostalgic memories of hot summers.

A deeper search is required to find local stories of hardship and challenge; see, for example, Evelyn Cox's (1978) account of challenges of being a livestock farmer in Shropshire during the drought. Drought as a risk is frequently "othered", being associated with distant places like California, Australia and South Africa (Weitkamp *et al.* 2020) through school education and the media. Indeed, conversations about drought in the UK news media only tend to start after a few very hot days. There are additional political associations with the word "drought" that mean that it does not tend to be used by statutory agencies until officially declared "water supply" drought. All these varied factors lead to significant challenges in engaging people in processes to research different forms of drought knowledge that support better decision-making. This is despite increasing interest in the role of indigenous knowledges of local people (lay, local, experiential, inter-generational) in local decision-making around environmental risk and climate resilience (Nakashima 2016).

Storytelling and the co-production of "drought stories" was critical to the transdisciplinarity of DRY project, enabling different forms of knowledge to be weighted equally, in creating a common language across varied academic disciplines of team members, and as a "way in" for engaging publics around a hidden risk. This surfaced adaptive and resilient behaviors invisible in more techno-scientific disciplines more commonly conducting drought research.

Working from the premise that story(ing) has value, in and beyond the academy, in enabling different forms of knowledge, inclusivity and capitals (Constant and Roberts 2017; Liguori *et al.* 2021), this paper introduces and critically reflects on Adaptive Participatory Storytelling Approaches (APSA) within a transdisciplinary research project dealing with hidden risk. It proposes a framework for thinking about APSA, demonstrating the challenges and opportunities of an emergent suite of methods in enabling moments of effective participatory storytelling.

2. Drought Risk and You Project

Engaging communities in research and retaining their interest is time intensive, sometimes dependent on finding the right community gatekeepers, and difficult when personal relevance or sufficient knowledge of the topic is not felt by the participant (Kristensen and Ravn 2015; Bondy 2012). Early experiences in the project revealed that it is challenging to engage the wider public around drought risk (see also Grecksch and Landström 2021). Therefore, APSA were co-designed and adopted as flexible, context-dependent and integrated research methods to reach participants with personal experience, memories, local knowledge and lay expertise that was, at first, hidden. This paper argues that this type of approach is necessary, productive, empowering and relevance-revealing to engage people with

impactful, transdisciplinary storytelling research when the topic is not of immediate or personal interest to potential participants. Given the power and mounting popularity of storytelling for policy, behavior change, and research insight (Davidson 2017; McCall *et al.* 2019), this paper is highly relevant to academics and practitioners researching similar apparently "hidden" and slow onset risks, such as climate change.

The Drought Risk and You (DRY) Project brought local and lay knowledge into the same space as drought science to expand the public conversation in the UK on this hidden and growing risk. It did so by increasing the diversity of voices in drought risk decision-making and embracing a holistic understanding of multi-layered, active citizenship in extreme weather resilience. This brought in experiences of drought impacts from different communities, and increased awareness and understanding of drought within and across those communities.

APSA have its focus on processual storytelling — methods designed to generate and co create stories — rather than narrative analyses centered on narrative as text/textual interpretations. Stories as shareable outputs were, however, equally important to the process, as a dynamic form of continued engagement and knowledge exchange. We also had a commitment to produce a living archive of digital stories (DS) as evidence of UK drought knowledge and resilience, and stimuli for drought conversations elsewhere. Different techniques were used to make stories emerge in a format that could be shared and re-shared — as outputs of the process with a life of their own beyond the project timeframe — especially through an online resource: the DRY Project Story Bank. The Story Bank has been shared with river catchment level and national stakeholder groups, and is also available as a resource on the UK Geographical Association's website for use in education settings.[1] It is a rich and comprehensive evidence base that brings different types of knowledge together around geographical and thematic case studies that would not have been possible without the team adopting APSA.

This paper first sets the ground for APSA by outlining the lineage of narrative inquiry for community-engaged research that our expectations were situated within. We then develop the underpinnings of APSA through describing four core methodological categories — digital storytelling; conversational storytelling; elicitation methods; and socially-engaged research methods — that formed the basis of our adaptive experiments, outlining their conventions and limitations (for us) before illustrating APSA through examples of our fusing and mixing of those methods. In conclusion, we provide a critical appraisal of the challenges

[1]The DRY project Story Bank can be accessed here: Story Bank: The DRY Utility.
The resources on the UK Geographical Association's website can be found here: All about drought resources — Geographical Association (geography.org.uk).

and opportunities of the APSA framework, considering emergent ethical issues, benefits for the research, participants and research team, and the ethos we developed.

3. Storytelling Approaches for Place-based Community-engaged Research

Storytelling approaches are increasingly used to facilitate meaningful forms of participation, increase civil agency and resilience to extreme weather events (McEwen *et al.* 2016; Klaebe 2013). They are used by those who recognize that global challenges are experienced at the local level, and in personal and specific ways; knowledge does not always circulate at a global level, according to models consistent with Western scientific knowledge production (Czarniawska 2004; Reissman 2008; Connelly and Clandinin 1990). The participatory turn in the academy, alongside a wider call to democratize research and scientific knowledge, asks us to rethink the way that knowledge is produced, incorporating models of co-production. "Knowledge controversies" arise in settings where "expert" scientific voices are called into question (Whatmore and Landström 2011; Naylor *et al.* 2017; Eyal 2019). Participatory or socially-engaged research aims for embedded, long-term interaction with communities based on a co-created research goal and outputs that serve a need in the community (Tungohan *et al.* 2020). It operates along a spectrum of engagement, aiming to make research accountable for its social consequences (Harding and Norberg 2005). Examples are participatory arts projects and participatory action research (PAR) (Furman *et al.* 2019; Wright *et al.* 2020). To expand the types of knowledge that inform decision-making, different publics are brought into these processes with experiential, practical and tacit forms of local and lay knowledge (Heron and Reason 2008; Landström 2020; Buletti Mitchell and Ejderyan 2020).

The DRY team had previously worked on UK storytelling projects related to heritage, climate change and flooding, primarily centered around a digital storytelling methodology (Capture Wales; BBC Wales, Project ASPECT; Wilson and Lewis 2013; McEwen *et al.* 2016; Holmes and McEwen 2020). Projects like Sustainable Flood Memories explored how communities remember past flooding events within personal archives such as photo albums and physical epigraphic markers, as well as how the stories that get shared about flood experiences might contain local knowledge about how to prepare for, cope and adapt within and between floods. DRY project's research premise was to use digital storytelling alongside other narrative methods, to co-produce knowledge of UK drought. This seemed promising given how narrative methods had captured detailed, emotive

and rich narratives of drought in places that have suffered extreme and long-lasting, repeated drought events, for example, in Australia (Anderson 2010; Wild Fires Story Project) and extreme visible weather in the UK.

As a transdisciplinary research project incorporating academics working across STEM, social sciences and arts/humanities, seven UK river catchments were selected as case studies to do both science-focused and storytelling work, interweaving the two where possible. The River Fowey, Cornwall; River Frome, Bristol; River Ebbw, South Wales; Bevills Leam, The Fens; River Pang, Berkshire; River Don, Sheffield; and River Eden, Fife, Scotland were chosen based on hydrometeorological and rural-urban gradients, providing examples of varying physical and social characteristics (Figure 1).

Stakeholders included public/communities and those working in health and wellbeing, agriculture, business, environment and built environment sectors. There was evident hybridity across sectors that blurred their boundaries and the roles played by individuals within communities which APSA were better able to accommodate than siloed disciplinary studies and more techno-scientific approaches.

DRY originally planned to create catchment-wide, "sector"-focused groups, including key sectors of society often underrepresented in drought discourse. We anticipated sector-focused, catchment-wide storytelling workshops in all seven catchments for story co-creation, resulting in a bank of DS that could be shared. The second phase was to involve sharing stories across sectors, and, in the final phase, across catchments. This would enable the progressive establishment of narrative networks comprising community stakeholders and drought-relevant organizations to achieve our goal of broadening the voices in drought risk decision-making.

Pilot work in the Fowey catchment revealed our goal needed to be revised, for reasons related both to the nature of community-engaged research and the topic of drought risk management itself. Much community-based arts work starts with small numbers and builds slowly. A long lead time was needed to establish the project within river catchment communities and identify local gatekeepers who were networked into different groups, and who had the social capital necessary to help us fill a workshop room. Until we were more established within the catchments, there were low response rates to the request to join researchers for drought-focused workshops at "sector" level.

The nature of co-designed research and co-created knowledge requires flexibility, longitudinal engagement and trust-building (Klenk *et al.* 2017; Flinders *et al.* 2016). Our activities, therefore, evolved in collaboration with participants — stakeholders, communities — and the DRY team. New, unforeseen forms of

South-North		West-East	
Fowey	1436mm	Fowey	1436mm
Ebbw	1456mm	Frome	792mm
Don	1009mm	Pang	695mm
Eden	799mm	Bevills Leam	630mm

Fig. 1. Location of the Seven DRY Project River Catchments Across Britain (Catchment Boundaries Are © UKCEH2020)

engagement became possible. Some approaches worked better than others, and some worked differently across our catchments (Figure 2). It was necessary to respond to the particular geography and contexts of UK drought risk within the seven case studies. As noted by Saunders and Moles (2013: 37) "... where we work, who we work with and how we work all affect the nature, meaning and effectiveness of public engagement". Place-based, community-engaged storytelling approaches required on-going attentiveness to the groups and existing local stories we encountered.

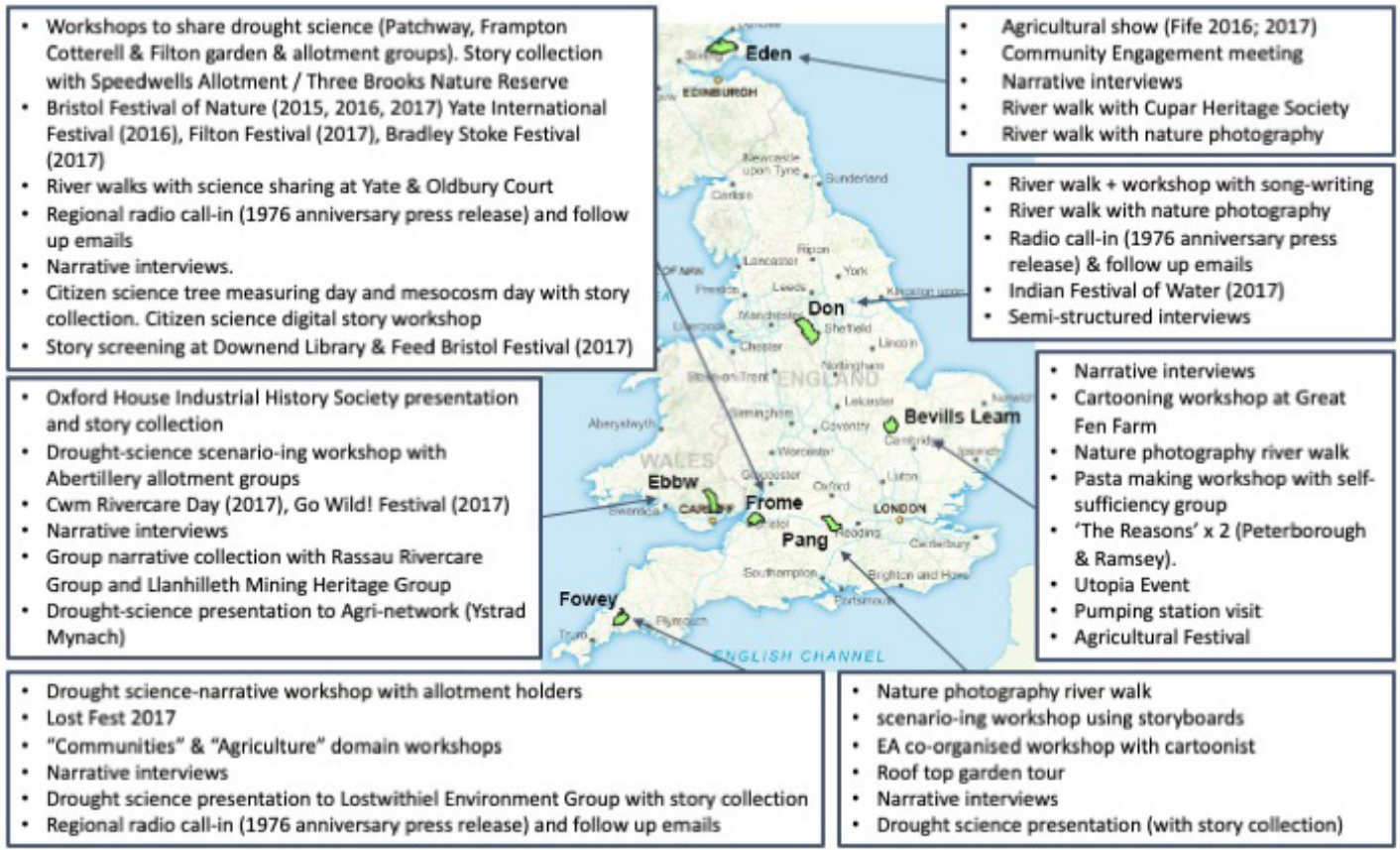

Fig. 2. Examples of Context-responsive Storytelling Activities Across DRY Project Case Study Locations

This paper is concerned primarily with methods designed to generate and co-create stories with communities in an engaged way; it is not about methods of analyses of those stories, which in research happens later, after the moments of storytelling. Our data elicitation methods are the foci of methodological novelty here; in other words, on storytelling as an enactment or live and reciprocal event. By this, we mean that the moment of storytelling is a co-production between teller and listener and is as important for research as the resultant stories we captured in text, audio and video outputs, because it shaped them. APSA's innovations are in their pragmatic and responsive application of "what works" from across diverse research methods in adaptive and context-dependent settings. This brought about richer diversity of stories, empowering storytellers to set the parameters of their storytelling themselves. We outline the development of APSA and offer critical reflection for those seeking to embrace similar approaches.

4. APSA: Adaptive Participatory Storytelling Approaches

As a framework, APSA should be understood primarily in terms of its intention to be flexible and adaptive rather than as a rigid set of techniques to apply to new contexts (because as we learnt, this probably won't work!). The main focus is on what APSA can generate as integrated methods and what can be learnt while applying them in a variety of ways and contexts, more than on what they are individually.

The key characteristics of a researcher or practitioner wanting to apply successfully APSA are very similar to the attitudes of a (good) story-listener. The need to adapt an approach to a specific research context can often occur after what in a storytelling session would be the response of the story-listener to the silences and things unsaid by the storyteller. In the same way as it happens in a story where silence is not an absence (of sound, ideas, sentiments) but can be just as meaningful and significant as what is said, in a community-based research process, lack of responses to pre-defined stimuli is not equal to lack of interest: by applying APSA, researchers should be(come) able to listen and realize that lack of participation is a call to reframe the researcher's ideas around the needs of a specific community and also to adapt the ways in which to interact with that community. The flexibility of the APSA framework allows researchers to iteratively respond, re-think and adapt.

When seeking to elicit, create and share stories, in fact, it is necessary to embrace a flexible set of methods. This is particularly relevant for the DRY project, because the methods available to the researchers were not quite fit for the task for reasons outlined above (for example, drought as a "hidden" phenomenon and so a

lack of drought memories or expressed relevancy within personal/community stories of experience) and described in more detail below (the form drought knowledge took; the desire to collect both past and future facing stories). The methods evolved in collaboration with the research participants, according to the sectors and places relevant to the research, and in response to the types of stories to be generated (in terms of research relevant themes and themes more productive as "ways in"). In this section, four core methodological categories (each with their own traditions and variations), that formed the basis of APSA, are briefly outlined, and the reasons of moving between research methods and combining methods across them are explained (Figure 3).

4.1. *Digital storytelling*

Digital Storytelling (DS) workshops were initially modeled on the StoryCenter approach which includes five steps (story-circle, script writing, audio recording, video editing, screening of all the stories) or seven stages (Lambert 2013). These steps/stages are suggested as being essential to make a "good" digital story as they enable participants to have ownership of the story, understand its meaning, become aware of their emotions, identify the plot, think closely about what can be seen and what can be heard in a story, and reflect on the potential audience of a story. DS is a facilitated group process, where the journey itself, in terms of social exchange and skills acquisition (writing, digital, editing), is perceived as more significant than the destination (Dunford 2017), but in research the pressure of "collecting data" could reiterate the importance attributed to the production of the output. This process would normally take place over several days of workshop, resulting in the creation of DS.

The DS model is well-established in academia and arts practitioner/community development worlds. Since its original conception, the DS process has been altered and adjusted to suit different contexts, mainly for issues related to time commitment and access to venues and technology. Nevertheless, the final outputs of a workshop are generally expected to be short videos in which each storyteller includes their own first-person narrative as a voiceover combined with personal still or moving images. The content of DS — the main topic of the story told — is more often decided by the participant, but examples of thematic remits for DS workshops exist (Dunford 2017). In addition to an adapted timeframe/format, the DRY project expanded the remit and outputs of DS workshops in response to a number of challenges: time poor participants; lack of interest or perceived relevance of drought as a "way in" to conversations; lack of images that could visually represent personal experiences of drought (absence); lack of willingness to share stories; finding future stories.

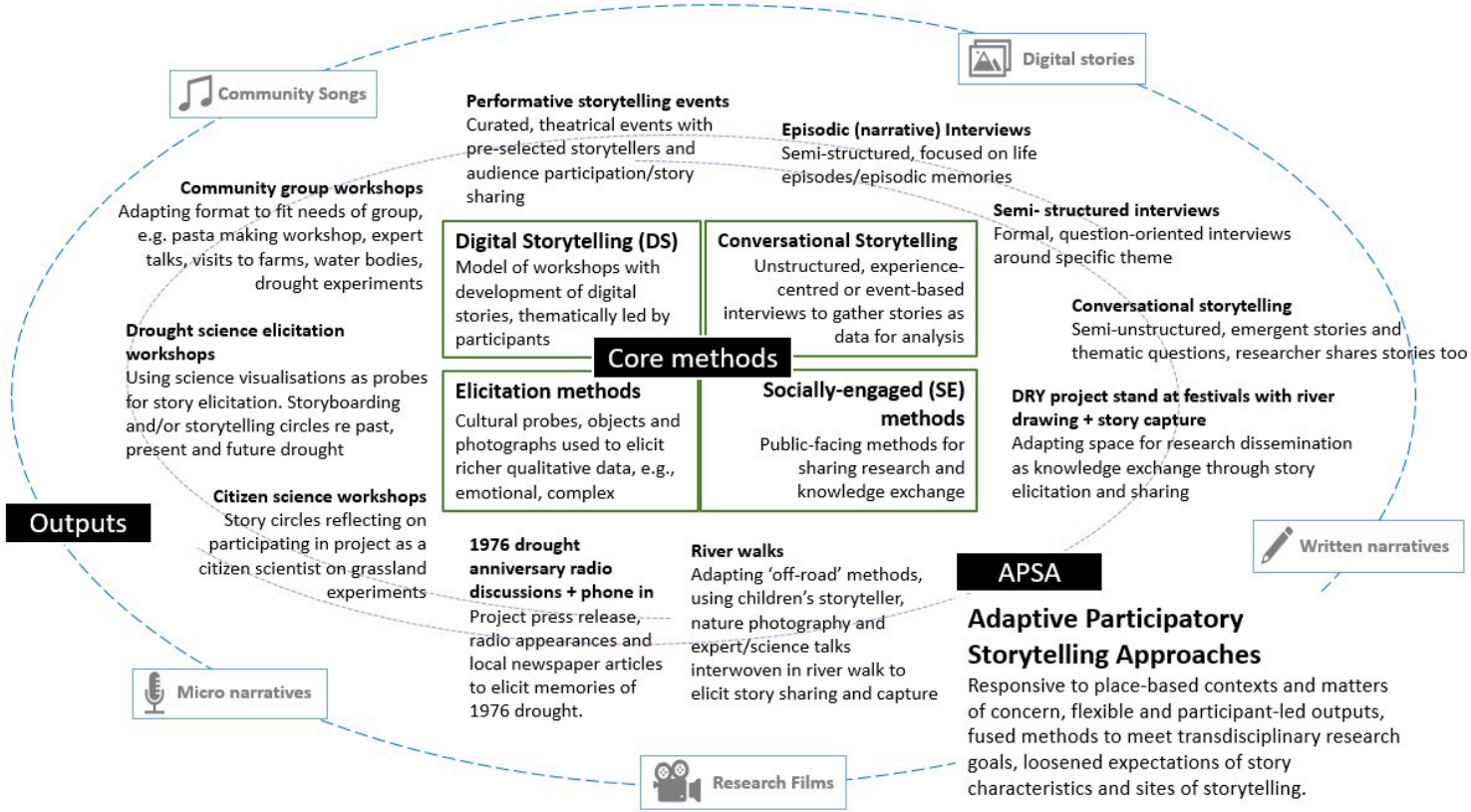

Fig. 3. Standalone Diagram of the APSA with Core Methods in the Center, Context-responsive Adaptations Inside the Ring, and Re-shareable Story Outputs on the Outside

To reach potential participants, researchers changed the way into conversations with those that were less interested in drought, or thought it held no personal, historical or future significance for them. Richness and personal significance were found in local watery and weather concerns, activities that connected to local water (fishing, boating, etc.), water scarcity in other contexts (when mains water turned off), positive water behaviors and hydro-power, as a way into talking about the possibility of, and local impacts of, drought.

Through incorporating drought-relevant rather than drought-focused stories, it meant researchers could work with extant community groups in a way that complemented their prevalent interests. This gave greater chances of engagement, flexibility and freedom within storytelling workshops, also ensuring a two-way dialogic process over an extractive one, aiming toward principles of participatory research and co-creation. The research team worked with community group leaders to ensure workshops were mutually beneficial, both in terms of themes explored during the workshop but also approach and mode of delivery. Perhaps the least predictable outcome of what became a co-design process in preparation of each digital storytelling workshop was a pasta-making workshop: this was organized in one of the project river catchments in collaboration with the Cambridgeshire Self Sufficiency Group and was tailored around water consumption and cooking skills. While they were learning how to make fresh pasta, reflections on the amount of water used during that process were facilitated to trigger personal memories and stories about water use in their daily life, which were audio-recorded and used as the basis for digital story creation.

The participating community groups were dependent on who was active in each catchment and their ongoing activity. In the Frome catchment, for example, momentum was built with allotment groups, where an expert on “no tillage” growing and drought resilient soils from the Allotment Society was invited to share expertise, on their request. One-off events were co-created and piggybacked onto existing community events such as monthly group meetings held by the Lostwithiel Environment Group (Fowey catchment) and Sustainable Wantage (Pang catchment). This endorsed the project activities locally and created a different relationship and openness to story sharing from participants. Because events were co-designed, some had greater emphasis on expert talks, others a practical component, and some on creation of stories. The DS model was adapted further to incorporate a drought science component, bringing specialist science and everyday stories into the same physical space (discussed further in the elicitation section). The timeframe of story creation extended beyond the workshop due to these adaptations.

A final adaptation was trialed in the Bevills Leam catchment. The DRY project uniquely had a deliberative theatrical component, inspired by a traditional Sardinian process of conflict resolution (Bakewell *et al.* 2018). The workshop space became a mock court room, the audience a jury, and our project contributors were on trial, performing their stories of water management to seek a collective community resolution. Everybody shared a meal together, where further stories emerged informally, highlighting the liveness and community-building aspects of storytelling. The process was apt for the Bevills Leam catchment, where water is fully managed and thus more politicized locally than other catchments. It played out differently in the rural and urban settings it took place in. Outside the rural community setting, a more geographically spread audience were less able to talk with personal and local relevance. DS — being less of the focus than the performative sharing and co-presence — were developed as a tool to help the storyteller identify the focus of the story they wanted to tell during the performance, but also created from, and alongside, a professional filming of the events.

4.2. *From narrative interviews to conversational storytelling*

Sector-level digital storytelling workshops did not work as an immediate method, and so we began scoping themes and relevant stakeholders through informal conversations within the Fowey catchment. This scoping work was then formalized in one-to-one conversational storytelling sessions, as an adaptation of narrative interviewing, as the project was rolled out into other catchment areas. Given that some participants did not wish to speak in a public forum or were time-poor, it was concluded that some stories may need to be collected on an individual basis.

The focus of conversational storytelling can be as much on the participant and their meaning-making as the subject of the stories they share. Ideally, a researcher conducting this type of session (as it would happen in a story-circle or narrative interview) will avoid influencing the direction of the story as much as possible through as few interjections as possible, only encouragements to continue or develop the story. This was not appropriate for the subject matter — drought risk — because it was not focused enough on gaining specific stories of drought.

But equally, semi-structured interviews, "where frameworks and questions are meant to be used consistently during each interview in order to ensure neutrality and validity" (Mueller 2019: 3) were not always appropriate either because participants would not recognize them as a space to tell stories, and because our questions needed to change according to the sector and catchment we were interviewing in, in order to find the drought-relevant stories. Mueller identifies two obstacles she faced with semi-structured interviews, the first being intense

convictions related to her subject matter (organizational values) that led to participants answering defensively or dismissively. The second was that the subject elicited visceral emotional responses that prevented deeper exploration. Drought, in different instances, worked with similar effect, especially where recent flooding was resonant in community narratives.

Episodic interviews (Flick 2000) seemed promising as a way of eliciting participant memories and stories linked to specific episodes and events (drought-related) in their lives through shorter narratives told within a dialogic interview format (Flick 2000; Mueller 2019). Here the participant recounts their knowledge of a concept across a range of situations, where the concept is contextualized in multiple ways that move from narrow to broad in scope (Flick 2000). Although participants choose which stories to tell, the researcher makes a series of advanced decisions about the domains from which responses will be requested or required (Mueller 2019: 4). An episodic approach allowed us to elicit stories specifically about memories of drought events, which were a useful starting point for deepening conversations about drought resilience and adaptive behaviors.

Interviews can reflect a variety of styles, dependent on the researchers' disciplinary background and skills and to some extent the type of participant, from the episodic interview, to more strictly semi-structured, to a form of conversational storytelling. Conversational storytelling is by its nature informal and "semi-unstructured". Participants told the stories that they wanted to tell, but thematic questions were used to prompt conversation when it stalled or did not flow freely (which allowed for thematic analysis across interview data). They often incorporated a "walk and talk" component (cf. "off road" interviews) or some form of photo- or science material-elicitation. These interviews could become "interview by anecdote" where an informal and conversational tone was established by the researcher sharing recent stories they had heard. This is qualitatively different from both more traditional, semi-structured interviews and narrative interviews, but was sometimes needed or adopted in order to enable participants to feel that they were in a safe and equal space of exchange where they could share memories and anecdotes. Already shared stories, including DS, were often more effective in prompting drought memories than asking direct questions related to those experiences.

Nevertheless, in some cases, the activity of storytelling could prove a barrier to accessing drought stories. Storytelling is a cultural activity that occurs naturally in social situations, but participants can be reluctant to engage with an activity that has been pre-defined as "storytelling". Invite someone to tell a story and the response will most likely be, "Oh no, I don't have a story to tell" or "Oh, I'm no good at that kind of thing". And that was even more the case if the subject of the

stories is predetermined: "Tell me a story about drought". Wilson's (1997: 25–30) Storytelling Performance Continuum suggests that it is at the conversational, informal end of the continuum that carries the least social risks, with a formal cultural performance at the other end, having higher risk of personal failure if the story is not well crafted and performed. Individuals who do not consider themselves skillful storytellers are more willing to contribute a story as part of a free-flowing conversation. The research process itself — its paradigms and language, perceived knowledge hierarchies, researcher's professional *persona* — can contribute to difficulties in engaging people in storytelling through a "formal" interview. Conversational storytelling operated at the low-risk end and helped mitigate this barrier.

4.3. *Elicitation methods for storytelling*

Our DS workshops, interviews and conversations contained well-known and less obvious elicitation methods. Storytelling research commonly involves an elicitation component (Goopy and Kassan 2019; Nind and Vinha 2016). Photo-elicitation methods help access rich, emotional responses as they offer a participant-led and more bounded entry point to reflect on complex issues and intangible feelings (Sherren *et al.* 2010; Quigley and Buck 2012). We used stimuli such as photographs taken during past droughts, as well as graphs, animations and other visualizations of past and future drought created by DRY scientists, to stimulate and reveal hidden participant stories. In the traditional DS process, stories are often shared through a story-circle using photographs, other visual stimuli or objects brought along by participants as a starting point.

The DRY team developed shareable drought science resources such as "bite-size" (small-scale, engaging, accessible) graphs, maps, tables, and gifs (see https://dryutility.info/for more detail of this process) that explored past drought data from the river catchments and future water scenarios. One goal was to elicit anticipatory stories from responses to modeled future scenarios of drought risk, based on climate or land use change projections, thinking about potential adaptations.

Requests for stories about future drought had the risk of appearing abstract. Stories, using established narrative methods, are generally generated from past experience or current practice. While participatory scenarioing is increasingly viewed as essential in water management and is explored in environmental modeling (Reed *et al.* 2013; Rao Mallampalli *et al.* 2016; Kok *et al.* 2006), there were few examples with such a strong focus on storytelling as ours, with narrative often being used in a broader sense to describe social or discursive factors in decision-making. Although some of our future stories remained more generalized,

we were able to introduce catchment- and sector- specificity through design of storyboarding workshops, as another adaptation of DS.

Storyboards, originating in film production, comprise sequences of drawings representing a camera shot, and some textual explanation, used to generate a story outline. Storyboarding in social science informs community-based participatory video, is a stand-alone method, and supports decision-making and empowers stakeholders to develop robust scenarios to prepare for future change (Elsawah *et al.* 2020; Liguori *et al.* 2021; Reed *et al.* 2013). Creating visual imagery in storyboards can help situate participants within unknown worlds and processes, make connections, and find solutions. As an act of "world-building" (Sturdee and Lindley 2019), they allow speculative scenarios to take shape as rich stories. In participatory approaches, drawing skill is less important; the storyboard is an aid to share the story (Liguori *et al.* 2021; Sturdee and Lindley 2019).

We used storyboarding as an accessible and collaborative way of engaging communities about our drought science resources and the personal and sector-level implications for them. We found that it had a freeing capability, releasing stakeholders from constraints and assumptions about "current water realities, current water governance, current institutional or personal thinking" (Liguori *et al.* 2021: 9). We particularly found storyboarding a useful tool for bringing scientific and lay knowledge into the same visual form through drawings and graphs. Including storyboarding in storytelling workshops created a clearly defined and achievable task that enabled creative, reflective thinking, and social learning. Participants shared their storyboards through a story-circle which we were able to audio-record, resulting in a particular type of future-facing DS through editing the audio and the storyboard visuals together.

4.4. *Storytelling as socially-engaged research methods*

Socially-engaged research methods incorporate community, public engagement and research impact activities and have significant overlap, particularly as they increasingly recognize any engagement needs to be a two-way process, with knowledge flowing back to inform research (Langdridge *et al.* 2019; King and Rivett 2015). Transmission or deficit models of research dissemination and "parachuting" in and out of communities in an extractive way are replaced with knowledge exchange or co-generation models, where participants are active agents within the process.

We encouraged multi-directional flows of knowledge through different types of story-sharing amongst groups of stakeholders. The initial attempt at sector-level DS workshops felt like "parachuting in" partly because the researchers were not

geographically located in that area and therefore APSA drew on socially-engaged research through a more sustained "being in" the community, developing relationships, and attending community events as a way of creating spaces of story and science sharing. Although we may draw comparisons with Participatory Arts and other socially-engaged methods, DRY differed in that a limitation for the research team was sustained long-term engagement around issues most pressing to community which, of course, was not always drought. The Reasons was probably our most engaged approach but was possible in part because of the saliency of drought within long-standing farming communities in the Bevills Leam catchment. It did not always make sense to stay with one group where drought did not resonate as a community issue. There was also a tension between working in depth but working with enough breadth to find and reveal the hidden stories of drought. A mixed approach meant that we began by adapting knowledge transfer or research impact activities toward knowledge exchange opportunities, and these often developed into more sustained relationships when a DS co-creation process followed the initial one-off interaction.

The approach was also broadened to ensure we reached individuals that did have personal experience of drought or were water sensitized (cf. Weitkamp *et al.* 2020). Early engaged individuals from water management, local history groups and farming meant our stories sometimes reflected a skewed sample of white, middle-aged men with relative degrees of efficacy. Through working with themed and local festival participation with higher footfall (such as Yate International Festival, the Bristol Frome catchment; Go Wild! environmental festival, Ebbw catchment; agricultural Fife Show, Eden catchment) and hosting less- and non-drought focused watery events such as themed river walks, a more diverse set of storytellers was involved in the process. These engagements worked better when they were based in communities where the river was visible and used, and depended on socio-demographics in the area. In one deprived area, people struggled to locate the river or see relevance in talking about it.

River walks (or walks to/around other catchment water bodies) provided an informal and inclusive watery space for bringing together scientific materials, organizational river knowledge and community-level stories. Some of the walks introduced drought explicitly during the event because of the audience, researchers (their skills and interests) and invited speakers local to the rivers. Others focused on nature photography as a hook because of serendipitous connections created in particular catchments. In the Frome catchment, a children's storyteller brought the topic of drought into a river walk through performance ("a huge elk sucking the river levels down"), intermixed with science interventions from specialists.

Fig. 4. Examples of Stories Co-produced with DRY Project. (a) Children's River Drawings from Festival Visits. (b) A Storyboard with a Future-facing Drought Scenario and Response. (c) A Frame from a Digital Story. (d) A Creative Micronarrative (Audio and Text, No Images). (e) A Community Co-produced Song About Drought Being Performed at a Community Storytelling Event. (f) A Film of a Community River Walk. (g) An Animation Describing Drought Science. (h) A Cartoonists Rendition of a Storytelling Workshop

At festivals "hidden water in food" and "drought memories" proved effective "ways in" to conversations about drought risk and adaptations. Water companies supplied free water saving gifts for the home, providing "water efficiency and saving" as another hook into conversations about drought. Children and adults drew pictures and wrote down drought stories on our paper roll of river drawings (Figure 4). This was a form of story data in its own right, as well as a prompt for discussions and audio-recording requests. As we hoped, often adults spoke with us while children drew, volunteering local catchment knowledge.

Audio-recordings, and occasionally video, of stories being shared *in situ* at the festivals/river walks were captured and used as the basis of DS. Written narratives were collected in these contexts. Festival and river walk "soundbites" were often well "crafted", with a clear through-narrative, because the person being recorded had already rehearsed the narrative in their initial conversation with the researcher or group. Most were happy to be recorded, which might be accounted for by the informal, enjoyable environment.

5. Discussion: APSA as a Flexible Framework

The stories coproduced in DRY range from carefully crafted autobiographical narratives in the form of written (text) or DS, to more partial and anecdotal fragments of stories, which we referred to as "story snippets", "soundbites" and then "creative micro-narratives". Project outputs extended to visual archives, storyboards, films, cartoons, drawings, and community songs. APSA enabled us to create a range of storied outputs from a diverse range of data elicitation methods tailored to community and place; context-specific storytelling methods resulted in different formulations of story "outputs" rather than a fixed output (Figure 5).

5.1. *Axes for iterative evaluation within APSA*

The process of moving from storytelling to shareable story or story output operated across spectra (Figure 6) involving explicit consideration of what is core and what is peripheral throughout the storytelling/sharing process. These spectra are expanded upon as a way of articulating the way that methodologies in APSA were creatively integrated and worked across and beyond. While the core methods of APSA are detailed in Figure 3, the flexibility and responsiveness of APSA are best articulated through the axes of the spectra. This flexibility and responsiveness is best achieved through iterative evaluation

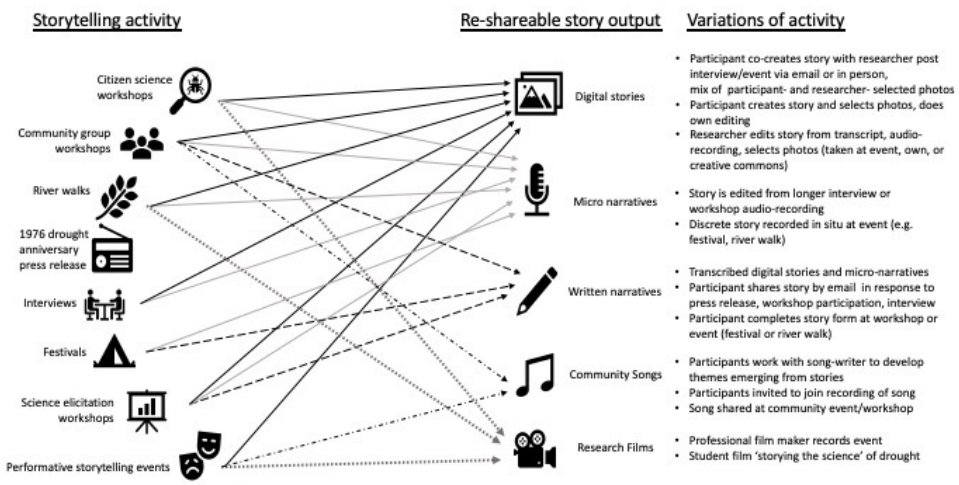

Fig. 5. An Illustration of the Adaptive Approach Which Enabled a Range of Storytelling Activities to Produce Different Story Outputs Appropriate to Participant (Skills, Time, Confidence), Story-content, and Context

embedded through the process and as a framework for others wanting to be inspired by these approaches:

- *Research topic (drought) as core to peripheral*: People did not always have a direct drought story to tell, however, they had drought-related stories, which gave us rich, contextual information about water, weather and values/behaviors within the place that they lived that told us something different about drought risk. These wider stories sometimes acted as a way into more focused stories about drought.

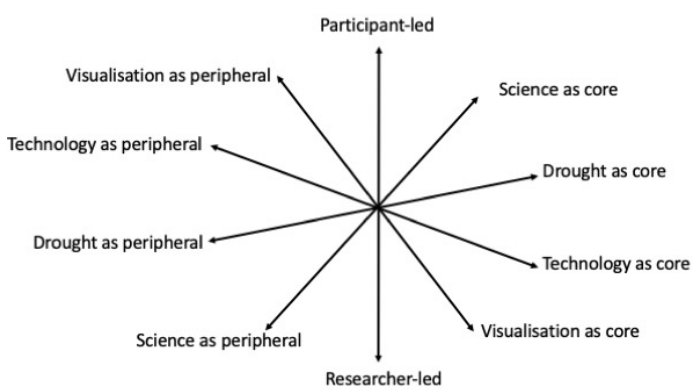

Fig. 6. A Framework for Using APSA: Spectra of Researcher Considerations

- *Participant- to researcher-led*: Recognizing that some participants have more time and skills to give to the project, but time-poor and more marginal participants have equally important stories to tell and share. Within socially-engaged research, these should not be de-prioritized because they are less involved with the entirety of the process.
- *Story Output as core to peripheral*: The form the "captured" story took was dependent on participant time and skill, but also the degree to which the story was participant- or researcher-led. For example, building participant skills in video and sound editing as part of the process is important in the origins of DS methods, but less so for us as this could act as a deterrent to storytelling.
- *Visualization as core to peripheral*: The amount and level of visualization were dependent on how invested the storyteller was in the process, the topic of their story, and whether the story was elicited from visual stimuli or the visuals were sought post-storytelling. It is important to think carefully about how the visuals and story support each other and can be most effective. Finding photographs "of drought" (as a "hidden" risk with slowly emergent impacts) was not always possible and sometimes visuals could create a disconnect with the story's meaning. DS without visuals (just audio and text, called "creative micro-narratives") could be equally effective.
- *Science as core to peripheral*: The interweaving of science (specialist, lay, citizen) depended on type of participation, science literacy, and relevance of science to the drought story that was significant to them. Story-science interweaving happened in different forms, and it was necessary to be pragmatic when it became less important than generating stories that told us something about drought perceptions, impacts, and adaptive strategies.

It is possible to use these spectra as a creative tool to position and reflect on individual and collective methods as APSA play out.

5.2. *Opportunities, challenges and ethos of APSA*

APSA offered both opportunities (A) and challenges (B), and required us to build a particular type of ethos (C) towards our project working (Figure 7). Opportunities were found in the access we gained to hidden — richer and more diverse — stories that would not have emerged if we had stuck rigidly with our original more traditional storying methodology. The research team also gained skills and interdisciplinary learning through its processes. Challenges related to the time and resources needed to respond to place specificity, build relationships, embrace interdisciplinarity and to the ethics of story authorship. These opportunities and

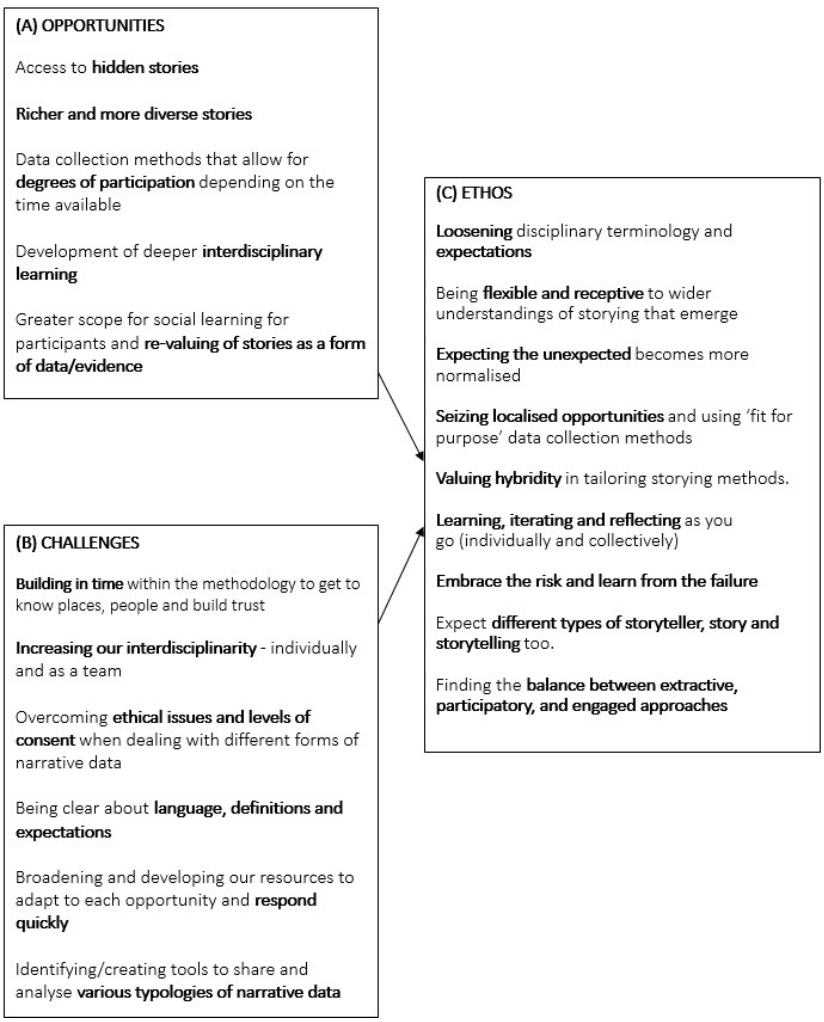

Fig. 7. Diagram of Opportunities, Challenges and Developed Ethos When Using APSA

challenges led us to an ethos of expecting the unexpected and being nimble and responsive to context-specificity.

APSA meant that our data elicitation methods could be "tailored for purpose" in different social, cultural and environmental settings, allowing for different degrees of participation linked to individual and context. Embracing a broader conception of what constitutes a story revealed opportunities to bring in different forms of local and lay knowledge about drought and wider watery contexts and relationships. An advantage of the added flexibility was that we were able to work with those that were time-poor and those who had limited digital technology skills.

APSA enabled us to find and capture more nuanced, hidden or indirect results of drought experience.

The multi-disciplinary sub-team in DRY conducting the storytelling research learned that letting go of methodological or disciplinary scripture was crucial.[2] We had to draw across storying and socially engaged methods creatively in order to achieve the project goals; this meant loosening expectations, valuing hybridity, and finding balance. We engaged individuals and groups in activities that were not *about* storytelling, but that provided the socially rich context in which storytelling exchanges will naturally emerge. APSA required us to open up our expectations of what a story should "look like" or involve. Alongside fully-formed stories, anecdotes provided pithy insights into "incidents worth recounting" (Michael 2012). Storyboarding future drought scenarios enabled more tangential, creative and abstract thinking. Not all of our story creation involved an "engaged" DS process, but stories still felt that they came *from* the community and allowed us to learn from a wider set of voices, building a new knowledge base that turned out to be more important for the project. We found there was greater scope for social learning and re-valuing of stories as a valid form data and evidence for participants, for example, in techno-scientific sectors and policy spheres (see McEwen *et al.* 2022).

APSA enabled us to increase our interdisciplinarity — individually and as a team — deepening our research capabilities. For example, our STEM researchers were opened to more participatory and creative methods and their usefulness in the construction of scientific knowledge. Although this took us out of our comfort zones, a key opportunity of APSA was that it broadened team members' knowledge horizons, skillsets and in some cases, values/identities, opening up new opportunities for further research collaborations. Part of the success of this was dedicated time to thinking about our interdisciplinarity and how it would play out in the project.

Research methods and participation will play out differently in different places (Bondy 2012; Kristensen and Ravn 2015), with places of story collection, creation and sharing yielding emergent outcomes. An initial challenge was building in extended time within the methodology to get to know places and people, and build trust, which proved crucial. This also required us to broaden our approach and

[2]A multi-disciplinary narrative sub-team, comprising human geography, drama, media studies, digital storytelling and business studies, met virtually once a month to discuss the developing narrative methods and conceptualisations, and how they were playing out across the catchments. This allowed us to iteratively evaluate our approaches and develop hybridity across narrative methods coming from different disciplines. This paper reflects and extends some of the (recorded) discussions had by that group.

develop our attitude to adapt to each opportunity and respond quickly. This level and diversity of engagement requires significant time resource to do it justice.

Another challenge was to overcome emergent ethical issues when dealing with different forms of narrative data, both anonymized and authored. We also thought carefully about our responsibility in sharing stories, how we framed them and the stories we told in relation to them, especially when storytellers were not present. Often this was about being clear in our language, definitions and expectations within each methodological approach, within the team and with participants. We created our own tools for sharing stories that made sense to audiences and avoided a story being taken out of context (e.g., through social media sharing, which participants could choose to do themselves). We often showed stories in pairs — a narrative and counter-narrative — so we could sensitively frame stories and navigate situations where audiences provided their own counter-narratives (see Willox *et al.* (2012) and Dunford (2017), on ethics around sharing).

Equally, the variety in storytelling methods and story outputs has meant that analyses of stories across the project has had variety too, partly due to the interdisciplinary nature of paper writing teams and partly due to the form the stories took as outputs available for analysis. Extractive forms of information gathering and thematic analyses have been used for social science and science-facing academic audiences (see Bryan *et al.* 2020; Liguori *et al.* 2021; McEwen *et al.* 2021) whereas discussions with community groups following story sharings have arguably encompassed narrative modes of analyses involving archetypes like heroes or villains of a story (where drought itself, farmers, or statutory organizations may variously take these roles and shift depending on the audience).

These opportunities and challenges required us to develop a unique ethos as a project (Figure 7). APSA represent a loosening of the "structural bolts" on storytelling processes; we learnt and iterated as we went along, recognizing that bringing different voices to the table meant different types of storyteller, story and storytelling too. Finding the balance was key. Through APSA, we became more open to unexpected twists, prepared to be unprepared and take risks in our catchment-based work, as a research ethos that "expects the unexpected". As such, we concur with Bruce *et al.* (2016: 1), who argue that emergent design of narrative inquiry that pursues unanticipated methodological changes is vital if narrative research is to continue to flourish and generate new knowledge.

6. Conclusion

The DRY project aimed to interweave storytelling and science to increase the types of stakeholder voices, knowledge and data providing evidence to support drought

risk decision-making. We developed a framework for APSA through an emergent process of exploring the overlaps between, and combining, different research methodologies to create something more "fit for purpose" to the specificity of local contexts and communities. As an interdisciplinary team, we reflected critically on the opportunities, challenges, and ethos — the need to value hybridity in methods and ensure flexibility in "opening up" for different kinds of participation and knowledge sharing in diverse place-specific settings. We offered a set of axes for researchers to consider when conducting this type of research. This paper represents a starting point for other transdisciplinary projects in an inclusive embracing of APSA as a flexible framework and ethos to engage communities around less accessible research themes like hidden risk, that demand representation of the voices that reflect multilayered citizenship.

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