

Routledge Studies in African Geography

**CLIMATE CHANGE
EPISTEMOLOGIES IN
SOUTHERN AFRICA**
SOCIAL AND CULTURAL DIMENSIONS

Edited by
Jörn Ahrens and Ernst Halbmayr



Climate Change Epistemologies in Southern Africa

This book investigates the social and cultural dimensions of climate change in Southern Africa, focusing on how knowledge about climate change is conceived and conveyed.

Despite contributing very little to the global production of emissions, the African continent looks set to be the hardest hit by climate change. Adopting a decolonial perspective, this book argues that knowledge and discourse about climate change have largely disregarded African epistemologies, leading to inequalities in knowledge systems. Only by considering regionally specific forms of conceptualising, perceiving, and responding to climate change can these global problems be tackled. First exploring African epistemologies of climate change, the book then goes on to the social impacts of climate change and matters of climate justice, and then finally, institutional change and adaptation.

Providing important insights into the social and cultural perception and communication of climate change in Africa, this book will be of interest to researchers from across the fields of African studies, sociology, anthropology, philosophy, political science, climate change, and geography.

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Social and Cultural Dimensions

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Introduction

Epistemologies of global warming in the South: The social and cultural dimension of climate change in Southern Africa

Jörn Ahrens and Ernst Halbmayr

Climate change is not only a fact that is hard to neglect. It is shaping global realities and has become one of the most decisive determinants of the global condition by impacting environmental stability, food security, social (in)equality, and so on. Despite this fact, each society and social entity affected by climate change frames the phenomenon not only by establishing different policies and institutions, but by different sets of cultural semiotics and techniques due to its specific modes of perception, affectedness, awareness, and publicness. As Mike Hulme suggests, climate needs to be understood “as an idea which mediates between the human experience of ephemeral weather and the cultural ways of living which are animated by this experience” (Hulme 2015: 3). Thus, he concludes, the concept of climate provides “a sense of stability of normality into what otherwise would be too chaotic and disturbing an experience of unruly and unpredictable weather” (ibid.). This sense of normality is then, of course, due to the specific social conditions in which a concept like climate emerges and becomes influential and it is exactly this stability that becomes altered with the new climate regime (Latour 2017).

The approach to climate, notwithstanding its global effectiveness, is then necessarily marked by a difference that is following signatures of perception, communication, and discourse-related production of meaning. Even if the two were comparable or translatable into scientific methodology, climate no less than weather would follow different social presumptions, cultural framings, and codes. By contributing to such an approach, Sheila Jasanoff explains that abstraction has been “the method by which modern science achieves its universality and heft. [...] Science creates entities [...] that reflect no one’s unmediated observations of the world and yet are recognised and accepted as real” (Jasanoff 2010: 234). It is clear, therefore, that the experience, knowledge production, and assessment of multifarious global phenomena are marked by a significant bias. On the one hand, it is necessary to state the overall impact of formalised transnational knowledge production that serves the needs of global governance of environmental phenomena and the discursive power relations resulting from it. On the other hand, life-worldly experiences and society-specific discourses of perception do emerge and form particular understandings of how certain environmental phenomena

and nature-bound processes are related to sociation processes, social interaction, and cultural meaning-making. Following such approaches, meanwhile widely acknowledged in the humanities and social sciences, the global challenge of climate change splits into a multitude of conditions that define climate change from specific social and cultural angles. Following Jasanoff, modern science's practice of mirroring nature, and thereby underwriting "shared human understandings of how the world works" (*ibid.*) is being replaced by an understanding of science as representing reality.

When Michael Hardt and Antonio Negri argue that, from its beginning, modernity undercut its humanistic potentialities such as subjectivity, sovereignty, or freedom by maintaining a transcendent order of power (Hardt and Negri 2001: 94), the order of an abstract, universal, and homogeneously structured science that dominates and also colonises other forms of knowledge. The geo-environmental divide in strategic and epistemological power that results from this situation is not only due to diverse environmental, geological, or meteorological preconditions, but it unfolds as a structure in which increasing climate vulnerability follows a decrease in global agency. Related inequalities are mirrored in documents such as the 1992 UN Framework Convention on Climate Change (UNFCCC) that, in its preamble, claims awareness of the particular vulnerability of "small island countries, countries with low-lying coastal, arid and semi-arid areas or areas liable to floods, drought and desertification, and developing countries [...] to the adverse effects of climate change" (UNFCCC 1992). The convention, therefore, intends to coordinate transnational responses to climate change with

social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the legitimate priority needs of developing countries for the achievement of sustained economic growth and the eradication of poverty.

(UNFCCC 1992)

In doing so, it not only perpetuates the established global orders of political, economic as well as epistemological power but also introduces responses to climate change into a classic understanding of development that is consequently aligned with the state of socioeconomic development in the Global North, the same part of the world that has brought about the present ecological disaster of planetary proportions.

Hence, a fundamental paradox of climate change becomes visible: although debated as coherent, homogeneous even, climate change in fact emerges on a global scale as a phenomenon characterised by highly varied patterns of sociation. It rather depends, in addition to the deductive method, on particular yet diverse cultural frameworks through which climate change embeds itself into the social and cultural conditions in which it unfolds. In accordance with this observation, Philip Smith and Nicolas Howe explain that climate change "exists in a complex field of stories defined by multiple, competing genres" (Smith and

Howe 2015: 16) and by different cultural frameworks, one may add. It is “a story that ‘everyone knows’, just *how* does everyone know it?” (ibid.). It is for that reason that the seemingly exclusively environmental problem of climate change is only insufficiently framed as a purely environmental issue that, following Peter Rudiak-Gould, paradigmatically attaches to the “Western nature-culture dichotomy” (Rudiak-Gould 2016: 263) that also maintains the Western domination in knowledge concepts and epistemology in approaching climate change. This does not only mean that environmental mobilisation in general as a crucial factor of reflexive modernisation is in need of the establishment of a “meta-narrative concerning those acts of narration and representation” that are regarded as climate change signatures (Smith and Howe 2015: 195). However, such meta-narrative itself has one coherent international version on the one hand, whose main proponents are international science and transnational institutions and agreements, and a multitude of narratives that are related to geo-cultural specificities in climate change articulation and perception on the other. The perception of climate and the consequences of climate change differs across and due to cultural traditions and socioeconomic structures (Stehr and Machin 2019: 16). From an anthropological perspective, Susan Crate and Mark Nuttall therefore emphasise the need to consider climate change in the complexity of its “temporal and spatial aspects in all its local, regional, and global dimensions” (Crate and Nuttall 2016: 16) and they also stress the

complexity of different narratives, explanations, discourses, and myths that all say something about our lifestyles, social arrangements, cultural practices, and economic systems and about our relationships to the planet, to one another, to the future and our place in it.

(ibid.)

Thus, for an understanding of climate change and its overall cultural, social, and environmental impact, it becomes crucial to approach this challenge by unfolding it as a universal but heterogeneous phenomenon that needs to be analysed and dealt with in its cultural peculiarities. Such urgency is also stressed by “Giddens’ paradox”, formulated in 2009 by Anthony Giddens who argued that, “since the dangers posed by global warming aren’t tangible, immediate or visible in the course of day-to-day life, however awesome they appear” (Giddens 2009: 2), this social abstractness of climate change often spreads inaction among social actors, from individuals to politics. Apart from this basic paradox of climate change perception and acknowledgement and the disparities in the general political will within national governments and transnational bodies to effectively counter the socio-environmental impacts of climate change, an integral part of it is that the planetary and therefore the seemingly consistent problem of climate change predominantly unfolds as a phenomenon of difference. Consequently, the overall global approach to climate change is becoming increasingly problematic rather than reasonably manageable when assessed as a consistent category. This approach to global climate change with its inherent inconsistency still informs a

majority of transnational climate action policies and is most prominently represented by the Intergovernmental Panel on Climate Change (IPCC) as the most important association for international climate change research and policy consultation. Today, 195 governments are registered as acting members of the IPCC and 120 NGOs as observers; its findings are considered the “gold standard” of climate change research (Mann 2012: 91). The overall approach therefore needs to address climate change as an immanently coherent phenomenon.

Paradigmatically, the “Headline Statement” to the IPCC’s *Fifth Assessment Report* (AR5) from 2014 declares that “human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have widespread impacts on human and natural systems” (IPCC 2015: 2). In line with this, the AR5 *Synthesis Report* (SYR) identifies climate change as a “collective action problem at the global scale, because most GHGs [greenhouse gases] accumulate over time and mix globally, and emissions by any agent [...] affect other agents” (IPCC 2015: 17). AR5 SYR explicitly points out that “effective mitigation” can be achieved only by “cooperative responses, including international cooperation” that was not only aiming at GHG emissions, but at other climate change issues as well (ibid.). Here, the IPCC establishes an approach based on the environmental plurality of climate change realities related to different extents of climate change impacts in different countries. In its reports, the IPCC is not only aware of the complexity of worldwide climate change realities, but its aim is also to respond to these realities and point out where measures need primarily to be initiated, accounting for the background of individual cases and looking at expected environmental consequences. That way, the IPCC has become an indispensable instrument of contemporary transnational climate change responses and a vehicle for the implementation of internationally agreed-upon climate ethics and its normative basis, and its projections of the global consequences of climate change are expressed in no uncertain terms.

This is because the IPCC realises that climate change impacts at a different pace in different parts of the world, and it produces detailed reports that strive to consider the variety of possible development paths of climate change in regions across the globe. It is precisely because of such climate change disparities that the IPCC expects not only national governments to play “key roles in adaptation planning and implementation” (ibid.: 29), but also highlights local governments and the private sector as “increasingly recognised as critical to progress in adaptation” (ibid.). Today, not only is the global dimension of climate change beyond dispute; there is also a growing consensus about the necessity of international collaboration in achieving climate change adaptation and mitigation. The IPCC emphasises the importance of this consensus in AR5 SYR, which states that “nearly all systems on this planet would be affected by the impacts of a changing climate” (ibid.: VII). This observation clearly refers to the levelling effect of climate change on the state of the planet. Even if it does take different regional impacts into account, this approach depends on the assumption that climate is a delocalised, global, abstract and mainly statistical phenomenon that needs to be acknowledged for being dealt with effectively.

Climate change is today perceived as one of the paradigmatic concerns facing globalisation. It has often been stated that it is making visible the negative qualities of globalisation processes that are still effective today (Helbrecht et al. 2021; Chakrabarty 2012; Maneschi 2018; Malone 2002). However, not only is climate change sustainably impacting the world on a planetary scale, it does so in radical ways. The drivers of climate change are not at all aligned with those regions that are primarily affected by its impact, hence it is the societies in the Southern African region that are most severely impacted. This is in spite of the fact they contribute least to the global production of emissions, as the whole African continent is only responsible for 3.8% of the worldwide total (Dietz/Engels 2018: 7; Rompel, this volume). Due to a structural lack of adaptation capabilities, these societies are considered especially vulnerable with regard to climate change impacts (Vanderheiden, this volume). Temperatures are expected to rise especially in the Sahel, West Africa, and Southern Africa, with massive consequences for many people's living conditions (ibid.). "Yet extreme climate events are far more than trending topics on social media; they are also a major threat to human and non-human lives, livelihoods, property, ecosystem health, energy and transport infrastructure, and other assets" (Leichenko and O'Brien 2019: 130). The African continent is thus expected to be hit by extreme heat waves "annually by 2045 under high-emissions scenarios" (ibid.: 131).

The most drastic effects of climate change can be observed in those regions of the world that are considered as the periphery of modernity. They therefore represent the bottom line of global development policies that still relate to a linear understanding of social and technical progress. When it comes to climate change, the Southern African region is already suffering enormous impacts on social institutions, people's livelihoods, and the resilience of entire sectors of society. In its fifth Assessment Report (AR5) from 2014, the IPCC stated that with an expected global temperature rise between 3°C and 6°C, the land temperature in Africa would rise faster than the global average (IPCC 2014: 1202). Only four years later, in 2018, the IPCC presented a *Special Report on Global Warming of 1.5°C* that included a list of expected climate change impacts on southern Africa – increasing risk of fire, water stress, and a decrease of food security by perhaps as much as 20%.

Poor people might be heavily affected by climate change even when impacts on the rest of population are limited. Climate change alone could force more than 3 million to 16 million people into extreme poverty, mostly through impacts on agriculture and food prices.

(IPCC 2018: 244)

Vishwas Satgar draws from this the conclusion that, despite numerous warnings by the scientific community, the United Nations, the media, and so on, "global leadership has failed humanity" in its response to the "most serious challenge we face as a species" (Satgar 2018: 1). Patrick Bond points out that the question needs to be articulated, how African climate change victims can be compensated

as “the Global South faces much greater impacts from climate change” (Bond 2018: 18). The question of who will be compensating whom, then, is an integral part of the larger debate about climate justice. Bond also produces a critique of the 2015 Paris Agreement. This treaty, still considered a milestone in global climate politics, specified that in connection with climate debts of emission originators towards vulnerable countries, the agreement would not provide a basis for liability or compensation (ibid.: 20). Among these major emission originators are China, the US, Europe, and India, “together responsible for 58% of world emissions” (ibid.: 21), whereas the African continent with very few exceptions, like South Africa, is making a minimum contribution (see Rompel, this volume). It therefore remains striking how marginalised these acute, regional challenges have been so far, not only within the climate change discourses of the Global North but also within transnational organisations. This goes hand in hand with the practices and rules of climate change policymaking and governance which by and large respond to the particular modes of climate change perception and the needs for adaptation or mitigation in the Global North.

This disparity is also reflected by the social sciences and humanities which, for the most part, have placed only marginal focus on the social, cultural, and political conditions in the Global South. In its material impact, it seems, climate change is shaped by and responds to a system of global inequality. Its processes manifest themselves rather differently, depending on a society’s position in a globalised and geopolitical world order. Significantly, this regional allocation also corresponds to the still-prevailing postcolonial order of disparities between the economically and geopolitically hegemonic societies of the Global North and those of the Global South, still regarded as the periphery. As V.Y. Mudimbe points out, “the process of underdevelopment”, first, is a consequence of colonialism and, second, caters to the needs of a “capitalist world system” based on unequal development and leading to (under)development dependencies (Mudimbe 1988: 3) affecting most severely the places considered as the global fringe. In this sense, what Mudimbe refers to as a postcolonial structure of dichotomies (ibid.: 4) that guarantees the continuation of the Global South’s dependencies and subordination within the regime of transnational climate institutions. With the above-mentioned structural difference between climate vulnerability in the Global North and Global South in mind, one could ask whether the current impact of extreme weather phenomena, constant drought, and so on, that is transforming affected societies into wastelands and zones of desociation, is emerging as the contemporary form of what Achille Mbembe calls “necropolitics” (Mbembe 2003).

It is therefore safe to claim that the IPCC has a limited understanding of climate change plurality, and only considers it in terms of material extent. What is not taken into consideration, neither by the IPCC nor by any other transnational climate change agreement or institution, are the consequences and effects of the embeddedness of climate change into the materiality of sociocultural topographies. The fact that the problem of climate change in substantial part poses non-ecological challenges has been wholly ignored in the public and political

discourse. The crisis of the environment is merely a stylobate for a crisis of sociation. That said, the emergence of perception of climate change within cultural environments varies across societies, not only due to different levels of material affectedness and vulnerability. Also decisive is how the phenomenon is integrated into cultural techniques and practices of self-perception. Only when perceived as a major part of the mundane, climate change, as a cultural concept and an environmental phenomenon, manifests itself not only as a physical process and climate entity, but also as a cultural entity that is emerging as a substantial factor of cultural worldmaking (Goodman 1978). It is in this sense that Hulme emphasises the semiotic dimension of climate change when, with Trumbo and Shanahan, he approaches climate change as a cultural construct based on a narrative that is not stable but may change at any time (Hulme 2009: 243). First, climate change needs to be assessed as an apparatus for sense-making. This is not simply because any cultural phenomenon needs to be addressed in terms of cultural semiotics and symbolisation. On the contrary, it is due to the functionality of the concept of climate in sociation that transfers the accidental experience of weather into the idea of a conceptual order as climate. This, as Hulme points out, produces and guarantees stability of that lifeworldly environment in which social interaction is taking place: “The idea of climate produces a sense of stability or normality into what otherwise would be too chaotic and disturbing an experience of unruly and unpredictable weather” (Hulme 2015: 3). As a consequence, the global climate change process is undermining this security and runs concurrently with various more local constellations, perceptions, and developments in cultural awareness and recognition, all of which make an impact at different levels of climate agency, climate affectedness, and so on.

To date, the leading international climate change policy actors and the established transnational institutions have not adequately considered this cultural and semiotic dimension of climate change. As usual, it is the IPCC that not only defines the standards of global climate knowledge through its reports on the global state of climate and its ongoing transformation, but also represents the leading approach to global climate change in general. In the IPCC reports, climate change is still approached as a consistent and universal phenomenon that only varies depending on different global regions and, therefore, due to different environmental conditions. On the one hand, the global phenomenon of climate change is regionally framed; on the other, it is impacting precisely these regional conditions. In this classic epistemological model, climate change diversity is only plausible as a material manifestation of environmental circumstances. As such, the phenomenon remains external to societal processes and is only impacting on the social conditions by appearing as a strictly non-social factor. At least the ongoing debate about the Anthropocene and its consequences demands that human capabilities be harnessed for reflecting on and responding to seemingly natural processes. As John Urry states, climate change represents a development of “bads, whose origins lie with the triumphs of modern society” (Urry 2014: 88) as it represents a result of humane sociation of nature within modernity. By way of a response to such a position, Kirsten Hastrup argues that humans are

everywhere and therefore constantly impacting on the planetary condition, and therefore they do not only act as destroyers, but “also as providers of collective solutions” (Hastrup 2016: 36). Hence, they conclude that what is needed is an approach that would integrate the natural and the social dimension of climate change: “We need to understand better the human responses to climate change, unfolding at the interface between natural and social histories that always outstretch a particular moment or place” (ibid.).

In contrast, when approached from the angle of cultural semiotics and related practices of worldmaking, climate change constitutes an epistemological entity closely bound up with techniques and practices of knowledge. It is at least these orders of knowledge that frame and determine climate change policies as they allow social acknowledgement or dismissal of the phenomenon. For that reason, Andrew Hoffman points out that for changing the existing cultural views on climate change, not only will “the vast institutions of our economy” need to be changed, but it will also be necessary to deal with significant resistance from “those who benefit from them” (Hoffman 2015: 5). The significance of the constructedness of existing social structures needs to become evident to open them to processes of transformation. It is in a way a paradox that it takes dramatic experiences of the impacts of climate change in otherwise securitised societies of the global North to make way for processes of sustainable social transformation. Events like Hurricane Katrina, in 2005, in the US (Adams 2013, Brown 2015, Kroll-Smith et al. 2015), or the flood disasters in Germany in 2021, serve as events that create social change as they “capture attention and drive public debate and political action” (Hoffmann 2015: 52). Clearly, the social orders of knowledge are not only directed at measurable processes but rely as much on symbolisation practices. The latter are, as social and cultural norms or lack of knowledge, for example, becoming effective in the resistance to adaptation action (Leichenko and O’Brien 2019: 173). Following this understanding of the relations between climate change as natural phenomenon, social practices of perception, and the production of meaning, climate change is approached as an epistemological entity that is imminently integrated into sociation processes and, therefore, plays an active part in the shaping of cultural reality. First, such an approach addresses climate change not only from one possible angle, for example, a purely scientific and physical one, but from a variety of involved angles that include aspects of materiality, epistemology, and social practice.

This approach eventually allows a much more comprehensive analysis, as it aims to cover the manifold, often highly diversified consequences and complex vagaries of the phenomenon of climate change. Second, it quickly becomes clear that the plurality of climate change is not only to be sought in the multiplicity of its regionally varying manifestations as a material phenomenon, but also in its many epistemological and semiotic characteristics. Even if the physical dimension of climate change remains untouched, it breaks down into a plurality of climate epistemologies that engender rather specific approaches to social and cultural framing of the concepts of climate and climate change. Hence, it seems reasonable to presume a climate change multiplicity that constitutes itself not

only as a plurality, but also as a set of concepts antagonistic to climate and its prevalent anthropocentric mode of change. An epistemological approach would consequently need to refer to both dimensions of knowledge production: cultural practices and science-based information about nature. In precisely this vein, Nico Stehr and Amanda Machin claim that a radical rejection of climate determinism and an overall emphasis on social constructivist explanations in nature-culture relations would only culminate in new forms of determinism that were reducing climate as culture (Stehr and Machin 2019: 117). The challenge, as they stress, is to reject approaches based on naturalism just as those based on constructivism (*ibid.*), through simultaneous “recognition of the entanglement of climate and society” (*ibid.*). From this constant interaction between nature and society, Anthony Oliver-Smith has drawn a rather instructive definition for adaptation: “In the process of adaptation human and natural systems conjointly construct socioecological systems” (Oliver-Smith 2016: 60). Humans, he stresses, interact with nature, “both shaping and being shaped, through a set of material practices that are socially constituted and culturally coherent” (*ibid.*: 61). Against this background, a mapping of climate changes is organised around regional and local distinction markers, resulting in the above-mentioned multiplicity of climate change. Likewise, Shmuel N. Eisenstadt’s concept of “multiple modernities” (Eisenstadt 2000) as a consequence of a lack of convergence of modern societies that is paving the way for a broad multiplicity of modernity (Eisenstadt 2018: 11), we now need to consider a multiplicity of climate change.

According to Urry, since the 2005 Kyoto climate summit, “global climate change has developed as *the* environmental issue in the 2000s, marginalising other concern from the ‘environmental’ agenda, such as nuclear risks, ozone depletion and the loss of bio-diversity” (Urry 2014: 89). Of course, Urry thus fails to recognise climate change as the meta-concept for environmental concern since the enactment of the Kyoto protocol. However, what he correctly points out is the genuine connection between environmental concerns in general and climate change in particular, and the emergence of modernity and its consequences.

These consequences include a threat to the future of society excessively reliant on constant integration of the future. Also, the most immediate and severe environmental threats, such as climate change, “are likely to fall upon the most socially vulnerable communities” (Brulle and Dunlap 2015: 1). Finally, appeals have been made for an “ecological modernization” (Rosa et al. 2015: 40) intended to fix the failures of modernity by not abandoning the concept of modernity itself. Paradoxically, the response to the socio-environmental threat of climate change seems to fundamentally question the legacy of modernity, thus, it consequently integrates itself into a modern development paradigm, but one that is merely an updated version of the old model. A technocratic mentality persists, in spite of the trappings of environmental sensitivity, and top-down responses that also assert the superiority of knowledge produced by the natural sciences are favoured. In contrast, local knowledge is abandoned or marginalised. The asymmetry in the production of knowledge about climate change primarily informed by a Western view of the environment is becoming more and

more obvious and it results in a loss of agency within social lifeworlds due to the demands of centralised top-down mitigation and adaptation approaches. What is needed, especially in influential transnational institutions like the IPCC, is a linkage between their climate change knowledge and local practices. Because, as “adaptation is a responsive action that individuals and communities undertake to protect their livelihoods over time” (Oba 2014: 3), human experience historically also includes various societies’ responses to climate change: “It is instructive that from social memory, pastoralists have developed knowledge systems about climatic cycles, including how events of the past are expected to return in the future” (ibid.: 220). It seems essential to include such experiences and attached knowledge systems into contemporary adaptation strategies, considering regional needs and historical practices that might be able to inform current concepts (see Bollig, this volume).

As the IPCC addresses climate change as a planetary problem in its AR5 SYR report (Chakrabarty 2021), it must be understood that any attempt at adaptation or mitigation only makes sense if it is based on transnational (and probably even trans-species) interaction. In this sense, the menace posed by climate change is increasingly understood as a problem that indiscriminately affects all life on earth and therefore calls for a substantial new understanding of the political and social (f)actors involved. Remarkably, in 2007, Ulrich Beck, inventor of the *risk society* approach in sociology, still considered climate change a “side-effect catastrophe” that would manifest itself as a “special combination of benefits and more or less likely damages and destructions” (Beck 2007: 146). Only 15 years later, it seems impossible to understand the overall climate change impacts as benefits, be it winemaking in the UK or the opening of the Northwest passage for constant shipping traffic (Nesbitt et al. 2022; Jogalekar 2013). A dystopian characterisation of climate change has been in circulation at least since the 2015 climate summit that resulted in the Paris Agreement as a legally binding international treaty on climate change. With few exceptions, climate change is today regarded as a development that needs to be stopped as it poses a threat to the survival of humankind. In its Synthesis Report from September 2021, the UNFCCC states that planetary warming of 1.5°C to 2°C is most likely: “For limiting global warming to below 2°C, CO₂ emissions need to decrease by about 25 per cent from the 2010 level by 2030 and reach net zero around 2070” (UNFCCC 2021: 6).

Beck applies the notion of the planetary when he interprets the emerging ecological crisis as a demand for “dealing with catastrophe-like risks the presence of the coming planetary state of exception” (Beck 2007: 146). This, according to Beck, also implies that any kind of risk as a phenomenon results from social construction and staging under particularly global society-based power relations (ibid.: 256). In this context, “some do have the capacities for defining risk, whereas others don’t” (ibid.) and the same is true of concepts like vulnerability and resilience (see Barrios 2016; Marino 2020). Thus, Beck clearly sees inequality of agency in the unbalanced power relations that persists in spite of risks to the planet. Published in 2007, Beck’s paper downplays the intensity and impact of climate change to a surprising degree. Nevertheless, Beck is fully aware that the

global nature of the risk does not imply equal distribution of the impacts as the globalised world is divided into a few who are able to define the situation and act according to their needs and the many who can do neither. It could be argued that “vulnerability” has in recent years emerged as a core concept in approaching and describing this majority of the world population. Risk, as Mike Hulme points out, is a matter of interpretation (Hulme 2009: 235). The individual as much as the collective perception of climate change is impacting on the organisation of state policies (Hulme 2009: 210). He emphasises that it is not so much scientific evidence and the accuracy of numbers, but cultural, political, and psychological factors that dominate the construction, perception, and prioritisation of risks in a society, whereby the application of the scientific framework is only productive if it is embedded into the cultural framework and is therefore much less objective than expected (*ibid.*: 211-13). Nevertheless, institutions like the IPCC are of course eager to limit uncertainties regarding future climate events. Finally, as Hulme posits in opposition to the efforts of transnational meta-institutions, it is always individuals who have the final say when it comes to risk assessment, and these people, again, are situated within a distinct social, political, and cultural realm that is itself part of global axes of power and agency. Other than scientific objectivity of risk assessment, “cultural, political and psychological factors play a more dominant role in the ways risks are constructed, perceived and ranked by people living in societies” (*ibid.*: 212).

Against this background, the notion of climate change evolves as a planetary threat and a problem to humankind that brings into question the techniques of production, dissemination, and perception of particular globally relevant climate-related knowledge. Such global knowledge, developed for managing anthropogenic climate change, still belongs to a “political modernity” committed to organisational forms such as the “modern institutions of the state, bureaucracy, and capitalist enterprise” (Chakrabarty 2008: 4). As Dipesh Chakrabarty explains, such concepts were established in European Enlightenment as they “entail an unavoidable – and in a sense indispensable – universal and secular vision of the human” (*ibid.*). Thus, climate change initiates a planetary transformation that is not only affecting humankind but the totality of social actors. The current estimated increase in temperatures by 1.5°–3°C worldwide will severely impact on regional infrastructures, lifeworlds, and global relations of equity, power, and different forms of slow, structural, and epistemic violence (Nixon 2011; Davies 2022). So far, however, the effects of global climate change translate into a new global order of vulnerabilities that are already increasing along with the existing relations of global inequality. Rather early in the debate on climate change, Giddens referred to the European Commission and the IPCC by saying that “the aim of emissions control policy should be to limit global warming to 2°C” when the effects of climate change were “probably already being felt” (Giddens 2009: 22). While Beck stresses the inequalities inherent in the global social order, Giddens emphasises that “given their location and lack of resources, the poorer parts of the world will be more seriously affected than the developed countries” (Giddens 2009: 22). Apparently, in its immediate consequences, climate change

turns out to be not only a universal phenomenon of natural transformation but also a new social reality that creates massive global inequality.

Climate change is surrounded by contradictions and inconsistencies, two of which particularly stand out: first, although climate change sets in as a natural phenomenon, caused by a segment of humanity, in a similar manner around the world, there is a great heterogeneity of social realities engendered by its consequences. Second, the institutionalisation and dissemination of climate change knowledge are under the absolute control of the Global North, whereas the Global South bears the brunt of its impacts, with limited resources for mitigation and adaptation and negligible support from the rich countries. Although it is slowly starting to affect and change the societies of the North, climate change is still mostly impacting the global periphery. It cannot, therefore, be neglected that the global order of climate change establishes clear-cut global influence and power structures that relate to the postcolonial condition of the contemporary. The challenge, on the one hand, is obviously to approach it as a global problem that interconnects regions that have hitherto been seen as disparate but are now forming bonds of commonality. On the other hand, the socioeconomic reality of climate change vulnerabilities and its overall social impact is marked by substantial inequalities that follow a well-established global geopolitical order.

Although the problem of global (anthropogenic) climate change has become a much-discussed issue within the social sciences, a systematic focus on its consequences for the Global South, and in particular for the region of southern Africa, is still lacking. This despite the fact that these societies are especially vulnerable to transformations in the ecological system. Due to their more fragile infrastructure, higher poverty rates, and ecological conditions, these societies face natural disasters related to climate change more intensely and frequently than other regions (e.g. the cyclones Idai and Kenneth that hit Mozambique and Malawi in the spring of 2019, and Freddy in 2023). At the same time, the region has for many years now been going through a period of severe drought burdening countries such as Malawi, Namibia, Botswana, (southern) Mozambique, and South Africa and threatening regional food security. Meanwhile, as Nicholas Chan argues, “African countries were far less engaged in the climate process and did not begin to regularly co-ordinate as a formal negotiating group until 2005” (Chan 2021: 322). Only since the late 2000s, he says, “Africa” as a region has been trying to position itself as an actor within the global climate change debate. Therefore, in Chan’s critical view, it has demonstrated and performed its agency “through an emphasis on weakness and, specifically, vulnerability” (ibid.: 320). As the meaning of weakness is vague and artificially constructed, Chan criticises the accentuation of a specific vulnerability that necessarily requires financial support from third parties. Vulnerability thus becomes a global political category that does not only define a position of marginalisation or exclusion, but also proliferates a mode of agency based on disadvantage.

The Southern African region, acutely affected by climate change, mainly relies on subsistence farming. The rise of global climate change is not only transforming the procedures of sustenance, but also deprives it of basic preconditions

for any type of farming, for instance, optimal temperature and rainfall. Perhaps most importantly, severe water shortage is already a reality in the region and its consequences are severe: the collapse of subsistence farming in general and traditional farming practices in particular; water scarcity and the resulting conflicts around water or abandonment of areas affected by desertification; emerging problems in food security; an increase in migration from the affected regions related to an urbanisation boom in the area; and severe problems with housing in the still-relatively small regional city centres. All of this translates into a variety of serious securitisation challenges related to water, food, housing, and natural disasters. Industrialised countries in the Global North and rapidly industrialising countries with poor ecological standards are the main sources of emissions that cause most global climate change. But the bill is picked up by vulnerable parts of the Global South that already struggle with their history of colonial exploitation, precarious infrastructure, high poverty rates, and unfavourable geographical locations. Under these circumstances, questions about the possibility of global climate justice evolve along with questions about the identification and attribution of causation and guilt. These questions become the basis for international climate change policies that align themselves not with the idea of equality in global climate change, but on the contrary, with that of fundamental inequality. Interestingly, this inequality reflected in the fact that African countries contribute least to climate change but suffer the gravest consequences is absent from most local epistemologies and local knowledge systems (Rompel, this volume).

Against this background, this book is organised along three fields of central concern that approach, reflect, and examine the social and cultural reality of climate change epistemologies in Southern Africa. First, it discusses and analyses climate change knowledge and epistemologies (Bollig, Sheridan; Nell; Bond and Galvin). Second, contributions invite questioning of climate change communication, in the media, and experimental settings to bridge differences in knowledge, experience, and institutional and organisational frameworks (Scott and Taylor; Faimau, Nkhukhu-Orlando and Sello). Third, the authors discuss the challenges of just transition and international cooperation (Vanderheiden; Rompel).

Official climate change knowledge is bound up with the paradigm of objective naturalism and climate sciences and is therefore part of a rather abstract scientific-technical knowledge production. Apart from the scientific discourse, public climate knowledge and discourses are framed by the specific cultural and social conditions that absorb, transform, and vernacularise this scientific knowledge. This book makes the case for hierarchies in knowledge production and climate change knowledge and for the theoretical and practical relevance of local and regional climate epistemologies in conceptualising, perceiving, and responding to climate change. By bringing together its authors' diverse fields of expertise, this collection aims to offer broad insight into the problem of climate change in Southern Africa, particularly focusing on the extent of its social, cultural, and political impact on the region. The following chapters examine the social and cultural dimensions of climate change, and in doing so they look at how global warming impacts the region from seven specific different angles.

The book's overall approach is informed by decolonial ideas, and it rests on close cooperation between scholars from the African South and the Global North and focuses on climate knowledge and epistemologies. Despite the fact that Southern Africa is one of the parts of the world most affected by the consequences of climate change, the region is largely relegated to the periphery of public climate change discourses in the Global North. Research on the social and cultural perception and communication of climate change in the region is generally still lacking.

Epistemology raises the question of how we know things. In his examination of different climate epistemologies, Matthias Rompel stresses the epistemology of climate science and the IPCC as the “engine for scientific knowledge production on climate change” as well as the development of international climate change agreements and goals for sustainable development. These standards direct international and bilateral cooperation and the funding schemas and orientation of climate change-related projects with Southern African countries. At the same time, impacts of different epistemologies and local knowledge “on the political response to climate change remain widely under-researched” (Rompel, 191) and therefore largely absent and is in turn identified as an important gap that has to be addressed in the future. Local epistemologies that differ “from the global epistemological vantage points established (e.g. by the IPCC)” (ibid.) tend to turn into “traditional knowledge and farming practices [that] no longer seem [...] suitable for the changing climatic conditions” (ibid.). The challenge from such a point of view becomes localising scientific insights, climate translation, and the scaling down of international concepts and guidelines to national politics and local realities.

Michael Bollig's (this volume) analysis of Otjiherero-speaking Himba pastoralists from north-western Namibia shows that the evaluation of experience-saturated local knowledge can be quite different when one takes local practices rather than global climate science as the point of departure. He elaborates on the pastoralists' mobility strategies and applied knowledge by experience. This includes knowledge about places, drought food, vegetation pattern, and the physical reaction of livestock to recurrent droughts. Himba pastoralists apply active epistemic strategies to knowledge acquisition, including enquiries about grazing conditions, news networks, and exploratory walks as well as specific forms of identification between humans and cattle. Cattle are recognised as individual agents, may accumulate experience, acquire leadership qualities, and lead the herders. “The entire herding assemblage, human herders, livestock, and vegetation are geared towards withstanding climatic perturbations” (Bollig, 38f.). Pastoral mobility thereby becomes a highly resilient key drought-response strategy with a high adaptive capacity that ensures the survival of livestock and guarantees human food security. This stands in contrast to most popular versions that attribute a low adaptive capacity and high vulnerability to local rural populations and “unlike policymakers, anthropologists would not hesitate to describe the Himba as having high adaptive capacity” (Ibid.). Bollig stresses that knowledge about weather and drought is not the same as abstract climate knowledge. The epistemology

and ontology of climate elements like rain or droughts may differ significantly. Himba pastoralists name droughts framing them as malicious agents that appear randomly, without a deeper metaphysical cause (*ibid.*).

Sheridan examines rainmaking and relational personhood through the lens of post-human and ontological anthropology. Ontology poses the question of what exists and inquires into the nature of beings and entities and the structure of reality. Sheridan thus shows that “rainmaking” is not only an Indigenous knowledge practice but an established anthropological topic that has gone through different interpretations from classical functionalism to current post-human multi-species anthropology. In African conceptions of the world, rain is a personified and gendered entity linked to power and morality. Rain rituals promote fertility, prosperity and health and turn in its postcolonial interpretation into “a metaphor and idiom of political contestation” (Sheridan, 53). Rain is therefore related to social/ecological change and moral personhood, generally conceptualised as anthropocentric but intrinsically relational. As a privileged actant, rain is not made but petitioned by specialists and it represents a model for material and semiotic flows of life. Sheridan mentions one of the few efforts to bring Nyangi rainmakers and professional meteorologists together at the IGAD Climate Prediction and Applications Centre in Nairobi for workshops on predicting rain between 2009 and 2011. While their forecasts coincided, their methods remained incommensurable. Sheridan argues that “[o]ntological and post-humanist questions and methods deserve a place in the theoretical toolbox alongside historical materialist and IKS [Indigenous knowledge systems] approaches to African rain but should not displace them” (*ibid.*).

Werner Nell’s chapter focuses, from a narrative theory perspective, on the perceptions and attitudes concerning nature and climate change among two rural resource-poor communities in South Africa. Their inhabitants are not engaged in agriculture and mainly rely on government grants for subsistence. Nell talks to individuals with leadership roles in these communities, who show a low overall environmental concern and an almost complete lack of notions such as climate change, global warming, or desertification. Drought and aridification are conceptualised as originating from the local community and are “never attributed to large-scale and long-term climatological processes” (Nell, 83). Nell identifies two different anthropocentric and one ecocentric communal narratives about nature. The most prominent one sees nature as unimportant, reduces the natural environment to its utilitarian value, and goes hand in hand with passive attitudes in regard to widespread littering. This passivity is based on “self-disempowerment in the face of litter” and ascribes responsibility to lacking municipal services. Nell relates this attitude to the history of enforced racial segregation and oppression.

Another, less prominent, narrative ascribes intrinsic value to nature in the limited context of gardening and caring for indoor plants. However, due to the scarcity and high costs of water, several interviewees had to abandon gardening, without associating increasing aridity with climate change or global warming. Only a very small third ecocentric group conceptualises nature as intrinsically valuable and tends to act in pro-environmental ways. But they still do not connect

their environmental concerns with climate change. Nell frames ecocentric perceptions as European and argues – in certain agreement with Sheridan – that traditional African worldviews are anthropocentric and “environmental concern tends [...] to be egoistic, or at best altruistic [...], centred on personal and communal well-being” (ibid.). Three factors are identified as contextually important for the perception of nature and attitudes towards it: material and financial status, exposure to nature, and education. For persons with low material and financial status, “the natural environment tend[s] to be [...] unimportant, or constructed in utilitarian terms”. In contrast, ecocentric narratives are associated with comparatively high material status and early guided exposure to nature, through trusted individuals or a group, and tend to be associated with higher education. Nell argues that in the absence of climate change and global warming discourses, the need arises to align these topics with local knowledge and immediate community needs and experiences rather than with abstract scientific notions.

However, the question of distinct climate change epistemologies is by no means restricted to pastoralists, Indigenous knowledge systems, or poor rural populations living on government grants. It is relevant for businesses, cities, NGOs, civil society, and governmental entities at different scales. Patrick Bond and Mary Galvin (this volume) focus on the catastrophic rain-related floods from April 2022 known as the Durban rain bomb. They examine national and municipal as well as civil society epistemologies that came to the fore by way of response. Bond and Galvin attribute the consequences of this catastrophe not just to extreme weather events but also to systemic state failure, corruption, and mismanagement. They identify national and municipal “diversion narratives”, whose “incongruence is itself an epistemology” (Bond and Galvin, 97). This state epistemology highlights the force of climate change and the need for future action in order to divert attention from multiple failures in providing preventative measures, climate-resilient infrastructure, or introducing climate change adaptation programmes. The government makes climate change leadership claims and spins climate action narratives as a smoke screen for corruption, mismanagement, and massive political elite support for fossil energy. Municipal narratives of climate adaptation excellence are just as much of a fig leaf.

Bond and Galvin identify three civil society epistemologies associated with different organisations, their scope, and their supporters. These are the solidaristic emergency, a disaster epistemology focused on disaster relief at the household level, the service delivery failure epistemology making demands at the community and neighbourhood level, and finally, the climate adaptation and mitigation failure epistemology, trying to integrate the first two scales and reach out to the national and global level. As epistemologies are developed through praxis, they reflect the character of the practising organisations and put epistemological limitations on their engagement and scope of action. Social activists and civil initiatives therefore range from charity-based organisations that maintain an explicitly apolitical stance and limit the scope of their operations to providing disaster relief and enabling physical survival, to organisations that work to

cover up the malgovernance and infrastructure shortcomings as the fundamental social dimension of such environmental disasters. Globally oriented, often anti-capitalist movements tend to go beyond blaming the municipality and contribute to climate justice discourses and just transition concepts. They organise protests, environmental impact assessments, and critiques of high-carbon development projects. This last group of organisations also includes South African unions that support just transition.

The authors stress the necessity of creating new knowledges including a climate justice epistemology and looking for “interlocking, overlapping, and mutually reinforcing ways to offer both analysis and action – especially demands for climate reparations and a far-reaching just transition” (Bond and Galvin, 117). Such a reinforcing approach is, however, missing. Instead, we see political rifts and food riots by people displaced by the disaster and met with xenophobia. As long as inequality and extreme climate injustices continue, ‘chaotic outbursts will occur alongside increasingly frequent extreme weather events’, Bond and Galvin predict.

Bond and Galvin are thus in agreement with Nell – even if they put it in quite different terms – that dealing with the climate crisis will have to go hand in hand with resolving extreme poverty and inequality. The perspective on governmental failures and civil society initiatives and protests Bond and Galvin offer also sheds light on the limitations of state-focused global mitigation and adaptation plans in the face of actually existing politics, which are likely to contradict liberal sustainable development plans as described by Rompel (this volume), which aim for “a balance between social responsibility, ecological soundness, political participation, and economic performance” (195).

He argues that international climate change knowledge “does not easily allow for the integration of local knowledge” (Bollig, 43). The international dystopian vision depicts the local pastoral communities as lacking the capacity to react to the changing climate and advocates instruments for education and raising awareness on climate change (*ibid.*). While being framed as victims of climate change pastoralists “have long been masters of drought” (*ibid.*, 29), who developed “highly successful mode(s) of adaptation to an arid climate” (*ibid.*, 46), a competence to be considered by community-based conservation programmes.

Alternative development scenarios discussed in Namibia are the so-called Arid Eden and the Local Autonomy scenario, while the Ministry of Mines and Energy aims to install several large-scale mines powered by a hydroelectric dam with the support of Chinese, Australian, and Canadian mining companies. The Arid Eden Scenario emphasises co-management of natural resources, emerging ecotourism, and trophy hunting markets run by public-private partnerships bringing new forms of investment and income to the region. The Local Autonomy solution is in contrast seen as based on unrealistic expectations as it argues for the right of “pastoralists to arrange their own adaptation strategies”, and urges the state to abstain “from large infrastructural projects, and has a

reorganisation of communal land rights” (Bollig, 44), to give local people the ability to adapt.

Bond and Galvin (this volume) are not the only ones who stress the need for new climate justice epistemologies. Philosopher Steve Vanderheiden (this volume) develops principles for a climate justice epistemology in cases of extreme vulnerability. By acknowledging differentiated vulnerability, African extreme vulnerability is recognised as distinct from that of small islands and atolls. From a corrective justice point of view, vulnerability rather than responsibility has to be differentiated and compensating victims takes precedence over punishing perpetrators. Vanderheiden builds on an understanding of adaptation as vulnerability reduction and an opportunity to enhance the recipients’ agency. At the same time, he notes that this potential is limited by “severely nonideal circumstances” such as non-democratic or ill-functioning governments and the fact that the most vulnerable are generally least able to exercise effective recipient control over such resources.

Treating extreme vulnerability in terms of climate justice implies a multi-layered approach that “starts with mitigating climate change, follows this up with efforts to insulate affected persons and peoples from harm through adaptation, and finally considers compensation, first of lost means and then of ends” (Vanderheiden, 180). It includes the need for developing a prioritarian scheme that gives “greater weight... to the most vulnerable, [...] or perhaps even [...] a veto power over decisions that would affect them adversely” and for directing more resources to extremely vulnerable groups in order “to reduce their vulnerability to a common baseline” (ibid., 174f.).

Territorial loss as a special kind of climate injustice differentiates Southern Africa exposed to increasing heat and drought, from the low-lying and small island states facing the threat of rising sea levels. While losses of land could be “remedied through ... alternative livelihoods”, reactions to lost agricultural productivity may have to include a “global redistribution of access to farmlands” in order to maintain “food systems or basic food security rather than resettling those displaced by inundation” (ibid., 179f.). The right to migrate is thus at stake and states “may be held liable for burdens associated with *in situ* or international resettlement of climate migrants, in proportion to their responsibility” and may become obliged “to accept climate migrants as temporary or permanent residents and/or [grant them] economic or full citizenship rights” (ibid., 180).

It is safe to prognosticate that well-established institutions will have to alter their practices substantially or even vanish, as the attempt at social adaptation to global climate change will impose and require new and rather specific orders. How may such processes of change be administered and structured? Which forms of institutional change are necessary and possible? Not only will societies be threatened in their future existence, but climate change governance will also affect the routines of pre-established politics and increase conflict and competition for material resources and ideological influence. At the same time, adaptation to the new conditions also necessitates the transformation of the dated mentality of (post-)industrialised societies into a new order of things in which ethics of the natural environment are likely to gain prominence.

Dianne Scott and Anna Taylor (this volume) reflect on the role of receptivity in experimental creation of new climate epistemologies through transdisciplinary collaborative processes implemented in the *Future Resilience of African Cities and Lands* (FRACTAL) project. With the example of Southern African cities, they investigate how engagements between decision-makers and scientists may be integrated into urban development decisions and how affective experiences contribute to the development of new urban climate epistemologies across different sectors and scales. The chapter argues that the notion of receptivity, as debated in political philosophy literature, offers a valuable lens through which to better understand the social negotiations and exercising of expanded judgment and agency that is central to addressing climate risks in cities. Receptivity as a concept and the practices of boosting receptivity among urban decision-makers, scientists, and other stakeholders provide an alternative to pursuing the idea that scientific climate information can be inserted into political decisions with the same ease it fits into more quotidian ones. That way the focus is shifted to the actors involved in processes that shape decisions. Receptivity becomes the basis for people to learn to shift their values and perspectives in “messy engagement” between different types of knowledge and readily encounter the frames of reference of others. This leads to the questioning of existing categories, expansion of the project participants’ views, and a shift of epistemology, new ways of knowing, and engagement. Through learning labs, cross-sectoral dialogue, disruption of conventional assumptions, use of performances and serious games, and the expansion of time horizons, new conceptual categories become developed and hybrid meanings emerge. Distinct forms of framing of climate change also play a crucial role in media communication of climate change issues. Gabriel Faimau, Nelson Sello, and Esther Nkhukhu-Orlando (this volume) focus on climate change reporting in Botswana’s print media and identify different thematic frames. Climate change communication studies are available only for a small number of African countries, but reports tend to be internationally framed and focused on political and scientific aspects of climate change largely disconnected from local realities. Climate change reporting in Botswana’s print media, however, deviates from this.

The chapter focuses on the mechanisms of anchoring climate change within well-known sociocultural spheres and objectifying it by transforming it into something perceivable and tangible. Climate change is thereby translated from an abstract scientific idea into everyday language. Prominent strategies employed by Botswana’s journalists include repackaging a global issue, metaphoric framing of climate change, and the representation of local realities. In Botswana’s print media, climate change is framed as a scientific issue reflecting scholarly and expert opinions, and as a policy issue that poses real threats to Botswana and its environment. Last but not least, it is framed as a pragmatic issue, repackaged to reflect the local realities and effects of climate change and challenge strongly held local and popular beliefs and misconceptions. Climate change thus becomes a Botswana issue framed as a “crisis”, a threat and danger that people can easily relate to. It is metaphorically framed as a matter of life

and death to stress urgency and related to familiar crises like AIDS or COVID-19. These strategies are buttressed by images of drought, crop failure, dead animals, and dry dams. As the authors argue, “the unknown climate change becomes known through images that capture and depict the familiar realities of Botswana” (Faimau et al., 161). Another strategy of objectification is individualised communication, involving stories of ordinary people with a strong emotional component in order to optimise the discursive effect of climate change reporting. What this approach accomplishes is a transformation of the abstract into concrete; thus, translated and contextualised, the issue of climate change becomes locally meaningful. The chapter leans in the same direction as Nell’s, as well as Scott and Taylor’s, although it focuses on different contexts, and it calls for a shift in media practices from an informative model of communication to a transformative agenda that focuses on the translation of global discourses for public consumption, as well as for the localisation of various adaptation strategies. This involves, as Faimau et al. (this volume) argue, a communication process in which “the common frames of reference are inserted into the knowledge mapping of climate change” and “the behaviour of individuals and groups is oriented and reoriented towards the urgent nature of the climate change issue” (ibid.).

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Part I

Climate and climate change epistemologies



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1 Drought, disaster, and identity in north-western Namibia in times of global climate change

Michael Bollig

Introduction

Coping with drought conditions has been essential for north-western Namibian pastoral communities. Household wealth and survival have depended on the capacity to cope with climatically induced shocks (Bollig 2006, van Wolputte 2007). Bollig (2006:157–169) sketches recollections of major droughts of the 20th century. These droughts are named and are addressed as vicious agents. “The Drought of the Great Dying has destroyed us” is a framing often heard. Droughts are referred to as *ourumbu*, from the Otjiherero word *rumbu* (yellowish), indicating a world that becomes dry and colourless, shorn of green and devoid of life. Droughts are not thought to be caused by social disharmony (as, for example, among neighbouring communities, see Sullivan 2002, Schnegg 2021) or by divine power (as, for example, among the Maasai, see de Wit 2016). Extensive interviews conducted in the mid-1990s provided evidence of a worldview that saw drought as accidental and without deeper metaphysical cause, a geophysical phenomenon humans had to cope with in order to survive in a landscape that had horrible droughts but also years of copious rainfall.

There is a set of strategies that households apply to respond to drought instantly. Such strategies are meant to ensure the survival of livestock and guarantee human food security. Pastoral mobility is a key drought-response strategy. Biographies and communal history are filled with accounts of drought-induced mobility. Herders deviate from established migratory routes and sometimes drive their herds over several hundred kilometres to access remaining pastures. In order to respond to drought successfully via mobility, a number of preconditions have to be met. Herders need sound knowledge of grazing conditions nearby as well as in distant places. Such knowledge is based on personal experience and extended exploratory walks through the landscape. Herders sometimes walk for days in order to explore the state of grazing grounds in a distant region. They also rely on the news on rain and the resulting grazing conditions through their social networks. When they meet, people exchange news about rain and grazing conditions first and only then talk about other issues. Have rains been soft and persistent over a day or two or have they been abrupt and torrential? Did rains cause brooks to flow and fill pans? How exactly did grasses react to rains, did rains cause valuable

annual grasses to sprout or were they only sufficient for the inferior *Enneapogon desvauxii*? Occasionally, herders even drive their cattle across international borders to the hilly landscapes of south-western Angola. The success of such mobility strategies depends on ready access to pastures. Indeed, there is no fenced, privately owned farmland in the region. Yet, migrating herders have to have permission to use pastures in a place before moving their cattle there, and in order to obtain it, they have to approach local traditional authorities, preferably a local chief. Lately, there have been reports of these traditional authorities occasionally demanding monetary compensation for the permit (Bollig 2020:268–273). Such permits are usually temporary, and herders are asked to leave after a few years in case they have not already left of their own accord. In her PhD thesis (2020), Namibian anthropologist Elsemi Olwage discusses how grazing permits are nowadays a bone of contention leading to conflict within communities. While some mobile herders argue that freedom of movement and temporary open access rules are essential for the success of herding strategies under drought conditions, more sedentary herders bemoan that such kinds of highly opportunistic mobility directly contribute to the degradation of communally used pastures and argue for putting village grazing lands under the control of local traditional authorities. Herders are not only mobile, they are also flexible in managing their herds if sufficient workforce is at hand. If a household has a number of young adults, it splits its household herds into three or four components, adjusting mobility strategies to the specific requirements of, for instance, lactating cows with calves or small stock. Often a household divides into three or more units, moving independently during a drought, thereby increasing the survival rates of livestock. Beyond mobility-related strategies, there are other responses to drought. People have resorted to drought food, such as tubers, berries, and nuts, which have been consistently used during past drought-induced famines. Since the 1980s, drought food delivered by government agencies has become more important and has replaced traditional drought emergency food. While most local strategies directly aim at ensuring herd survival and food security, there are also communal rituals that address drought conditions in a different sense. They are geared towards invoking the benevolence and blessings of ancestors through the sacrifice of cattle and visits to ancestral graves.

Local herders do not only command a range of drought response strategies. In many ways, social institutions are geared towards pastoral resilience. Expansive exchange networks based on the loan of single heads of cattle and entire cattle herds are of crucial significance to ensure that pastoralists have access to livestock if their herds are depleted by drought. Bollig (2006:294–309) shows how such networks are governed by rules and values of kinship. It is especially matrilineal links, relations to maternal uncles and cousins, which are significant in this respect. Coping with drought and uncertainty is also linked to social identities. Biographies are told about the accounts of droughts: droughts are often important turning points in narratives of youth, coming of age, taking responsibility, and growing old. Bodily experiences of drought and expertise in dealing with drought conditions are foundational for and fundamental to pastoral identities.

In summary, drought responses are deeply embedded in the social and cultural fabric.

Since the early 21st century, a new challenge has faced north-western Namibia: global climate change. Owing to a series of very dry years from 2012 to 2021 that caused high livestock mortality rates (Schneegg and Bollig 2014, Inman 2020) and the official proclamation of a national state of emergency (Shikangalah 2020), the vicious effects of climate change are nowadays much discussed, and north-western Namibia seems to have become a hot-spot of climatic change with a projected rise in temperatures of up to 7°C, partial collapse of rain-fed agriculture, and significant changes in vegetation by the second half of the 21st century (Reid et al. 2007). There are now comprehensive government plans that specify how to deal with global climate change (e.g. National Drought Policy of 1997 and the National Policy on Climate Change for Namibia, 2010). Such plans do not take local strategies into account. In fact, reports on vulnerability and responses to climate change diagnose a lack of capacity of rural communities to respond to climate change adequately. There is no mention of local narratives on climatic perturbations and claims of successful adaptation to past drought conditions. Expert opinions, however, are not unchallenged. In a countermove, Himba and Herero pastoralists argue that they have long been masters of drought and that their traditional institutions are weather-hardened adaptations to a challenging climate. Community-based conservation programmes frame the region as the Arid Eden of the continent and argue that a combination of sustainable herd management and conservation and ecotourism would be an apt adaptive strategy (Lendelvo et al. 2018). While the latter response is based on co-management, the former emphasises local autonomy.

I will first give more detail on the local climate regime, recurrent droughts, and recent drought emergencies. I will also introduce projections that deal with the region's climatic future and reflect on them from an anthropological point of view and continue with local representations of past drought responses to show how local herders narrate their dealings with drought. In the third section, I will discuss how governmental reports and scientific climate change adaptation analyses frame local pastoralists as lacking capacity and knowledge to address climate change successfully. It is evident from this discussion that the adaptation-to-climate-change narrative is hegemonic and leaves no space for local engagement. Finally, in the fourth section, I will deal with different local responses to this hegemonic discourse and local attempts to assert interpretative sovereignty.

This chapter is based on many years of fieldwork in the region. During 36 months of participant observation between the mid-1990s and late 2010s, I addressed the question of local perceptions and dealings with drought, and I gathered data on the manifold strategies to react pre-emptively or ad hoc to climatic perturbations. That work was undertaken before global climate change became a hot topic in Namibia. The first in-depth reports on the possible effects of climate change and the ecology and economy of Namibia appeared in the late 2000s (e.g. Reid et al. 2007). Local development initiatives then addressed climate change challenges and sought ways to make the rural economy climate resilient.

I conducted further interviews on the topic throughout the 2010s, and I was able to gather written reports and statements.

What is a drought? Meteorological findings and local concepts

Before going into an analysis of cultural representations of drought, I would like to acquaint the reader with the geo-biophysical characteristics of climatic perturbations in Namibia's arid north-west: The annual precipitation average of north-western Namibia's capital Opuwo is roughly 300 mm. Kamanjab, the place with the longest record of rainfall, experienced 14 droughts in 54 years (25.9%). While around a fourth of all years qualified as drought (a deviation of -20% from the long-term precipitation average), around 10% were classified as major droughts with precipitation less than 30% of the normal amount. The effects of rainfall variability on biomass production are tremendous. Based on comparative literature from West Africa (LeHouerou 1989:108) and my own measurements, I estimated that a 20% reduction in annual rainfall results in an 80% reduction in primary biomass production (Bollig 2006:114).

The 2010s witnessed a series of particularly dry years. The decade started with a severe drought that lasted from 2012 to 2014 (Keja-Kaereho and Tjizu 2019). Conditions then remained extremely dry throughout the decade. In May 2013, and again in 2019, the Namibian government declared a drought emergency and earmarked huge sums for immediate drought relief measures (Shikangalah 2020, Inman et al. 2020). This money was dedicated to relief food but also to the drilling of new boreholes. In a previous publication (Schnegg and Bollig 2014), we attempted to reconstruct the losses of livestock during these drought years. Informants rarely report thirst to be a major cause of death in their herds, indicating instead a lack of adequate grazing, that is, starvation as the major problem. Second, predators, most importantly hyenas, easily attack and kill weakened livestock. Third, illnesses spread and affect weakened animals and humans alike. Inman et al. (2020) report livestock losses for the 2010s from qualitative interviews. They quote herders alleging to have lost major parts of their cattle herds. The Namibia Drought Final Report by the Namibia Red Cross Society includes an account of a cholera outbreak and widespread malnutrition directly connected to drought conditions. Drought-related medical and veterinary problems increased and the drought turned into a complex emergency. While livestock mortality soared, and human malnutrition progressively became an issue, human mortality remained low. Drought-related food aid programmes (Keja-Kaereho and Tjizu 2019), and notably also local agency and experience-based coping strategies, helped to avoid high human mortality.

Multi-annual periods of aridity like the one in the 2010s were numerous during the previous 100 years, with droughts in the 1970s/1980s, the late 1950s, the late 1930s/early 1940s, and the late 1920s/early 1930s shaping biographies and collective memory.

“People have a bone in their neck”: Drought responses and social identities

Droughts make for essential parts of narratives about the past, identities, and personal development. They are crucial events in every herder's life and part and parcel of everyone's biography and shared memories. Important events are placed on a timeline of years of drought, each with a name: was so-and-so born before or after the Drought of Great Dying? Did so-and-so give birth after the year of the Drought of Horse-eating?

Gordon Gibson (1977) collected Himba year names in the 1970s. Those that refer or allude to drought dominate the long list of names Gibson compiled. His work revealed that these names are not *year* names in the strict sense of the word. If a drought lasted for two years, it was still given just one name. Gibson also makes clear that only some names have significance for the entire south-western Angolan/north-western Namibian region, while the majority of names have a more local relevance. I continued to collect drought names that appeared from the 1960s to the 1980s. These drought-related chronologies were valuable ethnographic data, but also an excellent tool to ask further questions: nobody knew his or her exact birth date according to Western chronology, but everybody was certain that he or she was born one or two years after a drought (Table 1.1).

Many named drought years are followed by a year name referring to the end of a particular drought, for example, *Ongoha ya Karasaruvyio*, the Washing of the Drought of Licking the Knife. There are other references to climatic perturbations in year names: a few years from the 1930s to 1950s bear the names of prominent rainmakers hired by Himba to make rain.

Each drought is connected with personal memories and recollections. In the following paragraphs I will quote from local accounts of specific droughts in some detail (see also Bollig 2006; there I reported on drought-related reminiscences at some length; the quotes here summarise some of these accounts).

Kate: “Go and die somewhere else”, the Famine of Chasing away the Hungry, 1941

From January 1941 onwards, severe droughts were reported for Kaokoveld in the communications of administrative staff. Around the middle of the year, reports of mass starvation and heavy losses in livestock came from all over Kaokoveld. Deprived of any trading contacts and prevented from buying or bartering grains by colonial regulations, local herders only had *bushfood* to rely on. A report estimated that 6,000 head of cattle at that time (probably 20%–25% of the total stock in the region) and some 3,000 head of small stock perished. Despite river guards threatening to shoot animals crossing the Kunene, the border river between the then Portuguese West Africa and South African-administered South-West Africa, Angolan Himba tried to escape from their settlements in south-western Angola. The river guards and police officers had no mercy: in March 1941, a herd of 517 cattle was machine-gunned and destroyed at Otjipemba after it had

Table 1.1 A chronology of droughts

Year name	Translation	Year and region
<i>Katambarise</i>	Deny Your Lover; the famine was so severe that men even refused to give food to their lovers.	1889–1891
<i>Ondjara ya Ngumbi</i>	The Famine of Ngumbi; Himba went to Humbe in Ngumbi land to buy grain.	1894–1896
<i>Kaurondu</i>	Place name – many people went there during a very dry year to water cattle.	1907–1908
<i>Ourumbu youtuitji</i>	Drought of Omutati Seed; a year in which people ate the seeds of the omutati (<i>Colophospermum mopane</i>) tree because of hunger.	1910–1911
<i>Omangowi (alternative name of above year)</i>	Fruit of a vine (not identified) that was eaten during this drought year.	1910–1911
<i>Katurombanda</i>	Pounding the Leather Garments; due to severe drought garments made of cattle and sheep skin were pounded, then boiled and finally eaten.	1914–1916
<i>Ourumbu wa seravera</i>	Drought of the Barren Fields.	1931–1932
<i>Kandukemwe</i>	One Milking; cows were milked only once a day because of the drought.	1932–1933
<i>Karasaruwo</i>	Licking the Knife; people licked the knife after cutting meat.	1934–1935
<i>Ourumbu ya Kate</i>	Go Away and Die Somewhere Else; famished people begging for food were told to leave and die elsewhere.	1940–1941
<i>Kariekakambe</i>	Eating the Horse; the famine was so bad that even horses were eaten.	1945–1946
<i>Ourumbu ya Tjisunga</i>	The Drought of Tjisunga; the drought happened during the year the Ngambe chief Tjisunga died.	1950–1951
<i>Ourumbu kOvambo</i>	The Drought of Ovambo; the drought was very bad in neighbouring Ovamboland.	1951–1952
<i>Ourumbu yOmasitu</i>	The Himba Moved the Herds to Omasitu; the tribe drove their cattle to Omasitu in this very dry year.	1952–1953
<i>Ourumbu yOtjimbundu</i>	The Drought of the Tjimbundu Man, a Tjimbundu trader died of starvation during the drought.	1961–1962
<i>Ourumbu yomakutu</i>	The Drought of the Maize Sacks; relief maize was distributed to hungry people.	1958–1959
<i>Ourumbu wonde</i>	The Drought of the Fly; flies beset people during this drought.	1976–1978
<i>Otjiṭa</i>	The Great Dying – about 90% of the cattle succumbed to drought.	1980–1982
	Upon the request to name recent drought years, an elder told me that droughts have become too many; he thought that the high frequency of droughts prevents people from naming years after droughts.	2010s

Source: Gibson (1977) and own data.

crossed “illegally” at Otjomborombonga, fleeing from drought and violence in southern Angola. In September of that year, 727 sheep were culled at Enyandi. Reluctantly, the government decided to provide famine relief food in order to prevent the worst (for a comprehensive description of the drought see Bollig 2006:162–164).

The drought of 1941 is widely portrayed in oral traditions. It is called *Ourumbu ya Kate*, the Drought of Go Away and Die Somewhere Else. Most adults have some recollection of this disaster. Kozombandi Kapika was a young woman when the drought of 1941 started and was in her seventies in 1995 when this interview was recorded.

Kozombandi (K): In the Year of *Kate* we were hungry. Then we were living here in Omuhonga. We moved because of hunger up to Outwa, to Otjinduu. We ate our small stock in the homesteads. Maize had not yet come, in those days we ate small stock only. People ate the animals during the day, the next day the hunger came back and they stayed five days, up to ten days, and they still were tormented by hunger. The next day they decided to slaughter another goat – the people survived like that. People living in Ombuku ate palm nuts. But we were far away from that place and we did not find any palm nuts and we stayed hungry. People ate small stock, that’s it. In that land where we settled in those days there were no palms. But the people ate *omboo* [pieces of wood from the *omukange* tree] and also the roots of young *omikange* trees. Yes the people ate *omboo* in the homestead of the father of Kaunahoni. When you reached the homestead it looked as if people had eaten palm kernels. That *omboo* the people chewed for a long time and then spat it out. [...] But *omboo*, of course, does not satiate anybody. The people chew it to get the liquid, they chewed pieces of fibre and they spat them out. How could this liquid satiate the people?

Interviewer (I): In this year of *Kate*, was it only the livestock that was dying from hunger, or were the people dying too?

K: When people are born they have a bone in their neck. People do not die quickly. If people were things that died quickly, many would have died that year. They would have died in great numbers and would have been completely destroyed.

I: Why was this year called the year of *Kate*?

K: That year was named after somebody who slaughtered a goat in his homestead. Then somebody else came and found him with the meat of that goat. This traveller said to him “let me rest a bit, perhaps my friend will decide to give me a little bit of food”. But that owner of the homestead just said “No, you just go away and die”. He did not want to share his meat with the traveller. He wanted to give it to his own children in order to help them to survive – that’s it.

Kozombandi narrates how emaciated people turned to chewing pieces of *omukange* (*Commiphora africana*) wood as a distraction from the pain of hunger. Famine

became so severe that rules of hospitality were discarded and food was hidden away. With hindsight, this is the most remarkable aspect of that drought. She emphasises the extreme resilience of people. Her emphatic claim, “When people are born they have a bone in their neck” expresses hardiness and determination to pull through.

Kozombandi mentions *omukange* as a drought food. While *omukange* was rarely resorted to, I have recorded abundant data on bushfood that was used habitually during a drought, most notably *ozozeu* (*Cyperus fulgens*) and *omarunga* (*Hyphaene ventricosa*), small tubers and palm nuts. Bollig (2006:195/96) presents a table listing a number of roots, tubers, berries, nuts, and herbs that were used as substitute food during periods of scarcity, which provides evidence of drought-related botanical knowledge.

While knowledge of drought food from the bush is still widespread, such food itself is of limited importance today. Drought aid food, maize, and oil imported into the region and distributed by the government and aid agencies such as the Nambian Red Cross have become much more important since the 1980s. Nevertheless, local knowledge of drought food is still widespread and my Himba informants often prided themselves on it, talking at length about what plants can be eaten during a drought. Today, this in-depth knowledge has the role of a marker of the social identity of an Indigenous community, marking the difference between savvy, drought-hardened survivors, and unknowledgeable outsiders. In contrast to this, spatial mobility has been relevant in the past and is still a relevant coping strategy. The following two accounts highlight the significance of mobility during drought.

Otjita: The Drought of Great Dying

Adverse conditions peaked in 1981, in Himba traditions called the “Year of Great Dying”. The drought had disastrous consequences, including widespread famine and high livestock losses, and it drove people into famine relief camps. A pastoral culture seemed to be on the brink of annihilation. Climatic perturbations were exacerbated by political conflict. PLAN, the armed wing of SWAPO, had stepped up their efforts along the Kunene border. They were alleged to maintain several guerrilla camps in the areas immediately bordering the Kaokoveld in southern Angola to the north. In order to check the advances of the guerrillas, the South African administration established three major military camps in the Kaokoveld in the second half of the 1970s. Paramilitary units (Koevoet), deployed alongside regular army units, recruited heavily among the Himba. Traditions leave little doubt about the severity of the disaster. Within a period of two years, Kaokoveld’s regional herd had been diminished from 110,000 animals to 16,000 cattle – a loss of around 90%. In the following account, a herder remembers his efforts to save some of his animals.

Tako’s migrations during the 1981 drought

[After sketching some preliminary moves of the cattle camp at the beginning of the drought] *I returned to my herds and drove them back to Omuhonga.*

There I stayed with my hunger. I rested until there was nothing left to eat anymore. I asked Vahenuna's father for a big ram which I slaughtered immediately. I ate and ate and ate, I ate with great hunger. That year there was a serious drought. Then I moved again. I left my goats with my mother's younger sister, the mother of Karambongenda. I drove my cattle to Oyomiwore, the next day I set off to Okahamwanda where I settled together with some friends. When the grass was finished we moved on via Oviyere to Okayere and then to the hill of Muzema. We stayed there for some time. But the cattle became too weak to climb the hill. There was still water in the waterhole but the hole was far from where we settled. I wondered what to do. I moved again and migrated to Otjisoko, finally I stayed in Otjitamutenya. I fetched my wife from her mother's place and brought her to Omuhonga. There our newborn died in the midst of the drought. I brought my mourning wife to her father in Omuramba. Then I took off to shift my goats. I slept one night at Ombandaondu, the next day I drove them and I stayed in Ombaka. From Ombaka I went to the camps of my friends who had migrated from Omuhonga. Then it started raining. Our starved cattle died of the sudden cold. I returned to Omuhonga, but cattle still died from the cold brought by the rains. The calves died in great numbers. The women skinned them to take the hides and make them into clothing. They died and only some survived. Nearly all the calves died.

When I returned to my homestead I found that many of my cattle had died. Many more had died in my herd than in the herd of the others. Yes, cattle are like that, some struggle to survive and some just give in and die. I set off again and migrated with all my livestock, goats, cattle, and sheep. I stayed in Oromutati. One night my calves escaped and ran back to the old homestead. One calf was killed by a hyena that night. In that place Oromutati several female cattle died. All pregnant cows had died by now, one cow after the other was skinned. They just died of drought. One cow I lost there, and I never saw it again. Then I sold one heifer and I got some millies and sugar for it on which I lived for some time. [...]

Now the big drought came. I stayed here in Ombuku until oruteni [Oct–Dec.], then I moved beyond that hill to a place called Okomwangwei. There another cow died. Then I divided the goat herd. Some I gave to my sister's son and some I left with another herd of goats. I was all alone as my wife was still with her parents. I had to do everything by myself: I watered the cows and calves and milked the goats. At that time I heard that it had rained in Otjitanga. I tried to move there. The cattle moved well the first day. We slept at Ohamukuta. But the next morning they did not want to get up. However, in the end we arrived at Otjitanga. The rain had not been good and we had to move on, but this time the cattle were too weak and many died. I divided the cattle: the stronger ones I gave to a Tjimba herdsman, the weaker ones I took. Now the cattle started dying all over the country. Entire herds were finished. The people became sad, their hearts were red. And during this disaster the war of Ozoteri made things worse. The remaining cattle fled.

People looked for strayed cattle in the bush around Okangwati. If they saw an animal they just shot it and sold the meat at Okangwati. I decided to climb the hills of Omazorowa with the remaining animals. After we arrived there all my cattle died, one by one, finished. Yes, finished, nothing was left. I said to myself, "Now I

will join the army". I sent a child with the remaining goats to my wife and told her to slaughter one for meat and sell the other ones for maize. I left to join the army. But suddenly the spirit of my mother's brother started to speak to me. And it told me not to join the army. It told me to return. And so I did. I went to Ombuku and took some of the cows I had given to the Tjimba shepherd and some animals which had been lost previously I found in the bush until I had about ten cattle. [...] But the cattle still went on dying. When the cattle died in our land of the Himba, many people went to the town to look for food. A person who died was not mourned anymore. That person was just buried and the people went back to their homes shortly afterwards. They did not stay at the funeral, not even a day. (Tako Hunga, June 1995)

The story highlights the immense importance of spatial mobility, and the herder's enormous endurance and readiness to move. Tirelessly, Tako drives his cattle on, only to save a handful of the animals. He walks for hours and hours, at times resting himself and the herd for one night only. While he occasionally moved together with friends, he usually moved alone.

The second case study portrays the moves of three livestock camps. They moved to south-western Angola together during the 1981 drought. The following account by a woman depicts the hardship of life on the move. Hunger, thirst, and exceptional physical strain are typical of such cattle drives, and women are additionally burdened with childcare – drought survival strategies are deeply gendered and marked by inequality of status and wealth.

Mukakaserari's migrational history in the Year of Dying

In this Year of Dying we migrated from our home to Okarisewandumbu, over there, far away. I was hungry and at that time I had just given birth to Tjihakamo. [H]e was still a very small child that crawled on its knees, he could not stand up yet. When we moved we stayed at Omuru wa Kaarwandu. Along the way Mungerinyeu slaughtered a goat and we slept and we ate.

Yes, the sun was high up, and the thirst was killing us. [...] When we settled we put our loads on the ground and climbed the gorge of Kaarandwa with our children and our metal pots on our backs [...], and we drank water there. [...] We went there, we settled there until we became hungry and Mungerinyeu took a goat from the herd and my husband slaughtered it.

Sacks of maize had not come to these parts of Angola. There had been no sacks of maize since the Portuguese left. [...] We slept there and ate that goat. The next day we stayed at the homestead all day, and the day after we returned to the well, we scooped water, and the next day we moved. We went to Omuseravari. I was so thirsty then, I was near the end. We went to the well and I drank water. I looked at myself. I fell down, I lay down, my hair was dishevelled. We stayed there until evening and then went to an empty homestead. There we stayed. And I slept. That evening we stayed at the place, and Vasongonona's father killed another goat. The people were finished, they just fell asleep near the meat and we did not eat [or] drink milk. The cattle were dry and the calves just died.

There was meat to make us sleep and to make us stay. The next day, Vasongonona's father killed another goat and we stayed the whole day, and we ate and the next day we moved our cattle again. We were on the move and we went to Ongokwa.

Yes, we had tied our hungry stomachs with the big women's belt. We drove our cattle, we drove, we drove, we drove. Then we rested in an old homestead. In the evening the men wanted to slaughter a cow. When they tried to catch the cow, they did not succeed, it just escaped, that's it, the cow just ran away each time they tried, they were very hungry. Finally Mungerinyeu succeeded in catching it. They slaughtered it, skinned it, skinned it, skinned it.

[...]

[T]hey said, "Let us water the cattle at the watering hole of Ongokwa". We were just two women. Tjikuwa and the other one climbed down into the well and helped each other to bring up the water as the well was very deep. We watered the cattle. They were soon out of control and did not listen to commands, they just came towards us. We ran away and the cattle just stampeded to the shallow well. [...] Yes, the two boys had to jump out of the well. They helped us drive the cattle back some distance, and they left us. They went back to the well. When they arrived, the cattle became wild again and started running towards the well with a sound like twaaa. The cattle did that until sunset and we wondered what to do. [...] We slept there, hungry, with empty stomachs of the day. We slept there and it was cold. Look, we did not take our blankets, we had thought we would stay there just during the day and in the evening we would return to our homes. We covered ourselves and the children with our calf-skin clothes.

(Bollig 1997c)

Both recollections intensely reflect on the bodily experience of drought. Hunger and thirst are key experiences, deeply inscribed into memory. They take different experiential forms, such as complete exhaustion, aching bones, and bowels. Perhaps this is what coping with a severe drought is all about in the first place: hunger and thirst and the determination to retain agency and care for children, livestock, and weaker members of the travelling party. Women report that they tighten their leather belts to prevent stomachache. Men slaughter animals and give the meat to their close kin. Another bodily experience related to drought is that of endless walking. In both case histories, people are constantly on the move. They shift their cattle camps much more often than during good years, sometimes on a daily basis, and they move over much longer distances, occasionally into unknown territory. Mukakaserari's account of a cattle drive with small stock and children in tow depicts a journey to southern Angola, which usually involves men and women travelling for days on end with their herds, often moving at night to avoid the hottest hours of the day.

Drought stimulates all senses. Immense dust clouds rising from herds, mooing, and yet more dust at the overcrowded wells. Dust is everywhere, on the body, on the tongue, in the eyes. It has the acrid smell of cow urine that sticks to the garments and the inside of the nose. Especially at a well, large herds create a specific

soundscape: constant mooing, the gulping and gasping of cattle finally drinking from a trough of well water, and the herders' cries. All this racket is in stark contrast with the silence of the night. Days gradually lose their structure as herders often have to get up in the middle of the night to drive their cattle to distant wells or water sources.

The ability to live with these experiences and carry on forms a core part of pastoral identities. The key actors of all three case studies emphasise hardiness and a will to retain agency. Himba drought coping strategies can be considered highly successful in many ways: while livestock mortality rates soar during droughts, loss of human life is extremely rare. Even during the mega-drought of the early 1980s, only a few (if any) people died directly of drought, according to local informants. Himba herders have also successfully retained their pastoral livelihood – after each setback, the herds bounce back, and traditional pastoral life continues.

The accounts of droughts given above reveal that the informants possess a great deal of knowledge about places, the vegetation patterns during drought periods, and the physical reactions of livestock to hunger and thirst. All the accounts quoted here mention a large number of places. In Tako's case, these places are all within a radius of 60 kilometres, while those mentioned in Mukakaserari's story are farther from one another. Her party left their usual grazing grounds and went to southern Angola. She seems to know every bit of the way, as though she moves through a landscape she knows very well. Some of that knowledge may originate from personal experiences. During good times, Himba men and women sometimes go on extended visits to distant kin and walk 100 or 200 kilometres, sometimes even more. In that way, adults gain first-hand knowledge of a large area spanning many hundreds of square kilometres. This knowledge is supported by the popular habit of daily conversations about the terrain, routes, and so on. Visitors are often questioned in detail about the conditions in distant places, the state of the vegetation there, and how much grazing has already taken place. Herders know exactly what kind of vegetation they can still count on during drought periods. Annual grasses make up most of the vegetation and tend to go first in the early stages of a drought. They often do not even sprout during dry periods, and if they do, they grow stunted and wilt before producing seeds, which is why bushy areas are preferred. Of particular importance are river valleys, not so much for the proximity of water, but because of the presence of seed-bearing trees. *Faidherbia albida* trees in the inundation zone of the Kunene River produce seed pods even during a drought, and as livestock rest under the tree, the pods drop gently on them. It is of crucial importance for herders to identify such places. Herders also have in-depth knowledge of how different livestock species act under stress. They often gave accounts of cows that displayed exceptional resilience to food stress, and even asserted that some cows developed true leadership qualities under dire conditions. Cattle are depicted as individual agents, and in accounts of drought-related mobility, it is often the cattle that lead herders to promising pastures and not the other way around. According to local views, cattle also accumulate experience over their lifetime and act on the basis of experiences from past drought periods. The entire herding assemblage, human herders,

livestock, and vegetation are geared towards withstanding climatic perturbations. Physical fitness, mental endurance, knowledge, and experience come together to prepare people for drought.

Living with climate change

While in the 20th century, north-west Namibian pastoralists mastered droughts by ingeniously linking resilience to drought to pastoral livelihood strategies and pastoral identity, contemporary and future climate challenges apparently put their lifestyle in danger.

Future climate projections are unanimous. The *Handbook for Southern Africa* (Davis 2011) predicts a decrease in annual rainfall and increases in temperatures between 1.2°C in the southwest and 2.8°C in the north-east of Namibia (see also David et al. 2013:217 who give slightly different figures and predict an increase of 1°C to 3.5°C in summer, and 1°C to 4°C in winter). The DEA report (DEA 2013) forecasts even more substantial increases of up to 5°C over the next century. Mean summer rainfall “is projected to decrease by around 17 to 23 mm by mid-century and 19 to 40 mm by the end of the century” (Spear et al. 2018:15). However, Spear et al. emphasise that “given inherent and irreducible uncertainties in climate prediction, and with multiple non-climatic factors influencing adaptation decisions [...] ‘climate prediction should not be the central tool to guide adaptation to climate change’” (Spear et al. 2018:17). While these projections pertain to the coming decades of the 21st century, past climatic dynamics are interpreted as evidence for the coming climate crisis.

These projections are customarily backed with a graph showing annual precipitation over the past decades. Inman et al. (2020) show rainfall figures recorded for the town of Opuwo between 1961 and 2019. The trend line of this graph shows a distinct decline in rainfall over the past six decades (Figure 1.1).

The graph is somewhat imperfect, though, as Inman et al. readily admit; there is no data for the years 1976 to 1991, meaning that the major drought of 1981 is left out and also the years 1999 to 2009 are left out, meaning that a decade with ample precipitation is omitted. The omission of the years 1999–2009 contributes most substantially to the decline of the precipitation trend line. If the drought years of the 1980s and the high precipitation years of the 2000s were taken into account, the curve would have more peaks and spikes (see Figure 1.2).

A look at a complete data set tells a different story. The last decade has been disastrous, and the past few years brought record low rainfall years. However, this dismal decade followed a decade with abundant rainfall. This interpretation does not question the trend towards a drier climate induced by global climate change. Instead of a steady decline, though, we see unpredictable peaks and disastrous valleys. Uncertainty about the next rainy season and the short intervals between torrential rains and protracted droughts may be a pertinent characteristic of the decades to come.

Droughts of today, however, are used to develop scenarios of future conditions when, for example, southern Africa is even more beset by a changing climate.

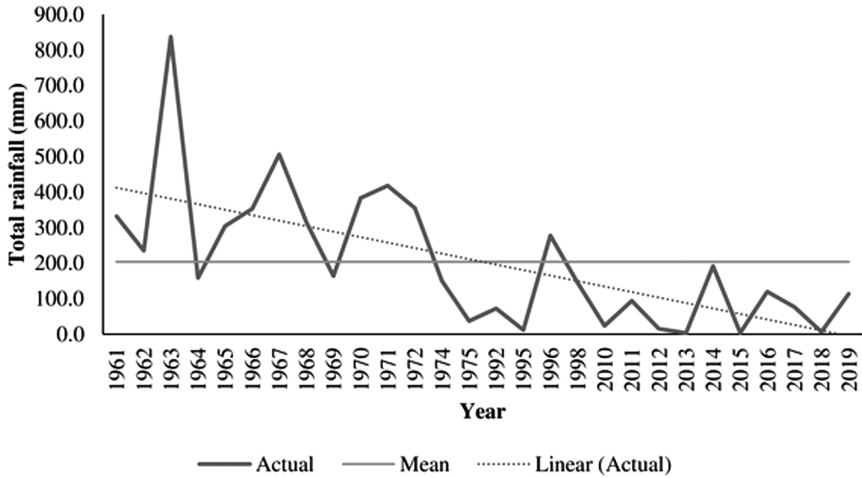


Figure 1.1 Total annual rainfall recorded at Opuwo town, Kunene Region 1961–2019 (source: Inman EN, Hobbs RJ, Tsvuura Z (2020). No safety net in the face of climate change: The case of pastoralists in Kunene Region, Namibia. PLoS ONE 15(9). (Inman et al. add that rainfall data was accessed by the corresponding author from the Namibia Meteorological Service data records in Windhoek on 25 February 2020. No rainfall data are available for the years 1976–1994 and 1999–2009.)

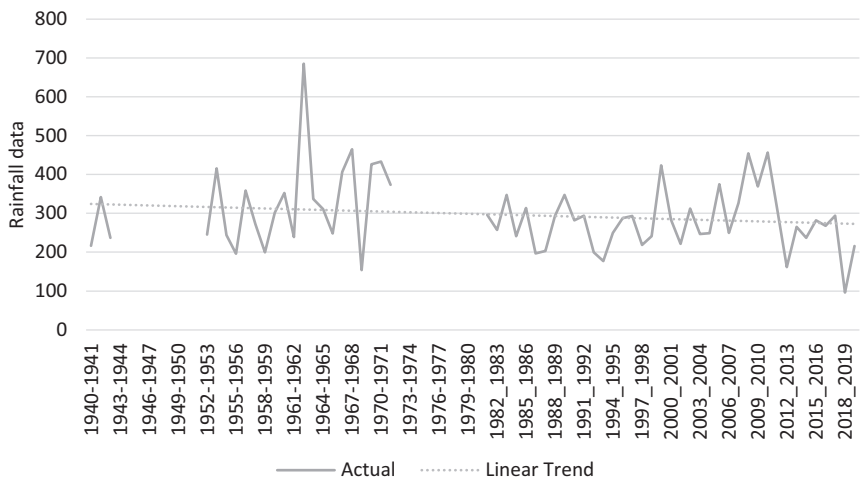


Figure 1.2 A more accurate graph that includes the data from the years missing from Figure 1.1 (source: graph produced by the author).

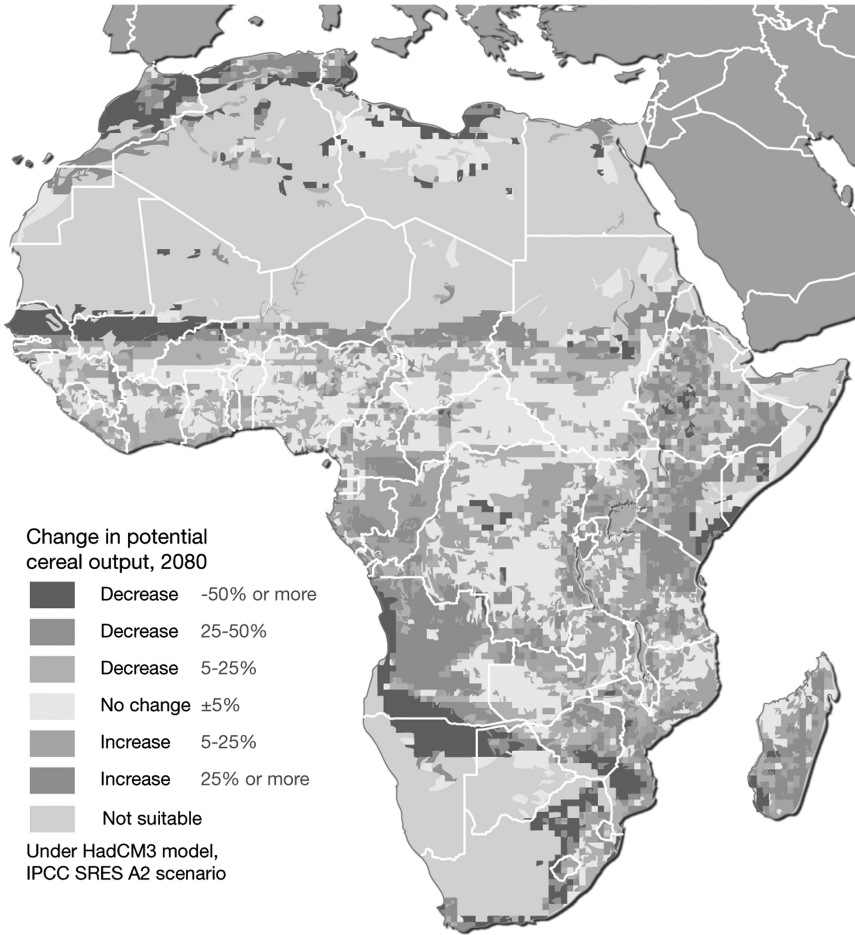


Figure 1.3 UNEP-produced map of projections of changing cereal output (source: open access, <https://reliefweb.int/map/world/africa-change-potential-cereal-output-2080>; the original version is in colour).

Climate projections underline this narrative (see Figure 1.3): the area the Himba inhabit will no longer be arable at all in the second half of the 21st century. Options for animal husbandry will diminish significantly. Figure 1.3 shows projected changes in potential cereal output in 2080. It was prepared for the United National Environment Programme in 2009. It has been used comprehensively since and some pertinent development organisations working in Namibia, such as the German GIZ, have used it on their websites. The map clearly shows that south-western Africa, notably north-western Namibia, is much affected by global climate change and will most likely head towards diminished agricultural outputs.

The map is based on HadCM3, a coupled atmosphere-ocean general circulation model (AOGCM) developed at the Hadley Centre in the United Kingdom. It was one of the major models used in the IPCC Third Assessment Report in 2001. Figure 1.3 shows the continental projection.

Contemporary authors invariably refer to the low adaptive capacities of rural communities in Namibia's north. Inman et al. summarise their results.

Our results suggest that the adaptive capacity of the Himba community is very low. They currently do not have safety nets, and many have already lost their source of livelihood. The environment they depend on for themselves and their livestock is no longer able to sustain them.

(Inman et al. 2020)

They connect their diagnosis to an analysis that points to a high dependence on natural resources, little diversification of livelihoods, and a lack of knowledge of climate change dynamics. Hence, programmes and projects are devised that aim at improving adaptive capacities. David et al. (2013:219) describe the development and application of climate change adaptation toolkits. Community planning tools were developed based on “consultations” with farmers that “aimed at raising awareness on climate change in the regions and to solicit inputs from the local communities/farmers so as to adapt it to the needs in the different regions”. These toolkits do not dig deeply into local experiences. They describe local opinions on declining crop yields and effects on livestock and yield standard solutions such as destocking, use of improved breeds, conservation farming, and “proper planning”, but also the commodification of “biodiversity products” (David et al. 2013:222–225), suggesting that such kind of forward-looking planning is generally not encountered.

People are well aware of global climate change and its potential local impact. Inman et al. (2020) reports that about two-thirds of her respondents in Namibia's north-western Kunene Region had heard of climate change. However, according to Inman et al., many did not find that climate change mattered a lot for their lives, but the recent drought did. They were generally not well-informed about the causes of these global environmental changes. In the verbatim quotes Inman et al. (2020) offer, some informants equated the recent multi-year drought to previous long-term changes in precipitation. Many were of the opinion that it was increasingly difficult to predict drought years via traditional forecasting methods. While the presence or absence of pods on the mopane (*Colophospermum mopane*) or the *Faidherbia albida* tree and the behaviour of birds and insects helped predict weather conditions, they were not reliable predictors anymore.

From an anthropological perspective, two issues are at work here. (1) Global climate change is a highly complex abstract summarising concept of long-term changes in climate and precipitation; this concept is not to be equated with local knowledge of weather conditions. Local knowledge narrativises local observations of the immediate environment, and there are no attempts to systematise or

generalise these observations. International knowledge of climate change, which nowadays permeates all governmental strategies for transforming rural spaces, is hegemonic. It does not easily allow for the integration of local knowledge, hence both types of knowledge should be portrayed separately. Where hybridisation takes place, it is certainly a welcome development, but Inman et al.'s account clearly shows that it does not take place on a grand scale in north-west Namibia. (2) The continued attribution of "weak adaptive capacity" to pastoralists in northern Namibia is puzzling. How can a community that prides itself on having survived so many droughts and attained such deep knowledge of how to act in a drought have a "weak adaptive capacity"? Is the fact that high numbers of livestock perish taken as evidence? If so, it bears pointing out that pastoral systems are attuned to cycles of boom and bust, and the past Himba success at reorganising their pastoral livelihoods and rebuilding their herds has been impressive. Unlike policymakers, anthropologists would not hesitate to describe the Himba as having high adaptive capacity.

Confronted with the fact that they have been characterised as weak and unable to adapt, locals have put forward two models of development that address contemporary challenges. In a recent publication, I refer to an "Arid Eden Scenario" and an "Indigenous Autonomy Scenario" (Bollig 2020). They are not mutually incompatible per se, but they do show some important differences.

Local agency in the face of climate change

Local actors react to these powerful discourses on contemporary droughts, emergencies, and impending climate crises. Locally, two solutions are being vividly discussed. The Arid Eden Scenario emphasises co-management of natural resources and sees a solution to drought-induced problems but also to long-term climate change in a diversification of livelihoods. Local actors in co-managed community-based organisations tap into the emerging ecotourism and trophy-hunting markets. The arid landscape, its wildlife, and its Indigenous communities are marketed and public-private partnerships bring new forms of investment and income to the region. The second solution emphasises local autonomy. Here, the argument is that as long as the state allows pastoralists to arrange their own adaptation strategies, abstains from large infrastructural projects, and encourages a reorganisation of communal land rights, local people will be able to adapt. Local leadership, the capacity to move freely across the landscape and open access to communal pastures are essential. I emphasise two local visions of a future with climate change here. There are other visions: for example, the Namibian Government, especially its Ministry of Mines and Energy, offers an industrialised vision of the Kaokoveld, in which several large-scale mines powered by a giant hydroelectric dam on the Kunene River constitute the future economies. Chinese, Australian, and Canadian mining companies have launched prospecting campaigns. While national stakeholders stress that mining is climate-resilient and that mines will work even under the most dismal drought conditions, these

prospecting initiatives are not met with approval at the local level and I will not discuss them here.

The Arid Eden Scenario entails a narrative that suggests that sustainable and highly resilient social-ecological relations can be achieved despite climate change. Through intelligent co-management of resources and the protection of stretches of land, local communities will benefit from species diversity and high wildlife numbers. Private business partners will be able to invest in and profit from a landscape that can tolerate drought and climate change. The scenario hypothesises a patchy working landscape of conservation (Kremen and Merenlender 2018), where core conservation areas, wildlife corridors, and zones of sustainable pastoral use intermingle. Namibia's Vision 2030 highlights this scenario and sets a target: "healthy, diverse and productive wildlife populations of economically important species on land outside State-owned parks, integrated into economic activities on farmland, and making a significant contribution to the national economy" (Office of the President, Windhoek 2004:153).

The Arid Eden Scenario suggests that sustainable and highly resilient social-ecological relations can be achieved despite climate change, if co-managed local institutions ensure an equitable distribution of costs and benefits, governmental institutions, and – perhaps most importantly – private business partners invest in and profit from a healed landscape (Lendelvo et al. 2018).

The Indigenous Autonomy Scenario takes a different point of departure. In 2012, a group of traditional leaders from the northern Kaokoveld complained to the UN that their rights as an Indigenous minority were being disregarded by the Namibian government. They criticised the government for not consulting them sufficiently on issues related to natural resources. I quote a large part of their statement verbatim as it illustrates their expectations as custodians of the land. They emphatically argue that the negative effects of climate change can only be addressed if pastoral mobility is not inhibited.

**INDIGENOUS HIMBA TAKE FIGHT TO THE UN BY
RICHARD LEE | 28 FEBRUARY 2012. OSISA. OPEN
SOCIETY INITIATIVE FOR SOUTHERN AFRICA**

Our people and we (i.e. the traditional leaders of the Himba, author) strongly object to the state's ruthless interference by the Government of Namibia [...] We are not consulted, included in any decision making processes, nor are we heard when we object. We are therefore the marginalized and oppressed tribe in our country Namibia. [...]

We, the original people of this Kaokoland are semi nomadic people. We are roaming with our cattle, goat, and sheep from place to place. We react to the change of climate in our semi dessert environment, and follow the needs of our livestock and move them to grazing areas that are sufficient for them, especially during dry season. The fencing of our land is therefore not

only a land right issue, and threatening our way of life, but more so a matter of our very survival. **We won't be able to adapt and mitigate the negative effects of climate change when we are no longer able to access and roam freely our land.**

We also face other forms of invasion into our territory by large-scale mining companies which will destroy huge areas of our environment without our free, prior and informed consent. Today, we now also hear that the Government of Namibia wants to build again a dam in our territory, this time in at Baynes Mountains, downstream of Epupa area. But as we have done so in the past, we strongly oppose and object to this. Again, the affected communities and traditional leaders have not been consulted, nor have we been included in any steps of the planning and decision-making levels. We will never give our consent to have our river being blocked, the life in the waters and dependent of it being threatened, and to have our environment being destroyed and our land being taken away from us. [...] We demand that our Kaokoland to be legally recognized by the state as our territory, that we have traditionally occupied and owned for centuries. [...] We insist that the government cease and desist from further interference, manipulations, and disempowerment of our customary tribal ancestral institutions. We demand that our traditional governance structure to be fully respected and our traditional authorities of Kaokoland by the government without delay.

What local leaders demand here from the Namibian Government is nothing less than semi-autonomy founded on ethnic institutions and local forms of authority. The vision of a semi-autonomous Kaokoveld, partially administered by traditional leaders as custodians of Indigenous land, in which resource ownership is held by the local people, is not without precedent. In a court case, the Canadian Cree gained wide autonomy from the Canadian Government and were granted semi-autonomous status, extensive self-administration rights, and rights to manage natural resources (Woons 2013). The Scandinavian Sami enjoy similar legal arrangements, having gained political recognition and substantial rights of self-governance (Henriksen 2008). The confrontation with external mining companies and a government seeking to implement large-scale infrastructural projects may trigger court cases, which will likely proceed along exactly the same lines as the Cree and Sami cases. The future of social-ecological relations in north-western Namibia may also rest on the outcomes of these proceedings.

Conclusion

Our generation will not experience the way climate change will impact the Kaokoveld and its future inhabitants. If projections are correct, the more

detrimental effects of climate change may be felt only in the second half of the 21st century, while the near future may be characterised by increased climatic uncertainty. Climatologists make it perfectly clear that their projections do not entail blueprints for future planning. Indeed, future climate change scenarios differ greatly from one another. The first step in developing these scenarios productively and in a participative manner is to take local experiences with drought seriously. Is it helpful to suggest that “adaptive capacities are low”? What would be taken as evidence here – past mortalities of people, degraded environments, failing livelihoods? Pastoralism in the Kaokoveld has been a highly successful mode of adaptation to an arid climate – in spite of war and colonial suppression, local herders have not only defended their pastoral lifestyle, but developed it further. Adaptive capacities are low if we define well-being, security, and adequacy in certain terms only. Bollig (2020) describes to what extent pastoral wealth has expanded over the past six decades. There certainly was economic growth and pastoral communities have bounced back from drought-inflicted disasters and political turmoil.

Local pastoralists could add a number of pertinent points to a comprehensive climate change adaptation strategy: the demand for greater mobility including migrations across national borders and lifestyles that opt out of consumerism. Indeed, according to a national survey, the pastoralists of the Kaokoveld are the poorest community in Namibia – if a monetary per capita income is taken as the yardstick. If pastoral property is accounted for, they are not poor at all. Pastoralists see themselves as hardy people “with a bone in their neck” – they are resilient and can withstand. Mastering climate change will not be an easy task to accomplish and may demand exactly this kind of hardiness and resilience, rejection of consumerism, and preparedness for mobility to guarantee survival and chances for a life of self-determination.

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2 When rain is a person

Rainmaking, relational persons, and post-human ontologies in sub-Saharan Africa

Michael Sheridan

In one of the earliest published accounts of African rainmaking, the imperialist missionary David Livingstone wrote that it was “one of the most deeply-rooted articles of of faith” in what is now Botswana (1858, p. 23). He presented this as an African “fallacy” and a vast intellectual error, while also cautioning his readers that appearing opposed to rainmaking would be a terrible way for Europeans to gain friends and influence in the region. To illustrate this point, he provides a semi-fictitious dialogue between an African “rain doctor” and a European “medical doctor”. The European patronisingly points out the African’s faulty logic, while the African makes this appeal for intellectual tolerance:

God has given us one little thing, which you know nothing of. He has given us the knowledge of certain medicines by which we can make rain. *We* do not despise those things which you possess, though we are ignorant of them. We don’t understand your book, yet we don’t despise it. *You* ought not to despise our little knowledge, though you are ignorant of it.

(Livingstone 1858, p. 26)

Livingstone’s 19th-century readers probably dismissed this plea out of hand, but it resonates strongly – perhaps even thunderously – with recent efforts in social science to take what non-Western peoples say about the nature of reality, personhood, and the agency of non-human actors very seriously. This scholarship seeks to develop more nuanced ideas of cultural difference and use these views to fundamentally re-imagine how to think about human co-existence with other beings on our planet. As the climate catastrophe looms increasingly larger, these explorations of ontological difference (understood not as mere worldviews, but as fully legitimate ways of being that ultimately constitute alternative worlds) seek to amass the empirical evidence necessary to support a theory of hope.

I first encountered these cloudy issues in East Africa. When I expressed a typically American response to a rainy day, such as “the weather isn’t good”, my friends would quickly intervene by reminding me that “rain [was] a guest, so you must greet it” and that “rain [was] always a blessing”. While studying the social history of sacred groves in Tanzania, I repeatedly heard that clouds get “pulled” up a mountainside to “greet the ancestors” in a sacred grove before dropping their rain

on farmers' fields. When discussing climate change in the North Pare Mountains, many people insisted that "the rain [was] different now" because sacrificial rituals to communicate with lineage ancestors had been abandoned (Sheridan 2012). North Pare farmers reported that gentle and reliable "female rains" had been the norm until recent decades, when violent and stochastic "male rains" had become more common. I heard nearly identical narratives of erratic and gendered rain and moral disorder in 2015 while doing a comparative ethnobotanical project on Tanzania's Mt Kilimanjaro and Mt Oku in western Cameroon (Sheridan 2016, 2023; see also Cleaver 2000). The ethnography of African rainmaking is replete with statements that rain is a sort of person with whom one must build a relationship. For example, in Botswana "rain is a stranger who has his own home" (Schapera 1971, p. 16), while in Kenya "rain is a guest" (Smith 2009, p. 18). I had considered these climate narratives and metaphors to be culture-specific idioms and epistemological statements about social change and knowledge in rain-dependent farming societies. Recent work on rainmaking, personhood, and ontological difference has, however, prompted me to reconsider the significance of rain in Africa. To what degree can rain be considered a social being in African societies, and what might this suggest for climate change adaptation on the continent? What if scholars, planners, and policymakers were less like Livingstone's medical doctor and showed more empathy for indigenous views? And what value could such a perspective hold for the global climate change movement?

This chapter attempts to answer these purposefully provocative questions, first by reviewing recent efforts to integrate African rainmaking and Western scientific meteorology. The second section examines some of the classic ethnographic texts on rainmaking, society, and morality. Next, I summarise African ideas about personhood before exploring the so-called "ontological turn" in anthropology and attempting to apply these perspectives to African rain. The conclusion evaluates the intellectual and institutional benefits of treating African rain as a social relationship with the potential to humanise climate change.

Africa's climate crisis and indigenous knowledge

As the other chapters in this book make clear, climate change is going to hit Africa squarely on the chin. This crisis demands the same sort of transformative regional consensus as the struggle against South African Apartheid (Lawrance 2020). With 57% of its population living in rural areas, it is the world's most agrarian continent (Statistica 2020). Water determines where Africans live and what they do, therefore, the region's long-term demographic and residential patterns are artefacts of rain (Bryceson 1990). Much of this rural population relies on primary ecological production via rain-fed agriculture and agro-pastoralism, so shifting rainfall regimes will further destabilise African economic systems already repeatedly transformed by the slave trade, colonialism, and neoliberal globalisation. The tempo of rural life in much of sub-Saharan Africa is set by the Inter-Tropical Convergence Zone (ITCZ, a low-pressure zone of converging trade winds that migrates north and south with the sun every year), which determines

whether an area has a bimodal (two rainy seasons near the equator) or a unimodal (one rainy season to Africa's north and south) rainfall pattern. The historically accumulated knowledge of what and when farmers plant and how pastoralists decide where to graze their herds is becoming less relevant as the ITCZ becomes increasingly erratic. As Tanzanian farmers often lamented to me, "we used to be able to rely on the rain, but now we're just farming by luck". The increasing variability makes Africa particularly vulnerable because the continent feeds itself largely on maize, which only produces its relatively large yield compared with other crops when it gets adequate water at the right time. In Malawi, for example, maize provides more than half of all calories consumed (McCann 2005, p. 166), so the cycles of flood and drought that loom in Africa's climate future will severely undermine its food security. Farmers across the continent face similar declines in both food and cash crop production (Thornton et al. 2011; Phiiri et al. 2016), while experts predict similar threats to the livestock sector (Rust and Rust 2013). The most recent economic synthesis of the effects of climate change on African economies argues that GDP per capita may decline by up to 15%, while socioeconomic inequalities continue to widen (Baarsch et al. 2020). All of this is projected to happen while more than half of humanity's demographic growth occurs in Africa by 2050 (United Nations 2020). Catastrophe seems imminent, and hope is quickly becoming our scarcest resource.

One strategy for lighting a candle against this impending gloom is to argue that African rainmaking contains nuanced ecological knowledge that could help African societies adapt to shifting climate regimes. Within the "noise" of ritual and symbolic elaboration lies, according to this view, a "signal" with pragmatic instrumental benefits. Typical examples of these indigenous knowledge systems (IKS) that indicate the imminence of a good rainy season include the flowering of particular tree species, bird and insect behaviour, and atmospheric observations (Roncoli et al. 2002; Chang'a et al. 2010; Shaffer and Naiene 2011; Phibion 2013; Chengula and Nyambo 2016; Jiri et al. 2016; Mwiturubani 2017; Iticha and Husen 2019; Makwara 2019; Marango et al. 2019). In North Pare, Tanzania, for example, farmers observe the amount of snow on the peaks of Kilimanjaro, watch for winds from the east and south-southeast, discuss the diffraction of light from particular stars (indicating ice crystals in the upper atmosphere), and examine the flowering and seed production of trees such as *Albizia schimperiana*, *Euphorbia kibwezensis*, *Erythrina abyssinica*, and *Manilkara mochisia*. The most important aspect of these knowledge systems, however, is not their success rate for predicting rain, but the fact that rural farmers trust this knowledge much more than meteorological forecasts. This is not just because the meteorological models are typically macro-scale analyses of air masses compared with the micro-scale ecological nuance of IKS. Localised rain knowledge is more likely to relate to quotidian livelihood concerns, such as the potential for wildfires or elephants invading farmland. The consensus in the IKS literature is that rainmakers possess detailed ecological knowledge that African governments ignore at their peril (Orlove et al. 2009). A critical perspective on this argument would point out that IKS may have instrumental functions, but they are also embedded in social, cultural,

and historical contexts that may be decidedly dysfunctional for some people. North Pare rain experts are consistently elderly men who stand at the apex of rival kin groups in a centuries-long contest of rainmaking efficacy (more on this below), so any attempt to integrate these men into the Tanzanian Meteorological Authority would also enhance political factionalism and patriarchal authority.

There is, however, one recent example of an effort to institutionalise IKS as a complementary meteorological system in Kenya. The Abasiekwe clan of Bunyoro (in Vihiga County in western Kenya) has long been famous for controlling rain. In 1963, the incoming government invited the *omukimba* rainmaker, Musungu Nyangi, to Nairobi to prevent rain from marring the country's independence celebrations (Akong'a 1987, p. 82). Jomo Kenyatta, whose ethnography of the Gikuyu people describes rainmaking and his own experience of getting soaked in the downpour that followed a sacrifice for rain (1965, p. 239), consulted Nyangi in the 1970s on behalf of a nation desperate for rain (Bulimo 2013, p. 39). From 2009 to 2011, the IGAD Climate Prediction and Applications Centre in Nairobi used British and Canadian development funding to bring together Nyangi rainmakers and professional meteorologists (from the University of Nairobi, Maseno University, and the Kenya Meteorological Department) for workshops on predicting rain. In their first meeting, the two groups prepared separate predictions for the "short rains" from October 2009 to January 2010, and found themselves in agreement about the overall timing and intensity of the rain season in western Kenya (Mojon 2009). They then disseminated their consensus forecast, in indigenous languages, via radio news bulletins and in churches and other community institutions (Moore 2010) in order to give farmers the information they needed to decide exactly when to plant and whether to switch to crops that could withstand heavy rains, and this proved successful (Koigi 2016). The scientists even built a meteorological resource centre alongside the Nganyi shrine forest (Ombati 2017, p. 89). This was, however, not simply a Hegelian matter of a rainmaking thesis encountering its scientific antithesis and resulting in a newly hybridised climatological synthesis. The project required delicate negotiations about secrecy, status, respect, and ethics (Guthiga and Newsham 2011). The Nganyi rainmakers considered their sacred knowledge about both IKS and ritual practice to be the private property of elderly clansmen, while some of the target audience of farmers in western Kenya worried that the rainmaking was equivalent to witchcraft and therefore "unchristian". The solution was that the consensus forecasts focused solely on the predictions, not the methods behind them. Maintaining this firewall between the two groups of rain experts meant that important and potentially problematic secrets were kept firmly off-stage. The lesson here is that African rain IKS are not simply an instrumental solution waiting for implementation. They are messy political and social processes that require fine-tuned institutional arrangements to produce effective relationships. It also suggests, as I will discuss below, that the ontological status of rain as a sort of person in Africa may ultimately matter less than the social institutions and relationships through which climate adaptation occurs. That is, if rain is a sort of moral person in African societies, just how important is this?

Rains and reigns in African societies

In Meyer Fortes and E.E. Evans-Pritchards' book *African Political Systems*, one of the founding documents of African studies, rain results from rituals that promote fertility, prosperity, and health (1940, p. 18). The key distinction is whose rituals. In centralised societies, rain and rainmaking relate to the power, legitimacy, and authority of the king or chief. In decentralised "stateless" societies, everyone participates in rain rituals and comes to recognise the linkages between identity, kinship, and territory through them. These two political dynamics correspond to Émile Durkheim's distinction (1900) between rituals and social action that promote organic solidarity (unequal groups in a society expressing their interdependence symbolically) and mechanical solidarity (similar people in a society expressing their shared values and beliefs symbolically). The core assumption in the book, which set the research agenda for African studies until the 1960s, is that cultural practices such as rainmaking exist in order to reinforce the particular structure of a society. This structural-functional perspective is broadly ahistorical, naturalises social order, and explains African cultural systems by reference to their internal connections. Rain is, in brief, a gloss for cultural coherence and continuity.¹

The definitive ethnographic texts about rainmaking from this formative period of African studies are *The Realm of a Rain Queen* (Krige and Krige 1943) and Isaac Schapera's *Rainmaking Rites of Tswana Tribes* (1971). The Krige and Krige volume describes a regional ritual centre in South Africa in which the position of "rain queen" is inherited matrilineally despite the domination of men in a patrilineal land tenure system. The authors demonstrate that everything from farming to children's games interlocks to form a distinctly Lovedu way of life, with rainmaking sitting atop the edifice like the capstone of a pyramid. Schapera provides a detailed examination of "rain medicine" techniques and discourse in Botswana based on fieldwork from 1929 to 1943. The text is more concerned with ethnographic specifics than theoretical generalisation but closes with the observation that no matter what changes colonialism had wrought, the Tswana remained convinced that rain, power, and morality were linked.

The post-colonial view of rainmaking in African studies shifted from this focus on continuities of structure, belief, and practice to address change, process, and dynamics. Instead of treating rain as a building block of social and political order, rain became a metaphor and idiom of political contestation (Southall 1970; Jedrej 1992; Gewald 2001). Wendy James showed how rain discourse expressed a political economy of credit and debt in southern Sudan (1972), and David Lan (1985) and Terrence Ranger (1999) showed how rainmaking and rain shrines formed arenas for political contestation in Zimbabwe's independence struggle. The 1990s literature on rainmaking extended these themes deep into the African past by demonstrating how Senegalese rain shrines shifted from communal rain/fertility sites to more individualised places of wealth and status because of the Atlantic slave trade (Baum 1999), how rainmaking constituted a political contest between missionaries and 19th-century South Africans (Comaroff and

Comaroff 1991, p. 209), and how discourses of rain and “healing or harming the land” informed the ways that Tanzanian “peasant intellectuals” evaluated their experiences in a 20th-century colonial society (Feierman 1990). Instead of being a plank of structural order, rain in these texts is a critical resource and an arena of conflict over land, authority, and legitimacy. The fact that rain connotes prosperity in so many African societies made it an effective foil for change and emergent inequalities. If Durkheim set the agenda for the first phase of African rainmaking scholarship, Marx informed the second.²

The most recent attention to rainmaking in African studies takes a broadly interpretive view that rain and rainmaking are more than the wet paint on the universal human quest for order or our ongoing preoccupation with conflict. Instead of a glistening surface phenomenon, this scholarship treats rain, rainmaking, and rain discourse as the watery pathway to the centre of African cosmologies. The landmark text is Todd Sanders’ *Beyond Bodies* (2008), which argues that the anthropology of rain in Africa has been too focused on instrumental aspects of rain as a means to do things (such as politics and economics) instead of its meanings to African rainmaking peoples. Sanders dives deep into the worldview of Tanzania’s Ihanzu people (who Fortes and Evans-Pritchard would have categorised as “stateless” segmentary lineages) to show that ideas about rain cannot be separated from those about gender and sex. Instead, all are embedded in a broad cosmological commitment to a “universe in which all power comes in masculine and feminine forms” (2008, p. 26). In this case, male and female rainmakers combine their complementary cosmic forces to tap into the “gendered universe” (2008, p. 117) and so recreate fertility and prosperity for the Ihanzu homeland. Yet, he insists, this is not a system of thought that symbolises things and relations. Rain, gender, and power are all practices that the Ihanzu *do*, a sort of performative cosmology, rather than topics that they *think about*. Sanders’s work (see also Sanders 1998, 2003) demonstrates that Africanists cannot decode rainmaking as being “really about” consensus or conflict without losing sight of how Africans make the world meaningful. He also demands that anthropologists stop ignoring or downplaying sex and gender because “African rainmaking is and always has been pregnant, so to speak, with gender, sexual, and fertility motifs” (2008, p. 7).

How do these diverse approaches to a continent-spanning phenomenon relate to personhood? The conceptual linkage comes from recent work in what we may call post-structuralist political ecology. Political ecology began as an interdisciplinary effort to explain both resource management and land degradation by contextualising them in local, regional, and global political-economic structures (Blaikie and Brookfield 1987). Post-structuralist political ecology builds on this generally structuralist Marxian scholarship by insisting that the field addresses both resource struggles and the discourses, narratives, and meanings that constitute those conflicts (Paulson and Gezon 2005). At the centre of this approach lies the insight that the ways in which humans relate to resources always imbricate personhood, political economy, and meanings; otherwise, the notion of “private property” would not make sense or be such a dominant cultural force. The literature on African rainmaking that investigates this nexus of social relations has

tended to focus on how rain discourses and narratives relate to climatological data and shows that talking about rain is rarely far from talking about moral personhood and social/ecological change. In every corner of sub-Saharan Africa, there are examples of farmers pointing to increasing moral decline as the reason for decreasing rainfall (Sullivan 2002 on Namibia; Shaffer and Naiene 2011 on Mozambique; Monson 2012 and Sheridan 2012 on Tanzania; Eguavoen 2013 on Ghana), even when the rainfall data show no clear trend. The issue of what sorts of persons are doing (or not doing) what in which places – in short, the topic of “belonging” – unifies these narratives of natural resources, personal behaviour, and rain.

One of the classic insights in African studies is the idea that property rights in Africa are not relations of people and things. Instead, these are people-people relations about things and are multiple and overlapping/disconnecting “bundles of rights” instead of simple monovalent linkages (Bohannan 1963). Africans, therefore, tend to invest in the social relations that confer rights to resources, and this ongoing process of negotiation is the dominant economic force shaping agrarian change in rural Africa (Berry 1989, 2017). Recent theoretical work in political ecology has contributed the additional insight that “rights” are always about socially legitimised access, and access is always about power. This “theory of access” argues that access is an “ability to benefit from things – including material objects, persons, institutions, and symbols” (Ribot and Peluso 2003, p. 153), which then shifts our vision from “rights” to resources to “bundles of powers”. Rain in Africa is exactly this sort of “bundle” of culturally meaningful notions of power that relate to social struggles, in particular, histories and political economies, which makes “access to rain” such a deeply significant social issue. The best evidence for this assertion is the widespread connection between rainmaking and autochthony in Africa.

One of the general patterns across all of sub-Saharan Africa, which keeps emerging out of socio-cultural and historical distinctiveness like similar knots in a vast regional tapestry, is the connection between first settlement and primary responsibility for the fertility and well-being of the land. In Oku, Cameroon, for example, I heard many stories about how the royal Mbele clan relies on the autochthonous Ntul clan to perform the rituals that “cool the land” (see also Gufler 2009). Similar examples of first settlers making rain on behalf of dominant immigrants can be found in Burkina Faso (Luning 2007), Tanzania (Shetler 2007), and especially Zimbabwe (Mitchell 1961; Lan 1985; Vijfhuizen 1999; and Moore 2005). Access to rain does not, however, always connote simple functional access to legitimate political power. In North Pare, Tanzania, the central debate in local politics (which even shaped who was willing to say what to an inquisitive anthropologist) was whose rainmaking was more legitimate. The autochthonous Wasangi clan had, they claim, settled the mountain first in the 16th century, and so had both primary rainmaking responsibilities and chiefly prerogatives. Both were parts of a “bundle of power” located in sacred groves used for sacrifices to ancestors in initiation ceremonies. The immigrant Wambagha clan (whom the Wasangi had encouraged to settle on their border with a rival chiefdom in the

19th century), however, happened to be famous for their own rainmaking techniques, which were not based in sacred groves. This contradiction led to what the North Pare elders call “Kibonda, the war of rain” in the late 19th century, and this civil war continues to shape local politics, kinship, and friendships today (Sheridan 2009). This is why some North Pare farmers only ask their ancestors for rain secretly, in order to avoid conflict that could affect their reputation and land tenure. The point is that autochthony and legitimate “belonging” are dynamics and struggles, not structural positions, and these continue to matter in new historical contexts (Geschiere and Nyamjoh 2000; Geschiere and Jackson 2006). Even when rainmaking seems irrelevant, or when it is an unperformed ritual instead of a living tradition, rain is often the rope that ties together bundles of rights and powers in Africa.

This review of rain and rainmaking in African societies shows the analytical depth and comparative breadth that the topic allows, as well as the diversity of conclusions that may be drawn. Throughout this section, we have encountered rain as the glue that binds societies together, the wedge that drives them apart, the pathway to deep cosmological meanings, and the connective tissue among issues of belonging, legitimacy, and power. Much of this discussion has concerned the role of rain in defining relations among persons, and its embeddedness in continent-wide patterns of gender/sex/fertility cosmologies and the rights of autochthonous first settlers. But what are we to make of the continent-wide assertion that rain relates to moral order? Does rain have moral personhood in sub-Saharan Africa? Before exploring this argument, in the next section, I review the literature on anthropological approaches to African personhood.

“I am, because we are”: African personhood

The title of this section comes from philosopher John Mbiti’s analysis of how African individuals relate to their groups via religion (1990, p. 106). The core idea, which has become more of a truism in African studies than a topic for empirical investigation, is that African personhood consists of relationships within a social system. A physical metaphor can illustrate how this sort of personhood differs from Western individualism. Imagine a handful of marbles in a box. Each is a separate entity, and they interact by clinking up against other marbles without losing any of their essence. Next, imagine a honeycomb. Each cell in the beehive only exists by being part of other cells; indeed, without each of the six walls it shares with the other cells, a single cell of honeycomb cannot even exist. To be human in such a honeycomb is therefore a shared social relation, not an experience of separateness. Archbishop Desmond Tutu’s insistence that “a person is a person through other persons” (1999, p. 34) has been popularised as *Ubuntu* and “African humanism”, and offers a vision of the common good in contradistinction to the amorality, social disruption, and environmental destruction caused by individualistic Western capitalism (e.g., Mawere 2014). Critical perspectives on this thoroughly hopeful view of relational moral personhood point out that *Ubuntu* has a “dark side”. Its emphasis on conformity can

oppress individual agency (Molefe 2019, p. 319), its neo-traditional normativity can disguise patriarchy (Gouws and van Zyl 2015), and its density of social relations can open people to the risks of jealousy and witchcraft in African societies (Ashforth 2005). Most relevant to this discussion of the status of rain as a sort of person in Africa, however, is the way that these ideas about relational personhood reduce the matter to a binary of African communalism and Western individualism. Marbles and honeycombs only get us so far.

All humans experience both selfhood and moral personhood. The cross-cultural difference lies in varying emphases on the social collectivity and the autonomous unique individual, as well as the culture-specific practices that make that distinction meaningful. Studies of African personhood applied this anthropological dictum differently; British anthropologists examined how individuals fit into structures of rules and roles while their French counterparts adopted a more empathetic approach very similar to the ontological one outlined in the next section (Riesman 1986). For the British, African beliefs were generally wrong in a positivist scientific sense (e.g., human bodies are not *really* composed of other people) but could be explained by reference to their social functions. The French *savoir africain* school, on the other hand, took African ideas seriously and examined their complexity and the internal logical structure. The major point of agreement between these two camps was that African personhood is achieved through life cycle rituals (McIntosh 2018). The issue is not whether someone is a person, but exactly how much of a person they are. Birth, maturation, parenthood, death, and ancestral status rituals punctuate a person's transformation. In Swahili, for example, the term for adult is *mtu mzima*, "a complete person", and such a person is married and working to reproduce society by having children. A person is, in this view, a process instead of a biological entity, a becoming rather than a being. Instead of explaining or interpreting African personhood, scholars have in recent decades shifted to existential and experiential approaches, asking how Africans creatively engage ideas and practices to produce themselves as persons (Jackson and Karp 1990). In brief, process has eclipsed structure. But what sorts of processes of becoming exist in Africa, and what purchase do they offer for understanding rain?

The conventional starting point is Marilyn Strathern's *Gender of the Gift* (1988), which proposes the term "dividual" as a sociocentric complement to the autonomous individual. The African dividual is partible because the walls of this being's honeycomb are each different relations and exchanges with other persons and entities. A sacrifice to an ancestor can bring healing through one facet of the dividual, while a neighbour's jealousy may manifest as witchcraft through another. Partible persons in Africa are therefore permeable and need to work carefully to manage, display, and conceal how their parts interact with the world (Piot 1999; Comaroff and Comaroff 2001; Neumark 2017). Putting this relatively static description into motion leads to the question of how Africans compose themselves from the diverse parts of other porous dividuals in particular historical contexts. The result of this approach is the "composite person" who undertakes the difficult social labour of assembling diverse relationships. From this

actor-orientated perspective, the myths, rituals, and identities that structured personhood for an earlier generation of anthropologists are instead conventionalised strategies for accumulating “wealth in people” (Guyer and Belinga 1995; Goheen 1996; Englund 1999). In North Pare, Tanzania, for example, men sacrifice sugar cane beer to male ancestors in *mpungi* sacred groves to obtain rain and blessings. Viewing this ritual as an action performed by creative dividuals allows us to see the event closer to the way that the people experience it themselves, as a gift exchange between members of a kin group. It also makes the relationships among the ritual participants into a sort of wealth, because the people who sacrifice are likely to help one another in economic, social, and political ways. A cow-horn cup brimming with beer is a tool for composing both a social group and, through them, a composite person.

All of this relates to rain because, as the political ecology of autochthony and rainmaking has shown, rain in Africa is always a critical resource with a particular sociology of access. Resource struggles are also contests of social and cultural meaning in which composite personhood both determines the means and constitutes the ends of the many ways in which Africans relate to the environment (Giles-Vernick 1999). This accounts for the ways that healers/rainmakers in North Pare say that their clans “own” particular rains, yet also zealously guard their ethnobotanical knowledge as wholly individual property. The collective kinship facet of their personhood matters in the rainmaking that “cools the land”, but each of them has different prescriptions for cooling a fever. If rain is indeed a person, then, is it a dividual composed of other persons? Before addressing it with this analytical vocabulary, it is necessary to construct an ontological approach to rain.

Turning ontological

Much like Livingstone’s “rain doctor” responded to colonisation, scholars are now responding to the ongoing climate catastrophe by demanding respect for and validation of African rainmaking ideas, practices, and institutions. Babane and Chauke, for example, suggest that the South African government “should view the issue of rainmaking rituals as reality not myth”, which they insist would be an important step towards empowering indigenous Africans (2015, p. 113). Nhemachema and Mawere press this argument further by identifying climate science as inextricably linked to colonial race science, therefore, the solution to Africa’s climate crisis must include the return of ancestral skulls and sacred rainmaking equipment from Western museums so that Africans may “have effective rain petitioning ceremonies” (2019, p. xx). These calls to take African rainmaking seriously, and as a “way of being” on par with Western meteorology, would find support in the ongoing “ontological turn” in anthropology and allied fields.

The ontological turn is part of a larger “post-humanist” scholarly project that rebuts Western rationalism and positivism in order to create intellectual spaces for non-Western visions of reality, being, and personhood, which may in turn offer new opportunities for thinking about life on earth in the Anthropocene

(e.g., Latour 2017). Three theoretical trends that dominate this effort to envision new “articulations of potentiality” (Wanderer 2018, p. 669) are new materialism, multispecies ethnography, and ontological anthropology (Keleman Saxena et al. 2018). New materialism extends the concept of human agency (the capacity for action) to non-human objects (such as the ways that omega-3 fatty acids can change human brain chemistry; Bennett 2009, p. 42). Multispecies ethnography moves beyond human subjectivity and the typical Western nature/culture dualism to examine other living animal and plant “selves” (such as the ways that mushrooms, to a degree, “want to” thrive on ecological destruction, Tsing 2015). Ontological anthropology is an experimental ethnographic method of using indigenous concepts to rethink what is “real” and what can be said about it (like how the motility of the powder used by Cuban diviners to materialise gods shows what power and divinity are, Holbraad and Pedersen 2017, p. 220). When applied to rain in Africa, these post-humanist perspectives offer new ways to engage rainmaking. The challenge here is not just to follow Malinowski’s injunction that anthropologists “grasp the native’s point of view” (1922, p. 24), but to think and write in a way that lets rain (and other entities) grasp us.

New materialism would examine the agency of rain in Africa by reconsidering what it has the capacity to do. Anyone who has experienced the way a parched, dusty African landscape bursts with greenery and vitality after monsoon rains knows that rain does things. In North Pare, rain does its magic in conjunction with banana plants, irrigation intakes, and sacred groves, so a new materialist perspective would locate these elements as actors in a network. Actor network theory (ANT) is a sort of “material semiotics” (Law 2009, p. 142) that grew from Bruno Latour’s work in science and technology studies (2005). It posits that all entities, from microbes to people to rainstorms, only exist as nodes in networks of relationships. Only relationships exist in actuality, and apparent entities such as raindrops and people only have their distinctive properties as the result of their relationships with other entities. In ANT scholarship, the term “actant” describes anything able to affect other nodes of its network, and a human is just another actant in a wider network (Gershon 2010; Dwiartama and Rosin 2014; Lave 2015). Part of what makes particular actants powerful and indispensable to their networks is their material physicality; a still pond is different from a rushing river, and this difference matters for networks of both fish and fishermen. Furthermore, some actants are “privileged” by their ability to cross networks. Rain is often a privileged actant (as is a rainmaker, of course) in Africa because it brings particular sorts of agency to bear on separate ecological economic, social, and political networks. Rain’s place in African networks extends far beyond ecological and geophysical relations, which is why Robert Mugabe’s government used to censor weather forecasts in Zimbabwe as a way to maintain political legitimacy (Fontein 2016, p. 48). Rain’s slippery evanescence, its downward motion, and variable intensity are, from this point of view, all aspects of its agency to affect its emplacement within networks that are simultaneously material and semiotic.

Although rain is not a species in biological terms, without some relationship to rain, it is very difficult for terrestrial life to exist on our planet. Multispecies

ethnography directs our attention to how meaning emerges from beyond human thought and perception. This “relationalism” involves extending concepts about people – intelligence, thought, communication, and agency – to include non-humans. Eduardo Kohn, for example, identifies an Amazonian rainforest as a “multi-species assemblage” (2013, p. 83), which “thinks” and communicates to both people and its non-human components through ecological processes. The tiny splash of a raindrop falling in the forest is a pre-linguistic “index”, in that it affects the non-human entities in that part of the forest in a semiotic sense even if no one (no human) is there to hear it. Rather than focusing on the Runa people and their forest as a socio-ecological system, Kohn reveals it to be a semiotic-ecological system, with trophic flows of meaning in addition to nutrients and energy. The key piece of ethnographic data is that native Amazonians see people, trees, and animals as sharing a single perspective or essence but differing in terms of what sort of body they have. All of these entities see their immediate contexts as houses and their nutritious drink as manioc beer – so that when one looks at a tree tapping a water source with its roots, one understands that the tree sees itself as being in its home drinking beer. Instead of reality being culturally relative depending on who is looking at it, in this view, reality is naturally relative in that not all thinking persons share the same sorts of bodies and the same world (Heywood 2017). From such a relational and “perspectival” approach, then, the personification of rain in Africa is far from an intellectual error, and is instead an insight into the connectedness of life that both describes rain better than meteorology does and also shows the way for anthropology to achieve a “permanent decolonization of thought” (Viveiros de Castro 2014). In a multispecies approach, recognising rain, seed, soil, farmers, and ancestors as an African assemblage of interdependent actors avoids Western reductionism and brings us closer to the African point of view. It also redefines them (again, relationally) instead of simply placing them in a network (Ogden et al. 2013).

As John Mbiti summarised this perspective long before anthropology’s ontological turn, “African ontology is basically anthropocentric: man is at the very centre of existence” (1990, p. 90). An ontological take on this aphorism would reject any treatment of this statement as a subjective metaphor or cultural idiom for a singular objective reality; instead, such a perspective creates a different world. The “man” at the ontological centre is the relational person described above, with multiple facets and connections to ancestors, descendants, witches, and non-human entities such as rain, not the lonely Western individual. This is not, however, an analytical statement about a distinctly African way of being (which would reproduce racist notions of radical biological/cognitive differences), it is rather a methodological stance from which to ask better questions that challenge absolute concepts and theories (Holbraad and Pedersen 2017, p. 287).³ An ontological analysis of rain would use indigenous African ideas and practices to ask *what rain might be* instead of “already knowing” *what rain is*, and only then locating it in social relations, and then likely asking how rain communicates in African eco-semiotic assemblages.

Post-humanism certainly offers food for thought, but just how nutritious is it? Critics have pointed out that its exciting potential to help scholars rethink just about everything also makes it “a persuasive if unmoored form of speculative futurism” (Bessire and Bond 2014, p. 441). In order to valorise indigenous alterity as a response to the multiple crises that life on our planet faces, it flattens different sorts of difference to a problematic binary of a coherent Western/objective modernity and an Other/subjective traditionalism. It is unprepared to account for the hybridity, contradiction, and structural asymmetries of power relations in both hierarchical societies and the contemporary global system (Corona 2020). As a sort of extreme philosophical idealism, post-humanism is a culturally conservative set of ideas that amplifies a respect for otherness into an ethical imperative of absolute cultural relativism (“thou shalt not judge the ontologically different”), which in turn undermines the potential for comparison (Graeber 2015).⁴ What if, these critics ask, what appears to be a stable way of being-in-the-world is itself the product of struggle among unequal social actors through transformative historical dynamics not of their making? What if rain discourse in North Pare is a fading hegemonic vision of male access to and control over both material and symbolic resources, articulated in counterpoint to social and political transformations of colonial and post-colonial Tanzania? Would treating rain as “ontological” make feminist political ecology questions about gender hierarchies unaskable? Is the ontological concern with “being” even appropriate for African concerns for “becoming”? The next section is an admittedly clumsy attempt to thread a post-humanist needle and still stitch together an assessment of how the personhood of rain in Africa holds value beyond the theoretical avant-garde.

Rain as a person

In Isaac Schapera’s classic text on rainmaking in Botswana, he describes a ritual for “cleansing the land” in order to prepare it for rain. Adolescent boys took special canes and cow horns full of rain medicine to the boundaries of the Kgatla homeland, dug holes, poured in the medicine, and beat the ground with the canes shouting “pula, pula!” (rain, rain!) before returning without speaking to or accepting gifts from anyone (1971, p. 76). It was absolutely necessary for these boys to be virgins. Sofonia Poonyane, who participated in this ritual in 1926, told Schapera how the elders lined the boys up and interrogated them:

Do you affirm that you have not yet slept with any girl? If you lie, it’s at your peril, and you will also make the tribe suffer, because we won’t get rain and so the plants will be unable to grow.

(1971, p. 79)

In particularly severe droughts, a cohort of virginal girls “sprinkled the fields” with rain medicine as well. Far away in Tanzania, clan elders (men who, by definition, had already become grandfathers) made rain by sprinkling consecrated water with the help of virginal boys. Next, the elders would prepare a green

mixture of sugar cane beer, the contents of a sheep's stomach (its rumen), and leaves of trees from a sacred grove, which an especially dark-skinned initiated (but unmarried) boy then placed – silently – at the boundaries of each farm in the area. For the next four days, no one could touch the earth with anything metal, and then, I was told repeatedly, it rained. What are we to make of these long-distance linkages between prepubescent sexuality, life-cycle phases, territoriality, and rain? The concept of relational personhood and the post-humanist perspectives described above may offer some purchase on this slippery question, particularly when linked to a political ecology framework.

Unlike Sanders' case study of gender complementarity in Ihanzu rainmaking (2008), rain matters about 300 kilometres to the east in North Pare are distinctly patriarchal and contentious. In 2004, I interviewed 40 elderly women about rainmaking. In all of these separate interviews, the women said that rain was unquestionably "men's business". As one woman summarised how North Pare women viewed rainmaking in the 1930s, "We saw these things not as politics, but as truth, because when a sacrifice was done, the rain would fall". The women did, however, disagree about who made the "best rain". Women who had married into the Wasangi clan (and its allies) asserted that these rainmakers' management of the October–December "short rains" (*Vuri* in the Chasu language) was more important for both agriculture and political authority than the Wambagha clan's control of the March–June "long rains" (*Ishika*); women married into the Wambagha clan said the opposite. The agronomic significance of rain was also changing in the period these women described. The *Vuri* rains were most important for the banana-based farming system in the densely settled highlands, while maize and cotton farming were most successful during *Ishika* in the warm lowlands to the east. And it was during the British colonial period that Pare farmers began to cultivate the lowlands in earnest for both food security and cash crops while the colonial administration installed Wambagha leaders as chiefs for the entire district. *Ishika* rains in the lowlands therefore became economically significant while *Ishika* rainmaking became politically significant. A superficial ontological approach ("it's all real") is a poor fit for this deeply unequal political and ecological scenario because women were doing around 85% of all labour in a colonial farming society marked by a strongly patrilineal land tenure system and high rates of male labour migration. There may have been a shared ontological understanding that rain was a deeply political matter, but conflict over whose rain meant what continues to shape politics in North Pare. A better framework for understanding this struggle over the symbols that legitimise access to material and social resources is envisioning rainmaking as competing ideologies battling for hegemony in shifting historical contexts (Sheridan 2012). As Holbraad and Pedersen (2017) suggest, then, turning to ontology requires more methodological depth.

A post-humanist perspective on rain demands that we begin with the material properties of rain and persons and then consider how these illuminate ethnographic evidence. African rain comes and goes. It contains both potential fertility and threatening erosion or flood, and it requires orderly moral and social

exchange relationships. Fundamentally, however, rain falls and flows. Farmers in North Pare are very clear that the way that rain falls is just as important as the amount. One man in his eighties explained that “a male rain has strong winds, hot sun, or is just simply dry male weather with the rain blocked; a female rain is *manyunyu* light rain and *ishinja* heavy mist and it moves gently and slowly”. What is significant about such statements is that in North Pare rain is not experienced as material wetness first and then thought about as gendered meanings second. As Joost Fontein argues in his new materialist and social history of a man-made lake in Zimbabwe, matter and meaning interact with imagination and perception when people encounter water in Africa (2015, p. 100). Rain is not “like” masculinity and femininity; instead, as in Sanders’ account of male and female rains in Ihanzu (2008, p. 115), getting wet in North Pare is a direct experience of a gendered cosmos. This is the first way that rain is a sort of gendered composite person in the area. The second concerns how both rain and human bodies participate in a general process of flowing vitality.

Like wet/dry and cool/hot, flowing/blocked is a key symbolic contrast that is widely distributed in sub-Saharan Africa. A post-humanist approach takes this knot of significance as linked to the material properties of the substances involved in a relational person’s sense of being in a world constituted by such contrasts. Matters of flow and blockage are scattered around the Africanist ethnographic corpus, sparkling like the glints of morning sunshine on a field of dewy grass. From Tempels’ overly broad generalisations about *La philosophie bantoue* (1949) to Devisch’s linkage of dance, weaving, and the gendered division of labour among the Yaka of Congo DRC (1993), scholars have repeatedly emphasised the concept of a “vital flow” that interconnects African beings and objects, and the resulting need for the closure, containment, and regulation of flows of fertility, wealth, and prosperity. The focus on the role of prepubescent children in rainmaking discussed earlier could, from this perspective, be interpreted as an issue of how flows of rain relate to flows of bodily fluids. Maurice Bloch boiled down the Malagasy version of this ontological paradigm to this formula:

[F]ertility is... the result of a blessing from the ancestors via the elders, a blessing which is achieved by containing the vitality of nature symbolized by water and the unknown owners of the land, in a container fashioned by men of authority, elders or kings.

(2020, p. 131)

Flow and blockage are therefore matters of power (and who has it), as studies of how these concepts relate to indigenous irrigation management (Sheridan 2002), witchcraft accusations and witch eradication (Feldman-Savelsberg 1999; Smith 2005; Geschiere 2013, p. 94), the ritual labours of kings (Chilver 1990; Warnier 2007), and the 1994 Rwandan genocide (Taylor 1999) demonstrate. Beyond these power-saturated social dramas, the work of maintaining vital flows can also involve mundane quotidian affairs. If you sit or stand in the doorway of a house

in western Kenya, for example, you may be asked to move so as not to “block the life” of the house (Ruel 1993, p. 108).

Recent phenomenological ethnographies of East Africa offer rich material for contextualising these material and semiotic flows of life and vitality. Paul Geissler and Ruth Prince’s account of how the Luo people of western Kenya perceive and experience land scarcity and HIV/AIDS describes how the material properties of water relate to other equally vital flows (2010, p. 113ff). To have a “proper” home, a young Luo man should build downhill from his father, which allows both rainwater and social relations to flow downhill to ensure ecological and social growth. The material generational linkages of blood and milk therefore flow downhill just like rain unless they are “blocked” by anomalous social conditions like widowhood or actions like witchcraft. Relating to this concern for movement, the gate of a Luo homestead and the door of its house receive particular ritualised attention because they direct the vital flows. A house is a sort of container from which life pours forth into an assemblage of material substances and relations of kinship that ultimately drain into Lake Victoria. Keeping the life flowing, in turn, requires a series of complementary gender actions, such as a husband making a fire and a wife cooking the porridge before having sex. The house, the cooking pot, the bed, and the womb are all containers through which life flows. To apply some post-humanist vocabulary to these people and objects, they are all relational persons and things that engage one another through acts of opening and transformation to produce a distinctly Luo assemblage and world of containment, life, and movement.

Knut Myhre’s ethnography of how the Chagga concept of *horu* (which he translates as “life-force”) permeates nearly every aspect of life on Tanzania’s Mt Kilimanjaro uses a rainmaking ritual as its core framing device (2017). The book begins and ends with an account of a 2008 sacrificial ritual for “returning life” to the ancestors in order to invite them to reciprocate with rain, and each chapter relies on indigenous concepts to drive the analyses of settlement, kinship, death, and rainmaking. Throughout the text, Myhre focuses on how houses and doors act as conduits for transformations and transfers of life-force, and in doing so are themselves social agents that attract and extract persons and things in a vast “relational matrix” of flowing vitality (2017, p. 116). These architectural conduits correspond both materially and semiotically with human bodily conduits such as backbones and throats, and plant parts like roots and flowers. This explains, for example, why a neighbour’s illicit sex act in one’s banana garden (a place without doors!) requires a ritual to restore the flow of *horu* that makes the bananas nutritious (2017, p. 98). With this understanding of how powerful fluids like blood, milk, semen, banana juice, the chyme from a sheep’s stomach, and rain all flow up and down Kilimanjaro’s slopes, Myhre helps the reader to interpret the meteorological information in a sacrificial sheep’s intestines and why *horu* must flow down so that rain may flow up. Rain on Kilimanjaro is, then, a specific form of the life-force that permeates relational persons and composite things, and this is what makes the flow of rain correspond with flows of blood, milk, and kinship. Finally, because rain is as much of a relational being as a person is, the exchanges

that bring rain tap into the same vital flows as the exchanges that bring people from one house into another at marriage, call new life into the world at birth, and “return life” to the ancestors at death. Again, indigenous analytical concepts combined with the material properties of relational persons and things precipitate new insights into rain in East Africa.

These examples of how rain flows alongside other fluids and forces suggest that African rain is person-like in that it is co-present with humans in a shared circulation of vitality and potency. Like the elders and ancestors who have primary access to these vital flows and are responsible for directing it, rain is amenable to becoming enmeshed in webs of reciprocity. As Nhemachema and Mawere (2019) noted, African rain is usually “petitioned” through gift exchanges instead of “made”. And much like the ways that houses contain social relations, crops contain nutrition, and human bodies contain fertility, clouds contain the (relational) personal power of rain. The relational personhood of rain is not, however, a tidy example of an “authentic African ontology”. Many ontological studies of the mutuality between humans and non-human actors focus on shared and respectful states of being, such as the concept of “shared breath” that hunter-gatherer societies in both North America and Europe use to articulate the ways that humans and non-humans share the same air (Siragusa et al. 2020). Contemporary Africanist scholarship on material properties, resource access, social connection, and personhood all focus on flowing processes, not objects or essences. An African version of ontological investigation methods would likely draw its own vital force from *becoming* rather than *being*. That is, the issue of “what rain is” matters less than “what rain becomes” in Africa. The term “rain-making” is therefore inappropriate because rain is always a relationship in Africa, never a thing being produced.

Conclusions

This exploration of the personhood of rain in Africa has attempted to show some of the benefits of taking rainmaking seriously. The argument required some redefinitions of “rain” and “person” and a reconsideration of rain as a thing that is “made” in order to ground it in African understandings and practices. The general theme of each section was that a dynamic and processual approach to material substances, the political ecology of rain, and relational and gendered non-human persons offered more insight into rainmaking than simple structural binaries like real/imaginary, modern/traditional, and person/thing. African rain stands revealed as a very specific sort of the “metaphysics of the mundane” (Shipton 1994), in which gendered rains interact with the living and the dead through gift exchanges and patron-client interdependencies. The material properties of rain engage the semiotics of shared vital flows, yet this vision of streaming life and prosperity does not reduce down to social and ecological harmony. Even when rainmaking is a gender-complementary process rather than patriarchal matters of domination, gender and social differences are fundamental aspects. Without a feminist political ecology of rainmaking, it is difficult to account for the ways that access to rainmaking

corresponds to asymmetries of land tenure, labour, and status. In African rainmaking, the micropolitical issues of exactly whose rope is binding together the “bundle of powers” that confer access, and the nature of contestation over whose bundle counts and to what ends, cannot be analytically deferred as side effects of cosmologies, states of being, and processes of becoming. Ontological and post-humanist questions and methods deserve a place in the theoretical toolbox alongside historical materialist and IKS approaches to African rain but should not displace them.

But what new opportunities does such a perspective on rain offer for African policymakers, climate activists, farmers, and their allies? Does the porousness of composite persons in Africa hold water? The relational personhood of rain rebuts the idea that it is difficult for humans to have personal relationships with climate change because the issue is just too abstract or too complex. African rain matters link climate change to the ways people feel and think about their bodies and their relationships. Highly motivational and emotive connections to climate are already widespread in Africa through rainmaking and could be activated and stitched together by some visionary activists to ground climate adaptation in African social and cultural contexts. At a broader level, however, the personhood of African rain begs the question of why more people do not experience the wetness of rain on their faces in such compelling and meaningful ways. Climate activism would look very different if it could forge some ontological and post-human connections among people and things as relational persons sharing copresence and a shared experience of the circulation of life on earth. It would also draw equally on science and faith, substance and meaning, and being and becoming as it prompts humanity to focus on vital flows as a civilisational imperative.

This exploration of African rainmaking suggests that aspirational rhetoric, while possibly useful for setting goals, may fall short without attention to institutions (Agrawal 2010). The example of the Kenyan Nyangi rainmakers’ collaboration with meteorologists described previously shows that relationships of mutual respect may require consensus-building institutional arrangements and conflict-settlement mechanisms more than an appreciation of indigenous knowledge systems and vital flows of fertility and prosperity among relational persons and things. The issues raised by African rainmaking also offer some transformational challenges and opportunities for African climate adaptation institutions. Networks of rainmakers and meteorologists could, for example, strive for women’s representation in weather prediction. Activists could incorporate the issues of moral order and the politics of autochthonous belonging that shape rural Africans’ perceptions and experiences of climate change in project proposals. Weather forecasters could refer to the life-force of rain in the same breath as isobars and the El Niño phenomenon. African rainmaking can, in sum, be a place to stand while looking forward creatively instead of a parochial vision of the past.

Notes

- 1 Generally, consensus-orientated accounts of rainmaking as a mechanism for producing solidarity include Wilson 1951; Kimambo and Omari 1972; Jacobson-Widding 1990; Mbiti 1991, p. 160ff; and de Beer 1999.

- 2 Generally, conflict-orientated accounts of rainmaking as arenas of contestation include Larson 1978; van Binsbergen 1981; Packard 1981; Landau 1993; Håkansson 1998; Pels 2002; Probst 2002; Håkansson 2003; Makuvaza 2008; Watson 2009; and Hutchinson and Pendle 2015.
- 3 Accordingly, the ontological turn emphasises “ontological” as a modifier (“ontological process”, “ontological difference”, etc.), never as a reifying noun (“the African ontology”, “a farmer ontology”, etc.). The ontological turn is about modes of analysis, not forms of reality (Holbraad and Pedersen 2017, p. 176). Therefore, it is better to speak of “the ontological aspects of rain in Africa” instead of “the African rain ontology”.
- 4 It is perhaps worth noting that David Graeber’s critique of the ontological turn was prompted by African rain matters. Eduardo Viveiros de Castro (2015, p. 12) criticised how Graeber had once characterised a rain charm as being unable to “really prevent hail from falling on anyone’s crops” in Madagascar (Graeber 2005, p. 430). Viveiros de Castro suggested that Graeber had simplified indigenous thought to an intellectual error that only Marxist dialectical materialism could correct; Graeber responded that everyone, African farmers and social theorists alike, struggles to comprehend a diverse reality that is never fully understandable (2015, p. 30).

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3 Environmental attitudes and narratives in two rural South African communities

Implications for intervention

Werner Nell

Introduction

Understanding perceptions and attitudes related to the natural environment is commonly regarded as a prerequisite when designing and implementing evidence-based interventions aimed at promoting pro-environmental behaviour among specific social subgroups (Ogunbode, 2013; Mtutu and Thondhlana, 2016; Rapholo and Makia, 2020). However, while significant research on this topic has been conducted in a variety of international contexts, given that such attitudes exhibit significant cross-cultural variability (Schultz, 2002; Ogunbode, 2013), it remains necessary to better understand nature and climate-related perceptions and attitudes among rural communities in sub-Saharan Africa (Ogunbode, 2013; Steynor and Pasquini, 2019) that have been found to be both highly vulnerable to and disproportionately affected by climate variability and change (IPCC, 2014). To address this gap, a narratively orientated qualitative study was undertaken to investigate environmental attitudes and narratives about nature among 25 purposively selected participants in two rural South African communities. Narrative analysis was employed to identify prevailing attitudes about nature in these communities and to subsequently outline a number of practical implications for contextually appropriate pro-environmental interventions.

Environmental attitudes and perceptions in an African context

Within the field of environmental psychology, people's perceptions of nature and their associated behavioural intentions have been conceptualised as environmental attitudes (EAs), which are defined as the set of beliefs, values, impressions, and behavioural intentions that an individual holds about environmentally related activities or issues (Schultz, 2002), and which have been shown to be important determinants of ecological behaviours (Ogunbode, 2013). While some conceptualise EAs as a unidimensional construct that ranges from being completely *unconcerned* to *concerned* about the natural environment (Dunlap and Jones, 2003), Milfont et al. (2010) have shown that ecological values can be described by an individual's position on two orthogonal dimensions. The first, termed *preservation*, which aligns with Schultz's (2002) *biospheric* concern, is a biocentric

dimension that reflects concern in relation to conservation and protection of the environment. The second is an anthropocentric dimension, termed *utilisation*, which aligns with Schultz's (2002) *egoistic* and *altruistic* environmental concern, and reflects an individual's perceptions, attitudes, and values in relation to the utilisation of natural resources for personal or collective benefit.

Another theoretical framework that has particular value in making sense of perceptions and attitudes related to the natural environment is narrative theory. In particular, in line with the assumptions of interpretivist epistemology (Goduka, 2012), social scientists working from narrative perspectives point out that perception, meaning-making, and social interaction are intertwined processes that not only reflect but shape social reality. According to narrative theorists, telling stories is a natural way to structure, make sense of, understand, justify, and explain our own and others' identities, behaviours, experiences, and place in the world. Narratives reflect and reinforce social identities and prompt actions that are concordant with the narrative in question (Polkinghorne, 1995; Ezzy, 1998; Murray, 2000; Riessman, 2008). Narrative theorists would regard perceptions and attitudes towards nature as being constructed and reflected via local stories, which, in turn, draw on and are embedded in wider societal narratives or discourses (Murray, 2000, 2003, 2018). The salience of this perspective is underscored by the fact that narratives embed and reflect sociocultural norms and values, which, although they are highly important determinants of risk perceptions related to environmental factors such as climate change, have been understudied in African contexts (Ogunbode, 2013; Steynor and Pasquini, 2019).

As such, from this perspective, environmental attitudes and behaviours could potentially be better understood, contextualised, and addressed by studying environmental narratives. Furthermore, environmental behaviour could be changed by directly focusing on narratively based perceptions about nature and the ways in which perceptions are socially constructed and transmitted. That such a need exists is clear from the barrage of eco-crises affecting humankind. These stem to a large extent from population growth, human behavioural practices, and increased unsustainable consumption, and range from deforestation and desertification, with concomitant habitat and species loss, to pollution, global warming, climate change, and a host of other crises (IPCC, 2014). Many of these problems particularly affect the African continent, which has been found to be highly vulnerable to climate variability and climate change, as well as disproportionately and increasingly affected by these phenomena (Schultz, 2002; IPCC, 2014; Chikosi et al., 2019). Furthermore, the predominantly quantitative studies that have been undertaken on the topic indicate that environmental concern in African, and in particular South African contexts, tends to be very low, or at best motivated by egoistic or anthropocentric considerations (Craffert and Willers, 1994; Struwig, 2010; Franzen and Vogl, 2013; Ogunbode, 2013; Munyati and Drummond, 2020). An urgent need has been identified to address such climate and environmental challenges in ways that are appropriate to African contexts (Ogunbode, 2013; Steynor and Pasquini, 2019; Tyler and Cohen, 2020). While a number of approaches and policies to these ends have been proposed, most of

these have been developed within predominantly Western contexts, and as such, carry with them embedded assumptions, worldviews, and discursive elements that are associated with various Western and predominantly positivist values and ideological positions (Tyler and Cohen, 2020). A need has been identified for approaches that privilege Indigenous knowledge and offer an interpretation of how the local world works through a particular cultural perspective (Goduka, 2012; Rapholo and Makia, 2020). Hewitson et al. (2017) point out that the contextual nuances that characterise developing countries are commonly either not fully considered or are dismissed as inconsequential for the uptake of information or interventions. However, as Ogunbode (2013) and Steynor and Pasquini (2019) argue, such assumptions are flawed as interventional outreach has been shown to have greater utility and effectiveness when it is congruent and resonates with prevailing contextual realities and values. In order to address environmental problems within underdeveloped Southern African contexts adequately, it is necessary first to gain a clearer understanding of EAs held by those living in such contexts. Framed in terms of narrative theory, the need exists to understand the narratives about the environment in these contexts, and how these in turn drive environmental behaviour. Comparatively little qualitative research has been conducted on contemporary EAs in sub-Saharan Africa (Ogunbode, 2013; Chikosi et al., 2019; Steynor and Pasquini, 2019). Furthermore, most existing studies on the topic focus on local communities that rely on subsistence farming and thus naturally tend to be more attuned to their natural environments (e.g. Chikosi et al., 2019; Rapholo and Makia, 2020), which do not reflect the realities that prevail in many resource-poor rural South African communities where residents mainly rely on government grants, rather than agriculture, for subsistence (Stats-SA, 2011). Thus, a gap exists in our understanding of these phenomena, which the present study aims to address by qualitatively exploring perceptions and attitudes about nature among residents of two non-agriculturally orientated rural South African communities by means of a narrative approach.

Study area

The communities involved in this study are situated in a semi-arid part of central South Africa, in the Northern Cape and Free State Provinces (Figure 3.1). The region is dedicated predominantly to large-scale commercial agriculture (especially game and wine farming). It is further characterised by high biodiversity, and the proximity of a national park, the Mokala National Park, created after the Vaalbos National Park was de-designated and handed back to a local community as part of a land restitution case (SANParks, 2017). In addition to its natural assets, the region also has a rich cultural, social, and political history.

The town of Ritchie, with a population of 3,504 (Stats-SA, 2011), is situated on the Northern Cape side of the border in an area that falls within the Frances Baard District Municipality, while the Ratanang community, with an estimated population of 4,213 (Stats-SA, 2011), is located in the Free State

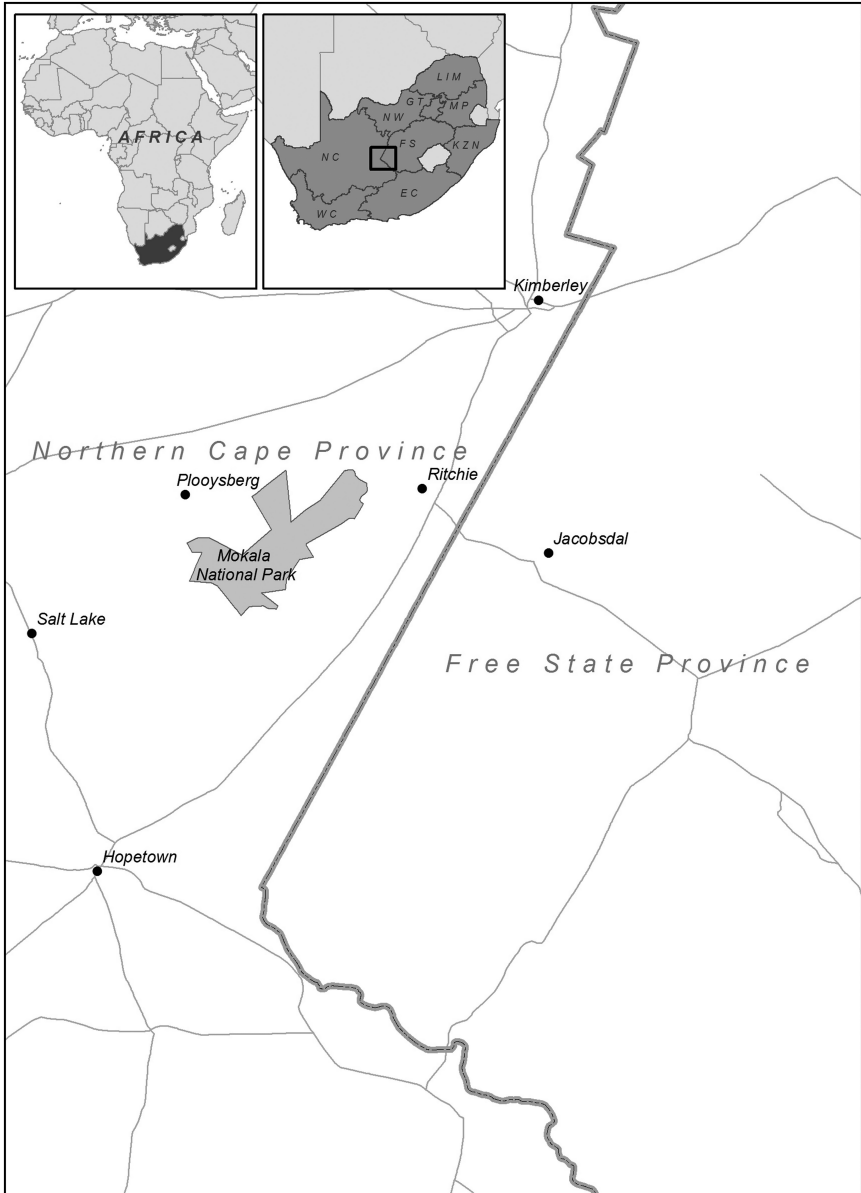


Figure 3.1 Map of the study area.

Province and falls within the Xhariep District Municipality (see Figure 3.1). The largest portion of the population in both communities classifies themselves as being black or of mixed race (Stats-SA, 2011). Unemployment and poverty are rife in both communities, and 84.7% of the population survive on an income – mainly derived from social welfare grants – of less than 2000 ZAR per month (equivalent to roughly 100 Euro at the time of writing), and 91.6% of residents have to survive on a household income of under 3000 ZAR (Coetzee and Nell, 2019). Concomitantly, the two communities are significantly underdeveloped. The reason for selecting these communities was that they represent comparatively typical instances of rural South African communities which, unlike more climate-dependent communities that engage in subsistence agriculture and have received some scholarly attention (Chikosi et al., 2019; Rapholo and Makia, 2020), survive predominantly on government grants. In addition, they are also adjacent to a South African National Park (Mokala National Park) that was considered valuable in a study that aims to explore narratives about the natural environment.

Methodology

As the aim of the study was to empirically explore perceptions and attitudes about the environment, a qualitative methodological approach was employed. Within this framework, a multiple case study design (Creswell, 2013), combined with elements of narrative design (Polkinghorne, 1995; Murray, 2000; Riessman, 2008), was adopted as the basis for the study. The latter is not a singular approach but includes a range of ways of examining the role of storytelling in understanding identity and social life (Riessman, 2008). In particular, narrative analysis is concerned with the structure, content, and function of stories and how they relate to broader narratives (Murray, 2003). Given this focus on the actual “storying” of experience and with stories/narratives as a whole, it adopts an approach that avoids fragmenting stories into de-contextualised themes (Murray, 2003; Riessman, 2008). This approach also allows for a more contextualised understanding of residents’ perceptions of nature, that unlike many other approaches, takes into account the temporality as well as the intersection of individual perceptions with social narratives and discourses, and offers a framework for explaining how such narratively embedded perceptions prompt social behaviour (Murray, 2000, 2018).

Participants and sampling

A group of 25 participants were purposively selected by means of snowball sampling, which entailed requesting the initially selected participants to refer the researchers to other potential participants who met the sampling criteria (Creswell, 2013). Two types of participants were recruited. First, in order to obtain views reflective of broader community trends, informant participants were

identified and recruited. Such participants are experienced and informed in terms of the topic at hand and are able to articulate stories and explanations that others might not (Tracy, 2013). The purposive sampling criteria that were set for these participants required that they be active partakers in or residents of one of the two communities for a period of at least ten years, and that they occupy a central or leadership role in the community that would enable them to have some insights into the prevailing views in their communities. This part of the sample comprised three male traditional community leaders, two male local ward councillors, four male religious leaders, two female community social workers, two female chief nurses heading community clinics, a female youth leader, a female police station commander, and a senior male detective from the local community police station.

The second subset of participants was recruited by means of typical instance sampling, which aims to select participants who represent typical instances of the phenomenon under study (Tracy, 2013), and consisted of nine “ordinary” community members (five females and four males) who did not occupy any particular position of centrality in their communities. As is the case with the majority of residents in both communities (Coetzee and Nell, 2019), these participants were all unemployed and subsisted on government social grants.

Data gathering

Individual face-to-face semi-structured interviews (Tracy, 2013) were used to gather data, as this approach strikes a balance between enabling the participants to answer freely and retaining enough structure to enable comparability of responses across interviews. An interview guide (Tracy, 2013) was used to facilitate the interviews. In particular, the participants were asked:

- How do you/people in this community view their environment?
- What do people say about nature? What stories do they talk about it? (Probes included: What good things do people say about the environment? What concerns do people have about the environment?)
- What role does nature play in your/their lives?
- What value (if any) does nature/the natural environment have for you/people in this community?

These questions were intentionally framed in broad, general ways to avoid inadvertently leading the participants, and thereby artificially co-constructing their narratives through the lens of concepts insinuated by the researcher, as it was deemed particularly important that all matters and phenomena discussed should be raised by the participants themselves.

The interviews, which lasted between 18 and 83 minutes, were all conducted either at the participants’ residences or their workplaces; they were audio recorded with the participants’ permission and subsequently transcribed verbatim for further analysis.

Data analysis

Interviews were analysed by means of narrative analysis following an approach that integrated the steps proposed by Polkinghorne (1995), Ezzy (1998), Murray (2000, 2003), Riessman (2008), and Grbich (2013), supplemented by the thematic analysis methodology proposed by Braun and Clarke (2006). This involved first becoming familiar with the data via the transcription process and subsequent repeated readings of the transcripts. Following this, an individual-level analysis of the participants' stories was undertaken. Segments of text that had elements of a narrative structure were identified and highlighted. A thematic analysis procedure (Braun and Clarke, 2006) was then used to code entire storylines to prevent fragmentation and consequent decontextualisation of narratives (Murray, 2003; Riessman, 2008). Once this was completed, thematic communal storylines that cut across the participants' individual narratives were generated using the same general methodology proposed by Braun and Clarke (2006) for identifying themes from coded data. During this process, special emphasis was placed on examining the similarities and differences between these narratives and seeking to account for them. The narratives were then examined structurally according to the guidelines proposed by Labov (1997) and Grbich (2013) by examining the plot, development, and resolution, as well as the construction and positioning of the characters within the narratives. To better understand how these narratives might have been constructed, the approach proposed by Ezzy (1998) was adopted, which involved examining the hermeneutic process in which narratives are shaped by events and lived experiences (which in turn serve as incipient or inchoate narratives), and how the narratives in turn shape action, which then influence the narrative, and so on. As part of this process of understanding and contextualising the narratives, the identified communal stories were then considered in terms of their possible intersection with broader social narratives and discourses (Ezzy, 1998; Murray, 2000).

Ethical considerations

Ethical clearance to conduct the study was sought and obtained from the North-West University's Human Research Ethics Committee (NWU-00342-15-S1). In line with the prescribed protocols, all aspects of the study, including its purpose, associated risks, requirements, and benefits, as well as the fact that participation in the study was entirely voluntary, were clearly communicated to all prospective participants prior to obtaining signed, informed consent from those who indicated that they were willing to take part in the study. Interviews were conducted individually in private settings and were subsequently anonymised by removing identifying particulars from the transcripts. A summary report of the findings was compiled and shared with the community once the study was concluded.

Findings

As will be discussed in this section, three main narrative themes about the natural environment were identified during the course of the analysis, which reflected a range of different perceptions and attitudes related to the natural environment.

Narrative theme 1a: Nature is not that important, and we rarely think about it, unless it can be of practical value in helping us survive in these challenging circumstances.

The most prominent theme that emerged when examining the data from a narrative analysis point of view was a conspicuous lack of any distinct or extensively formulated narratives about the natural environment among residents of both communities. The majority of the participants struggled noticeably to articulate their views of nature and were often entirely unable to answer the question, despite multiple formulations. Even among those who were able to do so, answers were generally hesitant and brief. Furthermore, with the exception of one participant who had concerns over the impact of habitat destruction by residents on the local wildlife, phenomena such as climate change and global warming were not mentioned. Wong and Breheny (2018) argue that such scant narratives should *not* be dismissed as not constituting “good” narrative data, as such stark, unembellished accounts are highly informative about social life. In this case, the absence of narratives suggests that most residents ascribed comparatively little importance to the natural environment, which was underscored and confirmed by those participants who *were* able to answer the question. The following excerpt from an interview with Participant 1, the wife of a local pastor, is illustrative of both these trends:

Interviewer: How do people in this community see nature and the natural environment; what do they say about it?

Participant 1: Hmm... (several seconds of silence, accompanied by a puzzled look, follows).

Interviewer: What I mean is... what do the residents of Ritchie think about nature, about things like trees, the animals, the river there (pointing to nearby river)? What do they say about these things?

Participant 1: Uh... I think... hmmm, how should I say it...? Well I don't... actually... actually to us, nature, these things are not really important. There are much more important things to worry about... people simply don't care about all that nature stuff here.

In addition to serving as frameworks for meaning-making, narratives shape decisions to act (Ezzy, 1998), and one manifestation of this was a noted lack of interest in visiting a nearby national park. This was underscored when Participant 2, a female health worker in her early thirties managing a local clinic, who, when asked whether people in the community ever visited the nearby national park, or expressed any interest in doing so, stated:

- Participant 2:* No, people here are not interested in those kinds of things. I know there was this other guy, who works at the park, so he goes there for that. But I don't know of anyone else that went there.
- Interviewer:* Why do you think this is? Do you think it is because they are not interested, or because it might be too expensive for them to go there?
- Participant 2:* No, people here don't go to places like that. It's only white people who would want to go there. I don't feel it is because they can't afford it that they don't go. They do so many things that cost way more money, like all the alcohol they buy, the pills, the drugs, and stuff like dagga (marijuana) that cost who knows how much. So if they really wanted to go, then they could have done so. People here aren't interested in all that nature business.

This participant's story also seems to reflect an ideological narrative (Murray, 2000) that ascribes ecocentric interest in nature and nature-based activities to white people, and positions it narratively as being outside the interests of people of colour, except in work-related contexts.

Despite the relative dearth of clearly formulated ecocentric or biospheric narratives about nature, a number of participants did recount narratives in which natural objects such as trees, rivers, and the soil were constructed in a utilitarian way; as resources that could support physical survival. Trees commonly became construed as building material and firewood, wild animals as potential sources of food, and land as space on which to grow vegetables for survival. These narrative meanings prompt a series of concomitant actions (Murray, 2000), which, in this case, involved the overexploitation of natural resources such as trees and wild animals, thus accelerating the loss of green spaces and attendant recreational ecosystem services that have also been identified by others as a significant problem in the region (Munyati and Drummond, 2020). As Participant 13, one of the few interviewees who expressed a love of nature, explained:

People chopped up all the trees around here to build their houses, they tore off the branches and chopped them down for firewood. They had no sense of the importance of nature. The place was stripped, the river is no longer a... it doesn't even look like a river anymore. Look around, there are no more birds and rabbits. I remember when I was young this place was teeming with life. But now there's nothing.

Narratives are almost always situated in, and influenced by, a variety of broader interpersonal, social, and ideological contexts (Murray, 2000). In this instance, prevailing contextual realities of abject poverty, unemployment, and underdevelopment in these communities (Coetzee and Nell, 2019), as well as the consequent struggle for material survival, constitute events that Ezzy (1998) describes as incipient or inchoate narratives. Their very nature invites certain types of narrative constructions over others, and thus constrains and shapes the meaning that is constructed and ascribed to nature and its constituent elements as

a predominantly utilitarian one that is focused on the concrete demands and lived realities of both the immediate and the local present. As such, ecocentric and biospheric narratives of nature that incorporate broad and in some ways more abstract notions such as climate change, global warming, desertification, and so on seem to be almost entirely absent from the narratives of the majority of residents. Concomitantly, given a gaze that is constrained by the unrelenting press of daily survival, environmental threats are constructed as significant and thus responded to only when they enter the participants' immediate lived experiences, if at all. And even in such instances, problems experienced in these communities such as increased drought and concomitant aridification, which could plausibly be related to climate change in the region (IPCC, 2014), were never attributed to large-scale and long-term climatological processes. Instead, they were narrated as individual- or community-level concerns whose perceived origins and solutions were to be found in the local community or in their own economic limitations. The narrative of Participant 6, which is recounted below, illustrates this trend.

Narrative theme 1b: Littering is rampant in the community and is caused by poor delivery of municipal services, but it is a problem only because it affects community health.

Another behavioural consequence of the absence of any ecocentric narratives that ascribe intrinsic or aesthetic value to nature among most residents is rampant littering. When asked about the communities' views on the practice, a number of interrelated narrative strands emerged. First, litter was rarely construed as an *environmental* problem. While many residents did perceive littering as problematic, this was almost always constructed as such solely due to health-related reasons. Litter was narratively represented as a symbol of illness and disease and therefore needed to be removed. However, at this point, structural tension emerged within the narrative, as the responsibility for the presence as well as the removal of litter was ascribed to inadequate delivery of municipal services, including refuse removal. This resulted in a storyline that could be classified as reflecting a tragic genre in terms of Grbich's (2013) classification, given how residents position themselves as recipients of unwanted consequences which they do not have the agentic power to address. The following excerpt from an interview with Participant 1, an unemployed mother of five, illustrates this narrative:

The litter, I would say, hmmm, the litter is a big problem for us. We are a disadvantaged area, so there is lots of litter, lots of rubbish heaps. We worry about all the germs. It is affecting our health. Our children get sick. People are angry because they feel we are not getting help in this situation, because, how can I say it, hmmm, the refuse removal only comes once a week to take away all the rubbish. It's all because they are not doing their jobs properly. The stuff just lie[s] everywhere and this makes problems for our health.

When analysing narratives, it is important to consider how individual social actors position themselves and other actors in the narrative (Murray, 2018; Wong and Brenehy, 2018). In this communal narrative, which was echoed by more than two-thirds of the participants, the residents are positioned passively, as disadvantaged, and as actual or possible victims of sickness and disease caused by the litter. The responsibility for this situation and the agentic capacity to remedy it are ascribed to the municipality (and by implication, the local government). As such, this narrative conveys elements of self-disempowerment in the face of litter, as agency is not incorporated as part of their own scripted roles as “ordinary” community members. Such narratives do not emerge in isolation but at the intersection of other broader societal narratives and formative events. In the context of South Africa, with a long and unfortunate legacy of enforced racial segregation and oppression, society was structured in ways that deprived people of colour of agency, and instilled, at least into some, a sense of being victimised by the proverbial “system” at whose mercy they were forced to exist. Intersecting with this national context, extreme poverty and lack of resources in communities such as these (Coetzee and Nell, 2019) likely serve as additional incipient narrative events that all conspire to support the coalescing of communal narratives where the agency is ascribed to a more powerful “other”, and the narrator as protagonist is cast into the role of a passive recipient and a victim of external agents. This narrative therefore constrains action, as is revealed by the fact that most residents rarely, if ever, did something to address the problem of littering.

Narrative theme 2: We have an appreciation for nature in the form of our gardens and indoor plants, although it is getting too expensive for us to maintain these.

A comparatively small number of participants recounted an alternative narrative in which aspects of nature were valued for their own sake, in particular, personal gardens and indoor plants and flowers. These were narratively construed as objects of intrinsic value on account of their beauty, which prompted actions such as indoor and outdoor gardening. When asked how people in her community (Ratanang) viewed nature, Participant 25, a 58-year-old woman working at the local municipality, explained that:

Some of the people here like nature. You'll find a few people who have beautiful gardens at their places. They like planting flowers. Even in some people's homes, you'll see there, they like having beautiful plants and flowers in their homes. I am one of them. I really love plants. I work in my garden, I sow, and I love planting.

A complicating action in the plot (Labov, 1997), which served as a counterpoint in this narrative, was that several participants recounted stories of having abandoned their gardens and gardening activities due to the water scarcity and the comparatively high costs of water that prevail in these communities, which are

both situated in a semi-arid climate. The story of Participant 6, a woman who has lived in Ritchie all her life, is typical:

I think nature matters to a few of the people here, but the big thing is that we have to, of course, water the trees and flowers. And water is a problem, and we have to pay for it. You water the plants, and then comes that water bill, and it is so high! My yard is like 'n dry veld (field). I had grass [a lawn], but I had to take it all out, because when I watered it, my water bill just became too much. In the past there were many people here where you would see, there were beautiful trees and flowers and all of that in their gardens, but since life has become so expensive they cannot manage to do that anymore.

Events and circumstances such as the arid climate, combined with high water bills, served as incipient narrative events (Ezzy, 1998) that hermeneutically interacted with the existing narrative of the value of gardening to prompt a reconstruction or re-narration of maintaining gardens as “not being worth the cost”, which in turn prompted many of these residents to abandon or downscale their gardens. Yet, as has been noted earlier, the ever-increasing aridity of the region was never constructed in terms of broader climatological or environmental phenomena such as climate change or global warming but was instead presented narratively as a local and primarily economic concern.

Narrative theme 3: Positive early experiences and exposure to nature, usually by a parent or trusted adult, leads to a love of nature and pro-environmental attitudes and behaviours.

Finally, three participants, all occupying comparatively high-level positions in the community, recounted narratives that expressed their overt love of nature. Participant 2's story is particularly telling:

To me, nature is a place to break away to, to go and find myself and reconnect with myself. If I feel stressed... that things are getting too much then I take my camera and go out into nature. I feel so close to nature. When you are in nature you can find yourself. If you really go and look at nature, everything in it, how wondrous it is, then you realise how incredible the creator is and what He put there for us. This is why I am a fighter for nature and the rights of nature. Like, a while ago I crossed swords with the municipality about the sewerage that is spilling into our rivers.

In trying to understand the origin of stories like these, which reflect an alternative minority narrative, the participants were asked where their pro-environmental attitudes towards nature came from. In every instance, the participants indicated that it was instilled from an early age via parents or experiences with adults who took the time to provide them with a guided exposure to nature or a

personal example that reflected a more ecocentric orientation towards nature. As Participant 4 explained, when asked where her love of nature came from:

My mum... She always loved plants and gardening, and I saw it and it made me like it too. And not just me. She started a succulent garden near the buffer zone over there. And then the other people saw it, and some of them liked the idea, and they started following her and doing the same. So it's her example. Most people here only litter, so they will never think on their own to do things like this [gardening]. But maybe when they go out and see how it could look, how it could look different, then that thing will kick in in you too and people might say to themselves "I will also try to do something like that".

Taken together, these stories all coalesce to point to the possibility that positively experienced exposure to nature via the agency of other people serves as an incipient narrative event that prompts the re-narration of personal stories about nature. In all cases such exposure came via persons "like me", members of the community who are similar to the individual in question, or alternatively, especially in the case of children, from parents or other authority figures who provided structured exposure to nature. In the latter case, the narrative vacuum that seems to exist in relation to nature was filled in a positive way via an exposure to nature that was both enjoyable and instructional. This point was emphatically underscored and illustrated by Participant 10, a male pastor in Ratanang who stated:

Some kind of education about nature is so important. And it will work. Why I am saying so is... when my son was in the first grade, they had a trip to Mokala National Park. And when they came back, that little boy was in the clouds because of what he learnt and saw there. And today, when he and I go into nature then he knows that you don't break the tree, you don't chop it off, you don't damage anything in nature for no reason. So one visit changed his mindset. The same with my daughter – they went there (MNP) with the creche. And when she came back it was the same. She said, "Daddy, that's where I want to be". And now, when I dig up earthworms to go fishing, then she comes to me and says, "No daddy, why are you doing this? Daddy, you cannot take them out, that is their home, they live there, you can't go and feed them to the fish!"

As was noted previously, narratives do not only serve as frameworks for perceiving and making sense of events, they also prompt actions (Ezzy, 1998). In the case of the small participant group who recounted ecocentric narratives that emphasised the intrinsic value and beauty of nature, all were also found to act in pro-environmental ways, as is evidenced in the stories of Participants 2, 4, and 10.

However, even among these participants, no personal story or expressed concern intersected in any way with broader narratives about large-scale climatological trends such as climate change. Instead, environmental concerns tended to be limited to their specific communities and their immediate surroundings,

and environmental challenges were framed as having almost exclusively local causes (such as littering by residents, poor municipal management, etc.) and local solutions.

Discussion

Taken together, three main nature-related narratives were identified in the two communities. The first and by far the most dominant narrative about nature ascribed very little ecocentric or biospheric importance to nature and regarded it primarily in utilitarian terms as a potential resource for economic survival. These narratives prompted residents to hunt local wildlife for food and chop down trees. This accords with the findings of others who point out that, in contrast to the ecocentric approach, which is typically derived from Eurocentric contexts where environmental concern tends to be high (Schultz, 2002), within the ambit of anthropocentric traditional African worldviews, ecocentric or biospheric concern for nature tends to be low (Craffert and Willers, 1994; Struwig, 2010), and environmental concern tends instead to be egoistic, or at best altruistic (Schultz, 2002), centred on personal and communal well-being (Maila and Loubser, 2003; Ogunbode, 2013). Drawing on previous research, Munyati and Drummond (2020) indicate that in the developing world – in Africa in particular – green spaces are commonly regarded more negatively by the public and are viewed primarily in terms of their possible economic benefits, resulting in a low prioritisation of their conservation. Nonetheless, these authors point out that behaviours associated with such views result in the loss of green spaces, a reduced capacity for carbon sequestration, and the loss of recreational ecosystem services. These authors continue to report their findings on how these views, in which little intrinsic value is ascribed to nature, have also been found to be prevalent at the level of local government in a South African province that is adjacent to those of the communities included in this study. Here, low prioritisation of their maintenance was found to be the main cause of substantial losses in both the quantity and quality of green spaces, which lessened the recreation ecosystem services available in the region (Munyati and Drummond, 2020), thus underscoring the concrete consequences that emanate from narratives and attitudes about the natural environment.

Also associated with these low levels of ecocentric concern among the participants was a tendency towards littering, and a marked tendency to construct litter not as an environmental problem as such, but almost exclusively as constituting a problem only when it posed health-related risks. In this narrative, the participants positioned themselves as victims of littering and ascribed responsibility for both the presence as well as the removal of the litter to their municipalities, which resulted in very little effort being expended by most residents to actively address the littering issue. This trend has also been noted in other African contexts, where Nigerian participants likewise expressed very little interest in taking part in any litter clean-up activities, even though they did regard it as problematic (Lucrezi and Digun-Aweto, 2020).

In the second narrative, espoused by a notably smaller group of participants, intrinsic value was ascribed to specific elements of nature. In particular, indoor and outdoor plants were narratively framed as objects of beauty, which prompted concomitant actions such as gardening. However, a complicating action that served as a counterpoint to this narrative plot (Labov, 1997) for several participants was that the scarcity and costs of water were constructed as being prohibitive for maintaining gardens, which acted as incipient narrative events that led to the reconstruction of the narrative and the reframing of gardening as “not being worth the cost”, resulting in the abandonment of many gardens.

Third, a very small number of participants recounted narratives that expressed a more wide-ranging and inclusive ecocentric and biospheric “love of nature”, which, in all cases, was instilled through early positive experiences and guided exposure to nature, and prompted activities such as recreational visits to nature environments and nature photography, as well as a variety of pro-environmental behaviours.

Using Milfont’s (2010) framework as an analytic lens to better understand residents’ narratives about nature, it would appear that the three broad narratives that emerged could be sequentially arranged along an axis denoting a low orientation to preservation and high orientation towards utilisation of nature for anthropocentric ends (also reflecting Schultz’s (2002) egoistic and altruistic attitudes) on the one side of the axis, and the opposite sets of orientations (congruent with Schultz’s biospheric attitude) on the other. This sequence is also clearly associated with the number of residents adhering to each narrative, with the majority espousing the first narrative, a significantly lower number endorsing the second one, and only three participants recounting the third narrative.

In the context of narrative analysis, it is important to attempt not only to note, but also to account for the different narrative themes that have been identified in the data (Wong and Breheny, 2018). By analysing the participants’ narratives in relation to their contexts, it was found that three factors in particular could account for much of the variability.

First, the participants’ material and financial status appeared to be strongly associated with their narratively expressed attitudes towards nature. In particular, those with few resources were typically preoccupied with survival, security, and taking care of their families. As a probable consequence, the natural environment tended to be narratively represented as either unimportant or constructed in utilitarian terms through the lens of material scarcity, as a potential source of resources and food. By contrast, those with more resources who possessed their own homes and gardens tended to express views that incorporated increased ecocentric concern for nature and a concomitant desire to preserve it, which was primarily reflected in the tendency among some residents to cultivate gardens for aesthetic reasons. Yet, even in these instances, limited material resources also played an inhibitory role, with high water costs compelling many residents to abandon their gardening efforts. Finally, those few participants who had comparatively high-income levels tended to show the most interest in nature and were able to visit places like natural parks given the resources at

their disposal (such as a vehicle and the funds to pay entrance fees, etc.). This finding also explains why the majority of the participants did not pay particular attention to nature, as poverty is widespread in these communities and very few residents achieve high-income levels (Coetzee and Nell, 2019). It also lends support to the social-class hypothesis which states that environmental concern is positively associated with high education and income levels and argues that people tend to become concerned with “higher concerns” such as the environment only when their basic needs are met (Mtutu and Thondhlana, 2016). Supporting this notion, in a comparative longitudinal analysis of 33 countries, Franzen and Vogl (2013) found the wealth of nations to be a primary determinant of environmental concern, a finding which has also been made in a South African context (Craffert and Willers, 1994; Mtutu and Thondhlana, 2016), with South Africans being shown to have the lowest level of environmental concern among the 33 countries that were assessed in a 2010 survey (Franzen and Vogl, 2013).

Second, exposure to nature emerged as the primary explanatory concept of differences in the participants’ narratives. In particular, those who were exposed to nature in a guided way via another individual or a group (in a context where nature appreciation or education was an explicit aim) in all cases recounted narratives reflecting perceptions of nature that leaned more towards ecocentric concern for nature and the need to preserve it. It also appears that exposure was particularly effective in cases where the participants were young, and arguably more impressionable to the experience, especially when a parent or other trusted and respected adult facilitated the experience.

Finally, the participants’ general level of education also appeared to be reflected in their views of nature, with higher-educated participants narratively framing nature as something that should be preserved for ecocentric reasons, and vice versa. Although findings from existing research pertaining to the relationship between environmental attitudes and educational level have been somewhat inconsistent, the majority of studies report a strong positive correlation between pro-environmental attitudes and individuals’ level of education (Fransson and Gärling, 1999; Theodori and Luloff, 2002; Franzen and Vogl, 2013). This trend has also been identified in South Africa (Craffert and Willers, 1994; Mtutu and Thondhlana, 2016), with some studies even showing that the very ability to accurately perceive climate change and variability was very strongly related to educational level (Rapholo and Makia, 2020).

The three factors discussed above also seem to account for the fact that even at the most ecocentric end of the stories that were analysed, there was a conspicuous absence of intersectionality with broader discourses tied to large-scale and long-term climatological phenomena such as global warming and climate change. Environmental problems such as drought and increasing aridification in the region, which have been associated with climate change (IPCC, 2014), were instead either not perceived and “storied” at all, or constructed in local terms as far as their origin and solutions were concerned. These findings are supported by a recent study, conducted in a comparable semi-arid region of South Africa, which

found that 36% of small-scale rural farmers, whose livelihoods are intertwined with the perception of weather and weather change, were not only unable to accurately perceive climate change but reported observations that ran counter to climatological data (Rapholo and Makia, 2020). The study further found that perception of climate change reduced drastically among farmers with less than ten years of experience, as well as among those who did not have post-primary education, where respectively 94% and 67% of farmers were unable to perceive climate change (Rapholo and Makia, 2020). From a narrative perspective, it could be postulated that the incipient narrativity of the contexts of farming and higher education would promote the construction of more coherent and extensive narratives about matters such as climate change, as has indeed been found in the rural Ga-Dikgale community in South Africa. Here, local farmers were found to have a fair grasp of climate change as a result of their personal experiences with floods, soil erosion, and drought that directly impacted their crops and livelihoods (Chikosi et al., 2019). Given that the vast majority of residents in the communities included in this study are not engaged in farming, lead lives that are not climate-dependent, and have very low levels of education, it seems almost inevitable that discourses that reflect global perspectives would be less accessible, and less likely to intersect with local narratives. Another key factor which seems to account for this finding is that the majority of residents in these communities indicated that they had *never* travelled much further than a few adjacent towns in their lives. Narratives are typically constructed by a process of contrast and comparison, and when someone has never left the general region where they were born, comparative and contextualised notions such as living in an arid climate, or experiencing more or less heat, rainfall, and so on than other regions become moot, and are understandably not incorporated in personal narratives.

Conclusion: Implications for interventions

As Mtutu and Thondhlana (2016) point out, knowledge gained from studies such as this one can be used to design contextually appropriate and relevant evidence-based intervention strategies and educational programmes. The necessity of such interventions is underscored by Ogunbode (2013:1477), who summarises a variety of sources on the topic by stating that “both environmentalists and social scientists now agree that efforts aimed at achieving global ecological and economic sustainability must incorporate strategies aimed at changing unfavorable practices among societies”. The findings of this study have a number of implications for interventions that aim to promote pro-environmental aims in rural, resource-poor Southern African communities. All of these proposals rest on the fundamental tenets of narrative theory, namely that perceptions and behaviour emanate from narrative constructions of reality, and that events and experiences may serve as inchoate narrative events that have the power to shape and reconstruct existing narratives (Ezzy, 1998; Murray, 2000), thereby bringing about behavioural change. Given the clear associations that were found between the local residents’ environmental behaviours and their narratives, as well as multiple

accounts of behavioural change as a result of re-narrations, a main implication of the study is that interventions aimed at prompting pro-environmental re-narrations of the residents' stories about nature hold significant promise in promoting pro-environmental behaviour.

However, in line with the social class hypothesis, the findings also suggest that the realities attendant to low socioeconomic contexts exhibit an incipient narrative character (Ezzy, 1998), which constrains the adoption of any pro-environmental narratives and consequent pro-environmental behaviours, and instead prompts a utilitarian construction of natural objects such as trees, plants, birds, animals, and rivers as resources that could aid survival. This argument is underscored by the observation that the participants' narratives about nature seemed to adopt ever more pro-environmental overtones based on the extent of their material welfare and educational level. Given this incipient narrativity of the contexts of poverty, lack of education, and material scarcity, it seems imperative that pro-environmental initiatives should not be divorced from general community development initiatives aimed at socioeconomic empowerment (Tyler and Cohen, 2020). Providing more education, more employment opportunities, and improved financial welfare in particular would be most beneficial. Failing this, many well-intentioned initiatives aimed at enhancing environmental appreciation, protection, or engagement are likely to meet with limited success, as the noted inchoate narrativity of conditions associated with poverty would likely greatly inhibit the development of pro-environmental narratives and behaviours.

Second, the participants frequently stressed the formative value of guided exposure to nature in contexts experienced as positive and enjoyable. This was particularly pronounced in the case of children, where even a single guided exposure to nature in some cases had a lasting impact on environmental narratives and perceptions. Viewed narratively, the implication for intervention is that there appears to be great value in actively promoting events such as guided exposure to nature in national parks, interactive animal experiences, and so forth, as these serve to interact hermeneutically with existing narratives in ways that prompt re-narration of personal stories about nature. In turn, this prompts pro-environmental behaviour changes. Furthermore, it appears that among the majority of the residents in these communities, a kind of narrative vacuum exists in relation to nature. In such a context, behaviours such as littering flourish. Guided exposure to nature appears to have the potential of filling this narrative void, providing coherent accounts of nature that then serve as a new lens through which nature is perceived and acted upon in more pro-environmental ways.

Finally, the study's findings also have implications for addressing large-scale phenomena such as climate change. The complete absence of discursive frames related to climate change and global warming in the participants' stories suggests that interventions aimed at targeting these phenomena in communities such as these need to be aligned with local knowledge and immediate community needs and experiences, rather than with abstract naturalistic scientific notions, or else risk complete separation from their lived experience, and probable failure. This notion is supported by Rapholo and Makia (2020), who point

out that a large proportion of rural farmers that looked to the media for information stated that they still grappled with concepts such as climate variability, and argue that such findings underscore the need for an Indigenous approach to mitigation and management of climate variability. And yet, as Tyler and Cohen (2020) point out, South Africa's climate change policies mainly draw on classical scientifically based discourses, view climate change through the lenses of environmental science constructs, quantitative energy, and economic modelling, and tend to be devoid of the notion of values. The authors go on to point out that these policies are also abstract, and insufficiently engage with the context and its dimensions such as the physical environment, scale, culture, people, space, and time. In particular, the Apartheid legacy of spatial segregation as an important contributor to the country's high emissions and low employment growth path tends to not be sufficiently recognised (Tyler and Cohen, 2020). A need therefore exists for an approach that also contextualises global climatological challenges in local, contextually relevant, and thus more accessible terms, and highlights local anthropocentric causes, consequences, and solutions. As Chikosi et al. (2019) point out, such endeavours are critically important, as communities can only craft adaptation strategies for the climatic hazards of which they are aware.

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4 **Conflicting narratives of extreme weather events in Durban, South Africa**

Politically opportunistic, experiential, and climate-justice epistemologies

Patrick Bond and Mary Galvin

Introduction: A climate catastrophe in the context of systematic state failure

From 9 to 12 April 2022, unprecedented flooding drowned hundreds of residents of South Africa's third-largest metropolis, Durban (officially known as eThekweni).¹ On the worst day (11 April) when 350 mm fell, more than 500 people across KwaZulu-Natal and Eastern Cape provinces died or remained missing months later. There were 130,000 people displaced, from nearly 17,500 households, as well as hundreds of wrecked schools that for months were unable to cater for 320,000 young scholars. In Durban alone, more than 14 000 homes were wrecked, as landslides and rising rivers washed away poorly built, badly located residences (McCain 2022; Naidoo 2022). The movement of people and emergency goods was arduous and sometimes impossible due to collapsed roads and bridges. In vast areas of the city, broken water and sewage reticulation pipes, and the collapse of the electricity system, left taps dry and power out for days. The toll in human life exceeded Durban's prior record of 64 deaths from the rain bomb of April 2019, when 168 mm fell in 24 hours, doing at least \$75 million in damage. In October 2017, 108 mm fell in one day, killing 11 people. While a freak storm in June 2008 dropped 160 mm in South Durban, only in 1987 was there a similar extreme regional event that did so much damage. And the sense of more rapid, more intense events was backed by many of the country's climate scientists (van Diemen 2022). A subsequent rain bomb on 21 May 2022 dropped another 280 mm in 24 hours (although without an announced death toll) (Figures 4.1 and 4.2).

When the floods hit Durban in 2017, 2019, and again in April–May 2022, it was obvious that not only the municipality, but also KwaZulu-Natal province and the national state government had failed to take the necessary steps towards climate-crisis mitigation and adaptation. The most obvious failures were the insufficiently robust civil engineering measures for major infrastructure and maintenance of already inadequate stormwater drainage systems. State housing provision and construction standards for tens of thousands of residential



Figure 4.1 KwaZulu-Natal floods, April 2022.



Figure 4.2 Desperate situation, KwaZulu-Natal, April 2022. Source: Sandile Ndlovu, *Sunday Times* (reprinted with permission).

structures in the city were also revealed as profoundly inadequate, especially in the 550 shack settlements that are mainly located on steep hills or floodplains along rivers (eThekweni Municipality 2019). University of KwaZulu-Natal Planning Professor Hangwelani Magidimisha-Chipungu complained that rapidly rising rates of urbanisation were “not followed by sound infrastructure for the people. We have opened our cities, but where are they going to stay?” (Waterworth 2022).

This chapter considers epistemologies of climate change in this context by first examining the government’s response to the floods, and then considering three different civil society narratives. While public statements by politicians and state officials acknowledge the role of climate change in the Durban floods and the need for the government to act and prevent such suffering in the future, their lip service is belied by their actions. This incongruence is itself an epistemology, which we term a *diversion narrative*. But civil society groups have often been distracted themselves, considering how their divergent responses have organically created at least three kinds of epistemological standpoints regarding the floods: 1) *emergency charity and solidaristic relief funding appeals*; 2) *service delivery failure critiques of the municipality (unrelated to climate resilience)*; and 3) *a broader analysis encompassing both of the above arguments, but adding climate adaptation and mitigation failure*.

Indeed, some organisations can weave the narratives together, but gaps in some civil society analyses do reveal epistemological limitations, which are often associated with scale: that is, the range of vision within these institutions’ mental maps. The household is the main scale for charity relief work. Groups representing localised communities typically make neighbourhood-based arguments and demands regarding the municipality’s failures; and climate-justice organisations try to do both – stressing race, class, and gender implications – but also reach (“scale jump”) upwards to national and global levels for a broader explanation. This is especially the case at a time the concept of “loss and damage” is under more explicit debate in United Nations’ climate summits. After reviewing these state and civil society perspectives, we conclude by posing questions about the ways these approaches reinforce either a neo-liberal approach or one based on challenging capitalism. By way of declaring bias, we favour the latter approach.

Climate as a “diversion narrative”: A state epistemology

In both epistemological and discursive terms, President Cyril Ramaphosa and other leading officials deployed an overarching climate narrative in April 2022. This was done not to explain the profound implications of the rain bomb and generate support for major policy and project changes, but instead was used to disguise a myriad of climate injustices and bad governance. The following pages reveal three ways in which both national and municipal governments developed and asserted the climate-diversion narrative. First is the assertion of climate leadership, which allowed politicians and state officials to divert attention from the reality of corruption, mismanagement, and the obvious lack of adaptation.

Second, as a diversion from its active undermining of emissions mitigation, the government cast itself as taking action against climate change. Finally, at the municipal level in Durban, the state claimed excellence in climate mitigation and adaptation, diverting attention from the limits of its planning and execution.

Government climate leadership claims as a diversion from corruption and mismanagement

Durban was in the climate spotlight when it hosted the United Nations COP17 climate summit in 2011. Although scientists and activists insisted on much tougher action, their appeals were ignored, and the event was generally considered a global policy failure (Bond 2012). In part due to the host country team's accommodation of Washington's agenda (and other historic polluters' interests), US State Department negotiator Todd Stern bragged to Secretary of State Hillary Clinton about what he termed a "significant success for the United States" insofar as many of the major historic polluter's objectives in limiting Combined But Differentiated Responsibility liability were achieved (Stern 2011). The municipality also engaged in repression of local activists, including the banning of a march that – after a court injunction against the city was obtained – attracted 10,000 participants and became the largest climate protest in African history (Black 2011).

Notwithstanding the rush of climate-crisis publicity in 2011 and throughout the subsequent decade, city officials appeared numb to the imminent threat, not bothering to make basic infrastructure repairs such as the roof of the violence-afflicted Glebelands migrant labour hostels (Burger 2018). The municipality was often accused of inadequate commitment to climate protection, in spite of the profusion of rhetoric to the contrary – for example, in 2020, claiming "to be at the cutting edge of climate change action, assisted by its progressive leadership and engagement within... the C40 Leadership Group" (a network promoted by former New York mayor Michael Bloomberg) (eThekweni Municipality 2020, Bloomberg Philanthropies 2022). Occasionally, journalists separate fact from C40 fiction (Harrisberg 2021).

A major barrier to the production of genuine knowledge about Durban's lack of climate-proofing was the city's notorious greenwashing. Even after the main provincial government investigation into Durban's fraud, the 2013 "Manase Report", publicised widespread municipal corruption and mismanagement (News24 2013), city officials pursued a nomination for the 2014 Worldwide Fund for Nature (WWF) "We Love Cities" Award. That entailed hiring a professional internet trickster who stole photos from numerous international Twitter accounts – using real people's photos but giving them new names – to promote the city (Bond 2014a). A central objective of this exercise was to promote a carbon-trading scheme for methane captured at the African continent's largest landfill, Bisasar Road dump, which by all accounts was a failed project (Bond 2019). One of the most brazen related gambits criticised in the Manase Report

was an attempted hijack of a \$475 million incineration tender at the same Bisasar Road site by former mayor (1996–2011) Obed Mlaba, using his daughter as a front (Dardagan 2011). Municipal greenwashing was corruption-riddled, as the Durban Solid Waste department became the main source of patronage contracts starting in 2016.

As a result of blatant outsourced-procurement rigging, then-mayor Zandile Gumede faced prosecution on corruption charges in mid-2018 and was named “The Mayor of Graft” by a major newspaper (News24 2018). Yet the San Francisco Global Climate Action Summit’s “One Planet City Challenge” nevertheless recognised her in September 2018 as “a leader in climate action” because she “continues to combine ambitious targets and focused action with community development initiatives” (Jika 2018, Municipal Institute of Learning 2018). Her response: “We are excited about winning this prestigious award, clearly, whatever we have been doing as the city is working and it is getting international recognition” (IOL 2018). Gumede’s mid-2019 arrest and forced resignation was the end of her tenure as the C40 urban climate network’s Vice Chair (Gumede 2017). By 2021, she faced 2000 corruption charges (Goba 2021), with court proceedings underway starting with a hearing on the state’s case in July 2022 but the conclusion is only expected in early 2023.

Immediately after Durban’s 2019 rain bomb, President Cyril Ramaphosa visited affected areas – alongside Gumede – to survey the damage (eNCA 2019). He promised emergency relief and rapid payment of what the United Nations Framework Convention on Climate Change (UNFCCC) refers to as “Loss and Damage” costs:

I immediately contacted our Treasury and said, do we have money to assist our people? And they said, “President, we have the money”. So money will be mobilised to assist our people. These are emergency situations that we budget for, so resources will be mobilised in the biggest way so that our people who are currently in need are assisted (eNCA 2022).

Yet only \$6.25 million was subsequently provided by the Treasury to meet emergency housing needs (IOL 2019b). That was just 14% of the city’s own estimate of the April storm’s \$46 million in residential damage, itself considered low given the scale of the destruction and the need for proper reconstruction (IOL 2019a).

Again, within days of the April 2022 catastrophe, the state promised reconstruction funding to the tune of \$70 million (McCain 2022). However, on this occasion, the higher-visibility fundraising drives favoured civil society groups, now supported by a much broader public, made aware of the disaster’s vast scale. Given both how much the state had abused emergency COVID-19 financing in 2020–2021 and how slow the prosecution was in the case of Gumede, there were suspicions the state’s emergency spending would be embezzled. Recognising the depth of his government’s self-delegitimation, provincial government premier Sihle Zikalala was surprisingly frank:

We want to say, without any equivocation, that all the resources allocated for flood relief and the recovery and rebuilding process will be utilised in line with fiscal rectitude, accountability, transparency and openness. We want to emphasise the fact that, having learnt the lessons of COVID-19, no amount of corruption, maladministration and fraud will be tolerated or associated with this province. We want to assure our communities that all the funds will be used prudentially and that no one will be allowed to feast on the suffering of our people in order to line their pockets.

(Mitchley 2022)

This was a poignant confession in part because Zweli Mkhize was one of his predecessors as KwaZulu-Natal leader (and indeed Mkhize unsuccessfully attempted to become the presidential successor to Ramaphosa in a late-2022 party leadership election). In 2021, Mkhize was fired as national Minister of Health due to corruption, to the tune of \$10 million (in COVID-19 communications grants) that benefited Mkhize's family and friends (Haffajee 2021). But Zikalala himself was also accused of abusing the emergency water supply by ensuring a tanker went to his house ahead of all others a few days after the 11–12 April water pipeline destruction in the north of the city. After widespread social media critique, Zikalala was compelled to apologise, but was the source of both jokes and resentment and so in August 2022 lost his job in the party's provincial internal elections (Citizen 2022).

But beyond personality politics and corruption, and beyond the contested prioritisation of emergency relief, there was a desperate need for longer-term, structural analysis and solutions. Politicians avoided such diagnoses and solutions, yet it was clearly in their self-interest to attribute climate catastrophes to human interference in the weather. Although climate attribution is usually a task that scientists normally do only in general terms, Ramaphosa's rapid climate narrative served to help divert attention from mismanagement, budgetary choices, and inappropriate policies.

A national diversion narrative of climate action

Ramaphosa's use of a climate-blaming narrative as a diversion entailed poignant statements that recognised the link between the Durban rain bomb and worsening climate change. No doubt moved by his April 2019 visit to a scene of terrible destruction (affecting a wealthy white homeowner living on a beach in the Amanzimtoti southern suburb), Ramaphosa recognised the link at that stage: "the force of nature is so huge and this is partly what climate change is about that it just hits when we least expect it". Then in April 2022, visiting a North Durban township, he was even more direct: "This disaster is part of climate change. It is telling us that climate change is serious, it is here. We no longer can postpone what we need to do, and the measures we need to take to deal with climate change" (NPR 2022).

Notwithstanding soothing, climate-conscious words, Ramaphosa's own background as a coal-mining tycoon is instructive. He grew enormously rich through his private conglomerate Shanduka (which he sold in 2016) (BusinessTech

2016). Shanduka displaced numerous families whose houses were in the way of coal mining in the 2010s, and also operated his mines without the required water licences (Letsoala and Shamase 2012, Villa 2014). The lack of state regulation appeared to be explicitly linked to his importance as a ruling-party politician (Jordan 2012). Ramaphosa also chose as its main coal-mining partner the world's largest commodity trading firm, Glencore, in spite of the fact that the notorious Swiss-based corporation was facing international lawsuits on dozens of ethical grounds (Silverstein 2012).

There were many other cases in which Ramaphosa's climate rhetoric was contradicted by policies and projects that support fossil fuel extraction. Perhaps most obviously, in mid-2021, Ramaphosa sought to protect Mozambique's gas-rich Cabo Delgado province from an Islamist insurgency by deploying more than 1000 South African army troops and much-needed helicopters (leaving only one in Durban for emergency rescues during the April 2022 rain bomb). The immediate goal of the military intervention was to defend the interests of Western and Chinese oil companies drilling offshore in one of the world's largest methane gas fields. As Ramaphosa's foreign minister Naledi Pandor testified in Parliament in mid-2020, "Great opportunity exists for South Africa to import natural gas from Mozambique" and hence "South Africa's security agencies need to enhance their capacity" (Fabricius 2020). But the South African troops performed poorly in Mozambique, in part due to budget cuts that were introduced at exactly the same time as the army was also deployed to quell the July 2021 riots and looting in which 350 people died, mostly in and near Durban. With that precedent in mind, in April 2022, Ramaphosa dispatched 10,000 troops to KwaZulu-Natal immediately after the rain bomb to assist with rebuilding, but also to prevent "opportunistic crimes in identified areas", namely sporadic incidents of looting and protesters blocking "key national routes" such as the main ring-road highway to protest the lack of municipal response to the crisis (DefenceWeb 2022). In Cabo Delgado, meanwhile, thousands of South African, regional, and Rwandan troops were fighting the insurgents. But the Islamic rebels continued their operations throughout 2022, disrupting the provincial economy and exacerbating a displacement crisis that reached nearly one million residents, with at least 6000 killed (Bond 2022). Nevertheless, TotalEnergies announced a potential resumption of its gas drilling and processing there for early 2023 when its own shoreline liquefied natural gas processing facility was secured. Ironically, the methane gas drilling is underway in an area that is the source of ever more destructive cyclones, due to rising sea-water temperatures that can be directly attributed to climate change (Barnet et al. 2005).

Ramaphosa also proved resistant to activist demands to halt state subsidisation of fossil fuels, electricity-intensive deep mining, refining, and smelting, which by 2021 reached \$50.6 billion annually (as calculated by the International Monetary Fund using a generously low \$60/tonne as its "carbon price") (Parry, Black, and Nate 2021). Yet he understood the implications of fossil-heavy electricity supply when the European Union threatened to introduce trade-related climate sanctions in the form of carbon tariffs on imports that generate greenhouse gases

(known as the Carbon Border Adjustment Mechanism). By October 2021, Ramaphosa was forced to acknowledge how South Africa's fossil fuels will negatively affect its economy:

As our trading partners pursue the goal of net-zero carbon emissions, they are likely to increase restrictions on the import of goods produced using carbon-intensive energy. Because so much of our industry depends on coal-generated electricity, we are likely to find that the products we export to various countries face trade barriers and, in addition, consumers in those countries may be less willing to buy our products.

(The Presidency 2021)

At the same time, South Africa's sudden turn to large-scale methane energy reflected a hope that the European Union and other Western financiers of Eskom would view gas as distinct from coal, that is, as a "bridge" or "transitional" fuel source. That position was rewarded in 2022 with an EU finding that both nuclear and gas should be considered "green" sources of power (Strauss 2022). Moreover, in 2020, Ramaphosa's public enterprise minister Pravin Gordhan appointed Andre de Ruyter as Eskom's new CEA. A decade earlier, Gordhan had served as finance minister and had arranged for the World Bank's largest-ever loan to pay for the world's largest coal-fired plants then under construction (Bond 2010). De Ruyter had been a lead executive at the coal-to-petroleum producer Sasol, formerly an apartheid parastatal institution that served to break United Nations anti-apartheid oil sanctions. There, De Ruyter was known as "Mr Coal". Reflecting his pro-fossil bias, De Ruyter announced in mid-2021 that 44% of his Just Energy Transition Partnership funds – including \$8.5 billion in supposed decarbonisation finance from the US, UK, Germany, and France committed at the 2021 Glasgow COP26 – would be dedicated to methane gas plants. The conversion of one plant and another new gas plant would together provide 4000 MW in the short to medium term (Presidential Climate Commission 2021). Yet it was by then widely understood that methane traps far more heat in the atmosphere than CO₂, and indeed, methane's potency was measured as 85 times higher over the course of two decades (Bloomberg 2022). Exactly one month after the April 2021 climate catastrophe, Ramaphosa announced his support for much *more* South African and African oil and gas exploration (News24 2022b).

The Ramaphosa government's other contributions to the climate crisis were legion. The National Planning Commission (2012), whose 2010–2012 deputy chairperson was Ramaphosa, was committed to "opening up the Waterberg [a region not far from where he was raised] for coal mining (and) a new heavy-haul rail corridor to the Waterberg coalfield (with expanded) export capacity in the line to Richards Bay". It also aimed to find "coal seam and shale gas reserves" and insisted that "gas-to-power projects should be fast-tracked (and) incorporate a greater share of gas in the energy mix, both through importing liquefied natural gas and if reserves prove commercial, using shale gas". The rail corridor and associated infrastructure were envisaged mainly to export 18 billion tonnes of

coal from a site in Limpopo Province, costing at least \$100 billion if completed (CESA 2013). In addition, Ramaphosa's transport parastatal agency Transnet was committed to privatising its rail lines to increase coal exports back to 75 million tonnes a year (in 2021, only 59 million tonnes were shipped due to the theft of copper cabling along the tracks) (Joffe 2021).

In the same province, another massive fossil-centric project emerged after Ramaphosa co-chaired the 2018 Forum on China-Africa Cooperation with Xi Jinping. Ramaphosa proudly announced a \$17 billion Chinese-driven Musina-Makhado Special Economic Zone (next to his former home village): "The following projects have been prioritised for implementation: a 4600 MW coal-fired plant, a cement plant and other metallurgical projects" (DIRCO 2018). The original coal generator plan was defeated by climate activists in early 2022 (Cronje 2022), but the "other metallurgical projects" would emit 34 megatonnes of CO₂ annually (Yende 2021). Hence, if the project goes ahead, these emissions will comprise 8% of the 420 megatonne national pollution target by 2030.

Meanwhile, Ramaphosa's ministers actively pursued fossil fuels without presidential objection. His energy minister recklessly pushed methane gas and coal (Steyn 2022). His environment minister rejected court orders to cut pollution by Africa's two largest greenhouse gas emitters, Eskom and Sasol (Carnie 2022). And his finance minister, Enoch Godongwana, delayed (by five more years) ratcheting up what was an absurdly low carbon tax, which in effect endorses the extremely high implicit subsidy to fossil fuels (Erasmus 2022a). From 2020 to 2025, the climate penalty was just a tokenistic \$0.34/tonne for the largest polluters (at the mid-2022 currency-exchange rate) – extremely low due to exemptions Eskom and Sasol had lobbied for (SARS 2021). At the same time as the exemptions were extended by Godongwana, scientific estimates of damage done by climate change (factoring in feedback loops) had risen to a \$3000/tonne cost of carbon (UCL 2021).

Municipal narratives of climate adaptation excellence as a diversion from inaction

Climate mitigation efforts were nearly non-existent at the municipal level in Durban as well. Just before the city hosted the COP17 in 2011, the Academy of Science of South Africa (Assaf 2011) commissioned a report titled *Towards a Low Carbon City: Focus on Durban* that opened with the claim, "The city of Durban has been a leader in South Africa with regard to climate change adaptation and mitigation initiatives". The Assaf study omitted any discussion of the public subsidies of carbon-emitting transport and the impact of port expansion plans, toxic petrochemical and oil-refinery facilities, and even the automotive industry.

The mitigation-diversion claim in Assaf's 262-page study required that its authors shy away from any critical mention of Durban's unprecedented public subsidies for long-distance air transport, shipping, fossil-fuel infrastructure, highway extension, and the resources spent attracting international tourists,

especially for sporting events. In particular, the study said nothing about the \$17 billion back-of-port plan for South Durban. The National Development Plan had in 2012 projected increased annual container throughput in the harbour from 2.5 million containers (when the report was written) to 20 million by 2040, to be achieved by digging out a massive new port at the site of an abandoned airport. When it became clear that container throughput would rise very slowly (to less than three million by the late 2010s), construction on that new port, scheduled to begin in 2016, was delayed to 2032 (Bond 2014b). Moreover, when it came to adaptation, Assaf failed to consider the existing harbour's vulnerability to extreme weather disruptions or sea level rise (Paton 2014). Assaf also failed to mention Durban's maritime greenhouse gas emissions, in the form of bunker fuels for ships, responsible for more than 3% of the world's total, even more than air travel (Makower 2022). Assaf neglected proposed roadworks to connect the growing container terminals and logistics sites, one of which destroyed the area's only "green lung" at a former horse racecourse (SDCEA 2020). And there was no mention of the displacement by trucking companies of hundreds of neighbouring Clairwood residents from their 150-year-old (black) community.

The Assaf study also ignored two large manifestations of fossil-fuel power in Durban: the toxic petrochemical facilities in South Durban, in spite of a tripling of oil-flow capacity through a new pipeline to Johannesburg via black neighbourhoods (Bond 2019). Likewise ignored were the climate implications of the plans to expand the automotive industry that did not include the production of electric cars (until a few were belatedly rolled off the Toyota South Durban assembly line in 2021, but even then, a charging system had not been rolled out) (Arnoldi 2021). However, the state was not the main culprit, and the report did name the highest consumers of electricity from Eskom's coal-fired generation supply: a large South Durban paper mill (Mondi), the Sapref and Engen oil refineries, Toyota, Frame Textiles, and the city's two largest shopping centres. Assaf neglected to address the city's biggest contributor to climate change at the time, the manganese smelter Assore, whose 2010 annual report conceded, "Electricity consumption is the major contributor to Assmang's corporate carbon footprint and reflects energy sourced from Eskom grid supply" (ASSORE 2010). Unfortunately, although Assaf did finally take a stance against fossil fuels in 2022 when offshore seismic blasting was at stake (due to marine conservation, not climate reasons), the leading scientific body in South Africa continued to disappoint. An example of its bias was its 2016 publication, "South Africa's Technical Readiness to Support the Shale Gas Industry", which was utterly climate denialist, so much so that it refused to admit or even discuss methane's far more substantial impact compared with CO₂ (ASSAF 2016).

In reviewing Durban climate mitigation, Assaf was not the only group of state-subsidised scientists to overlook or downplay glaring features of the climate crisis. The government's Centre for Scientific and Industrial Research (CSIR) – whose chairperson and CEO both came to the body from senior executive positions at Sasol – was at the forefront of methane advocacy, with no apparent regard for its climate impacts. The CSIR promotes a national gas

pipeline network, without considering the many dimensions of greenhouse gas emissions that would logically result from deep-undersea exploration, well-head and transport accidents, venting, flaring, piping leaks, and combustion (CSIR 2020). In Durban, at least two CSIR scientists were also guilty of downplaying the danger of storms in the harbour when they were engaged in environmental impact analysis for Transnet in 2012. The CSIR document, “Modelling of potential environmental change in the port marine environment” offered no analysis of storms, extreme rainfall, or rising sea level, leading to the government’s rejection of Transnet’s expansion plan because it did not “adequately address how climate change risks such as sea level rise and coastal storm surges will be addressed” (Paton 2014).

But in broader society, aside from a small network of civil society critics, it was not well recognised that the 2019 Durban Climate Action Plan and all other municipal climate-related activities failed to grapple with the scale of the crises, including Durban’s high petrochemical and industrial emissions (Municipal Institute of Learning 2018). The city, together with a range of academics and scientists, had created a narrative that Durban was “South Africa’s leading city in terms of climate change actions”, as asserted by Assaf. In reality, this narrative served to divert attention from the city’s contribution to climate destruction.

Epistemologies from civil society

Civil society organisations have been confronting climate change challenges at increasingly shorter intervals over the last two decades, at least. Their work has continued to focus on the reasons for climate-crisis formation but, through praxis epistemologies (challenging prevailing power relations and creating knowledge in the process), their own framing of the issues has become more wide-ranging and complex (Galvin 2019).

The rain bomb brought to light various knowledge framings, and in the following pages, three epistemologies are described. The first section introduces the three ways of producing knowledge and how they are embodied in organisations whose world views differ in important ways. This section shows how the choice and practice of epistemology are related to the nature of organisations and their external supporters. How these are related could be a fruitful focus for future research. The following sections discuss each epistemology in turn, focusing on one organisation, but also pointing out other organisations that utilise this epistemology.

The emergency, disaster epistemology is discussed briefly, based on Gift of the Givers as an exemplar of using one narrative in isolation. The case of the organisation Abahlali baseMjondolo is then examined with a view to understanding the service delivery epistemology, working in conjunction with the disaster one. The third epistemology, based on the fusion of the other two, is explored by considering the case of the South Durban Community Environmental Alliance (SDCEA). The three epistemologies are, ultimately, helpful in understanding alternative-developmental approaches to climate change in South Africa.

Epistemologies and organisations

The days and weeks after the April 2022 catastrophe generated three distinct approaches in civil society, with several important advocacy organisations making clear how their own choice of narratives would inform the knowledge they took from the extreme weather:

- 1 *Solidaristic disaster relief appeals*. These were made, among others, by the Islamic agency Gift of the Givers (GoG) and the shack dweller organisation Abahlali baseMjondolo (AbM).
- 2 “*Service delivery failure*” critiques. These were consistently made by street protesters, AbM, SDCEA, and the National Union of Metalworkers of South Africa (Numsa)
- 3 *Climate adaptation and mitigation failure critiques*. These came from SDCEA, the Climate Justice Charter Movement (CJCM), Oceans Not Oil (ONO), Extinction Rebellion, and the General Industries Workers Union of South Africa.

Since these epistemologies were developed through praxis, it is important to consider how the character of an organisation affects its engagement. Table 4.1 shows how organisations differ depending on seven characteristics related to the level at which they operate: their focus (geographical, issue based); the type of the organisation (including their political character); and their leadership (Table 4.1). An important factor is to what extent their explicit focus is climate related.

Most climate activists would take the position that all organisations must bring to the fore the pressing crisis of extreme weather events as well as their impacts. The following examples of several organisations’ epistemologies give a sense of how such shifts may occur over time.

Epistemology based on solidaristic disaster relief: Gift of the Givers and AbM

In GoG, we see how a well-regarded charity organisation maintains an explicitly apolitical image as a means of maintaining access to governments. Reliant on donations from the public, GoG avoids contentious or party-political narratives. So, although its website mentions climate change in passing (in relation to water borehole drilling), GoG’s sole focus remains bringing relief so that people can physically survive emergencies, especially in conditions of municipal state failure (Gift of the Givers 2022).

AbM also played an important role in offering relief to its members (said to number more than 100,000), even if the structural contribution of climate change to the rain bomb went unmentioned in their two main post-flood statements (Abahlali baseMjondolo 2022a, b). A range of organisations that work with AbM used their wide networks and resources to make appeals and deliver donated goods to shack dwellers in Durban. Requesting solidaristic relief was an

Table 4.1 Organisational characteristics that affect praxis epistemology

	GoG	Abahlali	NUMSA	CJCM	SDCEA
Level	Local, national	Local, some national	National	National	Local
Geographically specific?	No	Yes	No	No	Yes
Specific interest group?	No	Yes	Yes	No	Yes
Type of organisation	Charity	Social movement	Trade union	Organising structure	Grassroots organisation
Political, or class-bound?	No	Yes	Yes	Yes	Yes
Leadership/funding	Management	Local with outside support	Elected by members	Outside support	Local with outside support
Climate as stated focus?	No	No	No	Yes	Yes

early manifestation of AbM's way of generating knowledge about the primary victims of the rain bomb, although, as will be seen in the following section, its epistemology transcended apolitical relief and developed through praxis to embrace a wider and different set of demands.

Emergency relief, whether labelled charity or solidarity, is immediate and demanding. For the above-mentioned reasons, such relief needs have shaped the issue-framing and indeed the very epistemology of organisations that must address extreme weather events. Could these organisations achieve their goals more effectively if their emergency appeals communicated that, rather than such relief being a matter of Global North largesse, potential wealthy donors actually *owe* their constituencies (i.e. a demand for "climate reparations")? Apparently, whether implicitly or explicitly, the overall global and national consciousness has not advanced to the stage at which an affirmative answer can be given.

Epistemology based on service delivery failure: Abahlali baseMjondolo

Durban journalist Des Erasmus explained, in the popular e-zine *Daily Maverick*, that government's diversion narrative was well understood by community activists, as a means to cover up underlying malgovernance:

Local and provincial government spoke of climate change until they were reminded that notwithstanding climate change, poor infrastructure, drainage and sewer maintenance, poorly-built houses, and allowing residents to build homes on river banks had also significantly contributed to the fallout.
(Erasmus 2022b)

Daily Maverick columnist Judith February (2022) added:

[Ramaphosa] sashayed into the province, commiserated, committed the government to rebuilding infrastructure and blamed climate change. While it is true that climate change is real [...] we can also not ignore the effects of poor infrastructure and neglect over prolonged periods of time.

Indeed, this extreme weather event provided an opportunity for many to focus public attention on infrastructure shortcomings, which were continually stressed in not only the media, but in several of the most politicised statements about the April 2022 catastrophe.

Nowhere was this more visible than in many of the city's informal settlements that were washed away in full or part. Both Numsa (South Africa's and Durban's largest trade union) and AbM (Durban's largest community-based organisational network) expressed outrage at the scale and human cost of the destruction. For Numsa (2022), the core problem was that:

Many people are forced to build their homes on riverbanks because they are poor and cannot afford land or housing. People are desperate and they

occupy land along the riverbank because of this government's failure to provide land and decent housing.

Most of Durban's 569 informal settlements, hosting a conservatively estimated quarter of the city's population, reflect apartheid geography (UN-HABITAT 2019). The city's good-quality, well-located land was reserved for white, Indian, and coloured communities, not those of black Africans. Since 2005, battles fought by AbM and other community organisations typically began with a simple demand: to allow residents of the shack settlements to remain on land that was conveniently located for urban workers no matter how unstable soil conditions were in many of the sites. (For example, most of the informal settlements were located on steep hills deemed unsuitable for formal dwellings.) This was convenient in terms of the social reproduction of the labour force, because if workers lived inexpensively near industrial areas, then employers would not be pressured into raising wages to cover the costs of formal housing. Indeed, the national business elite's main early 1990s neo-liberal agency for "site and service" policy – the Urban Foundation – regularly promoted shack construction (Bond 2000). In Durban, the agency did so not only theoretically but practically in various projects. The highest profile was the hillside Kennedy Road settlement adjacent to Africa's largest landfill. According to local AbM leader Mdu Ngqulunga:

When I first came here in 1993, the Urban Foundation came here and promised us that we can just stay here and showed us [how to upgrade] the places that we had, all these measurements and things. They insisted that we shouldn't accept it if anyone else might come to say that this land is for someone else ... when we stayed here the housing department used to come and promise us that they're going to build us houses, this year, then this year, then they came and told us that the land is unstable for building.

(Bryant 2005)

It turned out that the municipality's apartheid-era civil engineers were correct about the dangers of such hillside settlements, although that was not clear until April 2022. The production of knowledge about the climate catastrophe then suddenly overwhelmed all prior oppositional knowledge about displacement. As a result, on 12 April, AbM (2022a) urgently shifted its framing based on emerging knowledge of hillside-settlement vulnerability: "When the waters have subsided we need to pick up the conversation about land and housing with much more urgency. We cannot continue to move from one disaster to the next while remaining in such undignified and dangerous conditions". AbM members who lost everything as a result of being housed in shacks on hillsides or flood plains (sometimes immediately adjacent to rivers that the rain bomb turned into raging torrents) may well be open to moving to a safe place, even if not as proximate to the city centre. However, a major planning rethink is needed, given not only the vast swathes of underdeveloped commercial areas in central Durban, but also that many well-located residential settings (featuring large plots) were developed in

the colonial era before the merits of a more compact urban form were recognised. From that standpoint, the existing “bulk” infrastructure (such as sewage treatment) can be utilised at a lower per unit cost than green field building far from the city centre.

But even if there is a new awareness regarding the precarity of housing in water-logged sites, there will inevitably be grievances about service delivery. With an estimated 40,000 people displaced, impromptu grassroots “service delivery protests” broke out from 13 to 16 April. Many condemned the municipality due to the lack of state services available, especially for those whose families suffered deaths, injuries, and destruction of their houses (Sharjah24 News). Newly homeless shack dwellers demanded more urgent relief, making their case more urgent by occupying and blocking roads in various parts of the city (TimesLive 2022; AfricaNews and AFP 2022; Ngema 2022; Lalbahadur 2022). The number of such protests has been increasing over the last decades and could be expected to rise further, given the dire and extreme suffering following the flood. Within two weeks, the municipal and national governments had increased the number of available police and army troops to put down these protests by a factor of 15 (DefenceWeb 2022).

Reflecting a shift in oppositional knowledge, consider the fury expressed by a protesting resident of Kennedy Road informal settlement, when comparing the rain bomb of April 2022 to that of April 2019:

- Protester:* There’s a huge damage that has been done here but the president couldn’t attend to our damage that we have here.
- Interviewer (eNCA tv):* This has been an ongoing fight for you. I’ve come here before when there’ve been protests as well. Has government ever offered residents here an opportunity to live anywhere else?
- Protester:* No, it never happened, because what they told us in 2019 it was also a very sad story, when officials at that time – a deputy mayor – at that stage she came here and said we have ourselves, we have to identify the land. How we can identify the land who owns the land? We don’t have those facilities to do that. Which means they’re just pushing us away. But what I can say? They have to relocate us because, you can see, this is a disaster area, yeah. This place will be washed away in a few years to come... This place is totally finished. They have to relocate us if it’s possible.
(News24 2022a)

Over subsequent months, there were numerous housing and water-service protests that achieved some limited victories in localised terms. With only 683 temporary houses provided by the municipality from April–August 2022, the most

impressive social resistance was the revolt against the city's 120 community halls – renamed “Care Centres” and responsible for 4000 homeless families – that still, in late August, housed thousands of flood victims in often intolerable conditions. One group of frustrated victims – Umsinsi Wokuzimilela – organised a break-out in July. Their first stop was a sit-in for several days at City Hall, followed by a surprise occupation of one of Transnet's well-located labour hostels where 300 unused rooms with beds and decent services were an enormous improvement, especially once they forced the city to rent the space indefinitely from Transnet for them (Xulu 2022a, b). Other protests occurred just north of the city, where in part due to funding shortages, water system failure persisted. Sewage pipeline breaks also went unrepaired for many months and hampered a return to the lucrative seaside tourist industry because *Escherichia coli* counts persisted at the most popular beaches through December.

There were repeated appeals by politicians to a very stubborn national Treasury – where Godongwana was fully committed to imposing severe austerity – to free up funds, but many weeks went by in April–May without Pretoria supplying even the promised 4% (\$63 million) of the estimated \$1.6 billion in damages to infrastructure and housing. COVID-19 spending had raised the annual fiscal deficit to nearly 10% in 2020, and with a very weak economic recovery, the attempt to bring that deficit below 5% became acutely painful. That, in turn, had become necessary following “fiscal consolidation” promises to the International Monetary Fund in August 2020, in exchange for a \$4.3 billion loan (Bond and D'Sa 2022). Ironically, Godongwana himself admitted in early May:

Durban to me is an eyeopener. In 2019, we had similar floods and they've come back on a mighty scale. We kind of did a patchwork when we were making our response there. We were not saying how do we make sure that we build resilience in Durban so that when the floods come back, we are in a better position.

(Eyewitness News 2022)

The 2022 response could not even be described as patchwork. The need to properly fund climate repairs and much stronger adaptation programmes were rarely if ever remarked on, aside from in an official commentary on the city's resilience made to the Presidential Climate Commission in August. By then, even the municipality's main climate official, Debra Roberts (2022), acknowledged the obvious links from the appalling structural features of what she acknowledged was municipal climate “maladaptation” to community anger:

One could argue that eThekweni is already in a maladaptive space because so many of the most vulnerable communities are repeatedly exposed to (and impacted by) hazards such as floods. Prioritising investments in infrastructure, ecosystems or other options without shifting the distribution of

resources and power will contribute to persistent inequality, which will likely have far reaching consequences. For example, these decisions could continue to move development pathways beyond social thresholds, resulting in repeated social unrest.

(Roberts 2022)

***Epistemology based on “climate adaptation and mitigation failure”
critiques: Organisations committed to climate justice and a just transition***

Was the municipality purely to blame? As Numsa (2022) put it, “Capitalism as a system has never succeeded in dealing decisively with inequality. It is a system designed to benefit the few who are very wealthy at the expense of the majority of people”. This suggests apparent scope for further development of the epistemology that comes from Numsa’s propensity to think globally and locally at once, which in turn leads logically to concepts of climate justice – even if Numsa soon thereafter formally adopted a climate-denialist standpoint in its mid-2022 national congress documentation.²

One Durban civil society movement has been at the cutting edge of local, national, and even global debates about climate justice for decades: SDCEA. The group, founded in 1995, is a network of 19 affiliates opposing petro-chemical complex pollution in an area with roughly 600,000 residents (including the large township of Umlazi with 450,000), most of whom are black (i.e. African, Indian, and coloured – and about 10% white, relatively privileged residents). SDCEA coordinator Desmond D’Sa reacted to the immediate impact of the flooding in the refinery area:

The spillage of toxics in South Durban is a common problem, and the spread of pollution through flooding can be devastating in our low-lying areas, especially those around the closed-down refineries. We are especially worried now that the Shell/BP Sapref facility, which closed last month, and did not receive adequate maintenance in their oil storage facilities. The stance that mayor Mxolisi Kaunda has taken on the climate crisis is irresponsible, including his failure to ventilate a detailed report on the city’s lack of preparedness last year.

(Perumal 2022)

That report apparently covered the 2019 adaptation and resilience failure but was not released to the public. For SDCEA climate officer Shanice Firmin, several examples of non-adaptation stood out:

There are too many cases of poor drainage systems within the city. We lack a serious climate adaptation and resilience strategy in spite of all the absurd hype the municipality generates. In South Durban, we still lack evacuation plans, in spite of known flooding in areas like the M4 and N2 highways, Tara Road, the Sapref Refinery, the M9 and South Coast Road. We see that there

are still no plans in place, to address what are increasingly severe weather conditions.

(Naidoo 2022)

Firmin had warned about all these factors in 2019, in a *Daily Maverick* article where she spoke on behalf of the

residents of sacrificial zones such as South Durban who live in such a heavily contaminated area, where industries are escalating toxic emissions to meet the demands of the business as usual. South Durban is located on a flood plain with the majority of development in close proximity to the coastline, which has been experiencing climate change impacts since as early as 2008:

- In June 2008, a storm flooded much of the South Durban basin, preventing the Wentworth and Bluff communities from accessing the main highway.
- A day prior to the COP17 summit opening in November 2011, a heavy downpour of rain inflicted such disorder that many lost their lives when RDP houses caved in and collapsed.
- In August 2012, the Durban port berths 203 to 205 awaiting extension were severely damaged as a result of heavy winds that caused a ship to collide against cranes, subsequently ensuring a two-week closure, and in our backyard, trucks leaving the Engen facility were found water-logged.
- In October 2017, an extreme storm left South Durban beleaguered, and an estimated 18 residents died. Gusts of wind were recorded at 180 km/hour, which steered an MSC container ship into the mouth of the harbour. This storm will go down in the book of history for the microplastic nurdles that suffocated our entire coastline as a result.
- Most recently, KwaZulu-Natal and South Durban residents felt the shock of the major storm that destroyed everything in its path in April 2019.

(Firmin 2019)

Indeed, SDCEA had intervened in each case and on many other occasions against climate injustice, organising dozens of protests – including a 10,000-strong one against COP17 in December 2011, at the time the largest climate protest ever held in Africa – as well as numerous environmental impact assessment and other technical critiques of high-carbon development projects (SDCEA 2019). In a 2019 open letter to Ramaphosa, D'Sa (2019) wrote:

We expect these drivers of climate change to continue taking our society over the cliff, because offshore Durban today, four massive corporations – ExxonMobil, Statoil, ENI and Sasol – are exploring for oil and gas in the dangerous Agulhas Current, more than 3 km deep, hoping to achieve a find as big as Total did offshore of Mossel Bay in February. These insane digs for fossil fuels must urgently be halted. Moreover, in the spirit of the “polluter

pays” principle, the damage the major polluters have done must be tallied up, and a bill given [to] them for these liabilities.

D'Sa (2019) also insisted that a just transition begin immediately, but with well-paid jobs:

In contrast, our workers who are lucky to get jobs doing the badly needed work are only able to get \$8.30 a day, and often piece work is paid as low as \$0.76/hour, for example in the Expanded Public Works Programme. This mix of state and business corruption plus extreme low wages for ordinary workers, explains why we have the world's most unequal society... We ask you to endorse the Million Climate Jobs programme that many civil society groups in South Africa have put forward.

The Alternative Information and Development Centre (2017) had arranged just transition strategies – termed “Million Climate Jobs” – as early as 2010, and had there been political will, such climate-proofing would have been officially endorsed in Durban, long before the rain bomb of 2017. Other groups also responded directly to the rain bomb as a climate catastrophe, including the national CJCM and the Durban-based ONO marine advocacy group. Symbolically and with surprisingly high national attention, these groups filed two cases charging politicians with culpable homicide with the police (in Durban and Johannesburg), on grounds of both mitigation and adaptation negligence. This delegitimation strategy followed several years of frustration – in part by building social support, doing research, and making parliamentary appeals generally ignored by those in power – and, as a result, CJCM and ONO charged Ramaphosa, his ministers of Energy and Mineral Resources and of Fisheries, Forestry and the Environment, the leader of the Presidential Climate Commission, provincial leader Zikalaa, and Durban mayor Kaunda (ONO 2022). As they explained:

The harms of this flood are the result of an uncaring, rotten, corrupt and failing government, at the national, provincial and local government levels. Instead of looting, mismanagement and fomenting violence, the ANC in power in KZN should have been using public money to upgrade infrastructure, provide homes, provide a lead in mitigation, adaptation and ultimately the deep just transition. Instead, it has brought great harm to the people... Mere disaster relief measures are just piece-meal and reactive, they will not work, the country needs to be on a climate emergency footing. Instead of taking the climate crisis seriously and despite being aware of climate science, this government has pursued more gas, coal and oil investments. It is also wanting to invest in expensive and dangerous nuclear power.

(ONO 2022)

Another climate-protest group in South Africa that regularly mobilises in Johannesburg and Cape Town, Extinction Rebellion, remarked that while

KwaZulu-Natal Province suffered “the worst climate shock in memory, banks like Standard Bank continue to pursue a fossil fuel driven agenda”. This statement was issued ahead of their Earth Day protest at the country’s largest bank the following week, although that protest targeted Standard’s lending for a Uganda-Tanzania oil pipeline (Extinction Rebellion SA 2022).

The most powerful oppositional force in South Africa was the trade union movement. But what was organised labour doing, when not ignoring climate? Ironically, one of the world’s most important voices for a *socialist* just transition based on a “class struggle approach” to decarbonisation a decade earlier was Numsa. At the time, its leadership included several climate-conscious staff – for example, the deputy general secretary, Karl Cloete (2012), and lead educator Dinga Sikwebu – who subsequently retired from the union in frustration. Numsa’s workers were most impacted by job losses in the high-carbon smelting, automobile, and other heavy industries, as well as by the privatisation of Eskom (Cloete 2018). The SA Federation of Trade Unions (Safu), of which Numsa is by far the largest member (305,000 members of the 629,000 total in early 2022), issued a statement the day after the Durban rain bomb:

Denialists and some profiteers dismiss us when we lament, raise awareness and alarm about climate change. They say we are exaggerating and overstating the danger of climate change and the urgency of the remedial measures ... and the necessity for urgent interventions with green solutions.

(SAFTU 2022a)

Safu leader Zwelinzima Vavi had in 2020 made explicit why such interventions should have a very different character to those proposed, since

The term Just Transition is now being used as shorthand for “yes, yes, we acknowledge that workers might be anxious, but don’t worry!” When the likes of anti-union Richard Branson and other billionaires use the term Just Transition, it makes me angry. When South Africa’s President, Cyril Ramaphosa, refers to the need for a “Just Transition” – in the same speech where he announced that the national public utility, Eskom, would be broken up or “unbundled” in order to attract private investors – we know the term has been captured, co-opted and corrupted.

We – the climate movement and the trade union movement – can no longer afford to endorse the central premises of the so-called liberal business establishment, of the mainstream, “big green” NGOs, and of market-focused think tanks. Some in our various movements have tried that, and it did not work. We need a different approach, aimed at the working class, the youth and all those who seek real change. We must challenge to current arrangements of power, ownership and profit... we must immediately start to use Just Transition in terms of a profound *socioeconomic transformation* – this is the only way to achieve “a zero-carbon world”. This is the reason we should advance social ownership of the renewables. Energy is a public good and

should not be privatised, same as the provisions of clean air, clean water, public healthcare and education, etc.

(SAFTU 2022b)

There were, however, immediate reconstruction needs to be addressed in Durban. The small 23,000-member General Industries Workers Union of South Africa union had perhaps the most radical leadership in the country, and made the most extensive statement, including an appeal for a genuine just transition:

How can this calamity have happened? The Durban municipality is praised for climate change adaptation, and its Climate Action Report is advertised as the first in Africa by any city... The city's mafia-like construction companies and corrupt politicians and officials have spent this period building crummy houses that quickly fall apart, failing to undergird homes with strong foundations, choosing untenable hillsides for housing placement, and diverting funds – but as the Mpisane and Singh empires showed, no matter how corrupt, the municipality would always give them new contracts...

The South African working class is desperate, due to the state's economic mismanagement and the capitalist investment strike. We need immediate emergency relief in KZN's disaster zone. But beyond that we need changes in the structure of power and in public policy. We demand a serious Just Transition that will mean many more jobs for so many of our members and for a society whose livelihoods must decarbonise even more rapidly than the economy as a whole. To repair the damage done and rebuild Durban so it can withstand extreme weather will cost billions – and it is vital we embark upon this task with maximum commitment to permanent job creation, especially within the state so that the era of procurement scandals, outsourcing and corrupt Public Private Partnerships comes to a decisive end.

And although we are firmly convinced that the South African ruling class and ruling party will reject this strategy, our members stand by in Durban and across the country to make a genuine Just Transition happen. We need to be able to tell future generations that the destructive mayhem of the climate catastrophe, the ruling party's degeneration, the state's repeated failures, and the capitalist system's lethal threat to us all, can be replaced by eco-socialism.

(GIWUSA 2022)

Climate epistemologies in South Africa

It is tempting to simply apply the now well-worn slogan, “Think globally, act locally” in our support for organisations that weave these epistemologies into a single thread. The various organisations do, after all, operate at different functional levels: they may provide or support relief in the wider context of state service

delivery failure, informed (or not) by the recognition that the crisis is caused by climate change and the failure of government's mitigation and adaptation.

In this chapter, we have considered not just how the various levels of engagement with the rain bomb crisis emerged, creating in the process new knowledges including a climate justice epistemology. Most importantly, these knowledges arose in different types of organisations, grounded in the particular South African context, through praxis, over time.

Ideally, in civil society movements, there would have been interlocking, overlapping, and mutually reinforcing ways to offer both analysis and action – especially in the form of demands for climate reparations and a far-reaching just transition – between these three perspectives. The failure to achieve synthesis is one reason South African civil society has been so divided and generally incapable, unable to take advantage of crises like these and organise more coherently at both local and national scales. The desperation on display in April 2022 was a chilling reminder of the mid-2021 mass looting experience (also mainly in Durban), as displaced people again broke into shops and shipping containers in search of food, water, and anything of value (Singh 2022). For Numsa (2022), this harked back to mid-2021, because like then, “shops have been looted because people are hungry and desperate”.

Such splintering, atomistic politics and survivalist mentalities appeared difficult to overcome in the early 2020s. After all, at the same time as rioting and xenophobia became a threat to progressive organisers, other unrelated splits were occurring: at least three different national climate justice coalitions, a terrible cleavage in the left-labour movement mainly between Saftu and Numsa leaders (AIDC 2022), continual misunderstandings between community activists fighting similar battles but without organisational coherence, a youth still to find its voice, and other well-known woes that the independent left faces everywhere.

In one effort to overcome these differences, a strong grassroots upsurge of concern and protest emerged in November 2021 to fight offshore gas exploration by Shell, Total, and Impact Africa (run by charismatic local entrepreneur Johnny Copelyn). It was successful, mainly in the courts, where over the subsequent four months, five out of six injunctions against seismic blasting were successful, largely on procedural lines (failure of the oil companies to consult). Indeed, in September 2022, the Shell/Impact case was decided in favour of its critics in one celebrated High Court decision, in part because of the defendants' failure to address climate concerns. There was certainly a climate narrative involved in this upsurge of protest and litigation. But the victories were mainly due to proponents of marine conservation (by far the main narrative of white middle-class protesters) and eco-tourism joining in alliance with black shoreline communities and fisherfolk, albeit without any obvious just transition language.

As a result, desperation to raise consciousness about climate justice and change the overall power balance led CJCM activists in February 2022 to call for international sanctions against Ramaphosa's government, especially the withdrawal of an \$8.5 billion concessional finance deal struck in November 2021 at

the Glasgow climate summit (Climate Justice Charter Movement 2022). The strategy of delegitimisation and the tactics of financial disinvestment together reflect the activists' strong sense that this kind of economic punishment is what motivates elites to change tack. A precedent for such international solidarity against Pretoria was set in 1985 when anti-apartheid sanctions hit the white establishment hard, leading to an economic crisis and the end of apartheid by 1994. In addition, a wedge may well be driven by the European Union's (and other Western) Carbon Border Adjustment Mechanism climate tariffs, and if done properly, such a wedge could go sufficiently deep as to break the bloc of high-carbon emitters away from the rest of the economy.

But local conditions also needed the most acute attention. For example, social psychology was also stressed as a site of overdue intervention because an even worse degeneration of the collective spirit was feared the day before the Durban rain bomb. On Sunday, 10 April, a march through the city centre was called by a national xenophobic movement: Operation Dudula, meaning "to drive back". Fortunately, that attempt to light a spark failed, for as Chris Makhaye (2022) of *Daily Maverick* reported, "Instead of the 'mother of all marches', Operation Dudula's launch in KwaZulu-Natal was attended by just a few dozen people, many of whom were bused in from Gauteng". Nevertheless, as another sign of the times, former mayor Zandile Gumede was voted on the same day by ANC members as head of the ruling party's Durban branch, which in recent years has been the largest in the country, although the corruption charges she is facing may prevent her from serving (Ndlovu 2022). All these political processes in Durban confirm once again how dynamics remain fluid and difficult to predict.

Yet one obvious place to look for optimism is in the lives of ordinary Durban residents who are striving to provide mutual aid and sharpen their critique of local, provincial, and national governments. Over the past half-century, the city's activists have often been at the forefront of such struggles: in 1973, when port workers organised and helped seed a national labour movement; in the mid-1980s, during the cross-class and race, community-based anti-apartheid resistance under the United Democratic Front banner; in the late 1990s, under the banner of the "We are the Poores" movement that fought commodification of services; in 2005, when AbM shack dwellers rose up and won both street battles and legal struggles against evictions; and in the ongoing environmental justice advocacy campaigns by poor, black residents against industrial pollution in their areas.

Still lacking, however, is a vision of an alternative to the deep frustration and anger at inequality in South Africa, amidst extreme climate injustices. Without such a vision and organised resistance movement that stretched to a national scale, this sort of community opposition could be reduced to chaotic outbursts, as extreme weather events become increasingly frequent. Formulating such a vision may seem to be a pipe dream, as it would require a deep, urgent change in the balance of power. How that might happen remains unclear. While Ramaphosa began losing power internally within his badly divided ANC party, which in Durban won only 42% of the vote in the 2021 election (14% less than in 2016),

the ANC has lost control of most major cities to centre-right opposition parties (working in coalition), while also in 2021, the xenophobic Operation Dudula began organising in working-class communities targeting African and Asian immigrants (reminiscent of the successful right-wing populist agenda of Brexit, Trump, Modi, Bolsonaro, Duterte, Orbán, etc.).

What, to conclude, are the strengths and weaknesses of the three kinds of epistemologies we have examined? First, had the state been adequately prepared with adaptation and resilience programmes, there might be more sympathy for (opportunistic) national and local politicians who shifted blame from their own failures to climate change. However, in spite of the fact that they were doing nothing to address either their malgovernance or climate change itself, this discursive strategy had worked so far, both in Durban and across South Africa, and it would likely continue. Second, the experiential advocacy narratives of GoG, AbM, Numsa, and aggrieved community protesters reflected urgent, genuine threats to their very survival, and along with concern about relief funding that was at risk of being stolen by officials, they reconfirmed popular disgust at the local municipality. But the third, climate justice-based perspective has persisted, and it blends traditional South Durban articulations of environmental justice with local and national climate-centric movements as well as some of organised labour's most advanced elements.

While not yet completely dovetailed, the latter two epistemologies may help broader society learn once again how to fight oppression with an organisational response, one that transcends handwringing, meagre reforms and charity, regardless of the fact that emergency relief is regularly needed for hundreds of thousands of people. The one certainty is that the latest Durban rain bomb heralds far more profound climate injustices until the popular epistemologies fuse into a coherent climate-justice ideology and programme for taking power.

Notes

- 1 “Durban” comes from the name of the first Cape Colony governor at the time of white settlement in 1835. The use of Durban instead of eThekweni – which is technically the entire metropolitan area in contrast to the old pre-2001 border area – throughout reflects conventional naming routines. There was a controversy over the two different meanings of eThekweni (one being a sexual innuendo) in isiZulu that led a former mayor (Obed Mlaba) to advocate a name change.
- 2 In its 2016 Congress document, Numsa was firm: “We resolve to link our struggles around climate change with our struggle against global capitalism and find allies in that effort across the globe”. But the leadership’s position shifted in the meantime, and a former Eskom leader was hired as an energy advisor. So Numsa’s mid-2022 congress documentation carries these pro-coal sentiments:

While the government has committed itself to move away from coal, we notice that coal exports from South Africa, and indeed globally, have skyrocketed. Many countries in the world, especially those that are in the BRICS axis, refused to make such commitments. China continues to build coal-fired power stations, with clean-coal technologies. The fundamental question is: why is South Africa not doing the same given the abundance of coal?

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Part II

Climate change communication



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5 Receptivity to the knowledge of others

Building urban climate resilience in Southern African cities

Dianne Scott and Anna Taylor

Introduction

The field of climate services is based on the premise that relevant climate information and tools for decision-makers can be provided by authoritative experts and transferred to societal users of information who will then use the information to make decisions that lead to climate-compatible urban development (Vaughan and Dessai, 2014; Brasseur and Gallardo, 2016; Nagy et al., 2020). This stems from the deficit model that assumes that poor decisions are made because of a lack of scientific knowledge (Cook and Melo Zurita, 2019). Yet there is a growing body of knowledge suggesting that people learn and shift their perspectives and values through affective experiences, rather than being given information, no matter how tailored.

This chapter explores how transdisciplinary collaborative processes can be designed to provide a space for thoughtful and critical dialogue between diverse urban stakeholders to engender an enhanced understanding of and receptivity to creating more resilient cities through the inclusion of climate information in decision-making. The Future Resilience for African Cities and Lands (FRACTAL)¹ project proposed from the outset to use a transdisciplinary approach to knowledge production and application, as literature over the last two decades has critiqued the conventional disciplinary academic system and its conceptualisation of science and society as a binary set of categories (Hessels and van Lente, 2008; Klein, 2013; Swilling, 2014; Polk, 2015; Vogel et al., 2016).² As transdisciplinary research aims to produce knowledge to address real-world social problems, it requires a “messy engagement” of diverse participants who bring different types of knowledge to the engagement process (Davies et al., 2008, quoted from Nagy et al., 2020, 149).

This chapter presents one of the critical outcomes of the FRACTAL project, namely, the emergence of the concept of receptivity as an alternative way to understand the shift to a more sustainable way of thinking about future development decision-making in Southern African cities. Receptivity is argued here to be a subjective, non-material process associated with values, identity, ethics, and emotions operating at individual and social group or community scales (Lotz-Sisitka et al., 2015; Gosnell et al., 2019, 58). This notion of receptivity echoes

the emerging literature casting the Anthropocene as a social problem, requiring socially negotiated solutions and situating human agency as central to this process (Löfbrand et al., 2015). This differs from the technical, expert-dominated solutions to climate change issues in cities (Gosnell et al., 2019).

The chapter provides a brief review of the concept of receptivity, outlines the context of the FRACTAL research project, and gives evidence of how receptivity was stimulated in it. The evidence is presented through the following five overlapping themes:

- The creation of a safe space for engagement.
- The engendering of cross-sectoral dialogue in participatory forums.
- Embodied practices and the use of serious games.
- Disrupting conventional assumptions about contentious issues.
- Expanding time horizons and thinking about the long-term future.

The first four of these themes were identified from a review of existing literature on receptivity and used to deductively structure the analysis of the FRACTAL evidence. The fifth theme emerged from the evidence inductively as an important aspect of receptivity as related to issues of climate change and urban sustainability.

The concept of receptivity

The notion of receptivity has been debated by political scientists and philosophers (Kompridis, 2011; Nedelsky, 2011; Mihai, 2016; Beausoleil, 2019), as well as researchers from science and technology studies (Lawson, 2010; Latour, 2011) and various studies in applied fields such as agriculture, education, and medicine (Gosnell et al., 2019; Kumagai et al., 2018; Hendren and Kumagai, 2019; Kumagai and Naidu, 2015, 2020; Nagy, et al., 2020). These writers question the established ways of thinking about human judgement, decision-making, and action to understand societal change and the deepening of democracy.

The literature shows that receptivity occurs when actors, in their encounters with frames of reference and knowledge different from their own, open themselves to the frameworks of others (Kompradis, 2011; Nedelsky, 2011; Mihai, 2016; Stengel, 2018). If they do not open themselves, it suggests that they do not want to change their frame of reference and instead want to remain in the realm of business-as-usual in their decision-making and practice (see Scott and Taylor, 2019, for a literature review). Essentially, it is posited that receptivity results in a shift in *epistemology* or way of knowing social reality.

When encountering different frames of reference, through engagement and dialogue on substantive issues, peoples' views expand, and their decision-making becomes more impartial. It is the everyday engagement with different points of view that enables the cultivation of judgement and the ability to respond to the inevitably changing world around us (Nedelsky, 2011). Experimentation and new possibilities arise: "we experience an enhanced understanding of ourselves, each other and the world around us, through the opening up of additional questions

and possibilities” (Kumagai et al., 2018, 1779). Receptivity to other frames of reference is in no way passive, it is rather a stance, a way of engaging, thinking, and acting in relation to others that is open, with a willingness to share, to let go, to take on and arrive at new insights and new ways of thinking and being (see Scott and Taylor, 2019, 4).

It is in participatory processes in which actors engage in dialogue that they are likely to come across different frames of reference and a state of receptivity can be facilitated (Kompradis, 2011; Patton and Parker, 2017; Kumagai et al., 2018). It is proposed that in these spaces, a community of practice could become receptive to different ways of thinking and doing, and actors thereby shift into a more transformative mode in their practice.³ In suspending their existing categories, space is made for “new or marginalized viewpoints to find their way into the political arena” (Ryan and Flinders, 2018, 137). Through dialogue, mutual recognition and respect grow, nurturing trust between parties (Hendren and Kumagai, 2019).

When people feel safe in an environment of trust and empathy, receptivity and listening⁴ is enhanced (Beausoleil, 2014, 2019). Thus, if receptivity is an affective and thus primarily embodied state, some authors argue that embodied practices, such as role-playing, playing serious games,⁵ and storytelling, might be among the most direct and effective routes to fostering receptivity and giving people a voice (Furber et al., 2018; Justice et al., 2018; Magnuszski et al., 2018). Therefore, it can be argued that receptivity is a crucial forerunner of both transformation and change (Lotz-Sisitka et al., 2015).

The literature on receptivity highlights several concepts, namely collaboration, dialogue, safe spaces, trust, listening, empathy, mutual learning, communities of practice, and affect (Callon, 1999; Beausoleil, 2014; Patton and Parker, 2017; Justice et al., 2018; Kumagai et al., 2018; Beausoleil, 2019; Hendriks et al., 2019; Scott et al., 2019). Theorists from a range of domains have used these concepts to argue that in transdisciplinary, collaborative research, a “safe space” – a space in which it is safe to take risks and venture out of one’s comfort zone – is essential for fostering dialogue, and that receptivity to other viewpoints and knowledge prompts critical assessment of conventional categories, opening the door to mutual learning and transformational thinking (Hendren and Kumagai, 2019; Nagy et al., 2020). Furthermore, theorists argue that an affective, dialogic approach that captures voice and personal experience allows for the suspension of existing frames of reference and has the potential to shift to more transformative understandings of complex problems (Beausoleil, 2014; Meijers et al., 2016; Ryan and Flinders, 2018; Hendriks et al., 2019).

Context of the research

The transdisciplinary FRACTAL project commenced in July 2015 with a view to better understanding regional climate patterns impacting Southern African cities and the governance arrangements shaping urban development pathways. It was designed to facilitate engagement between scientists, government

decision-makers, and civic actors in Southern African cities, all of whom hold knowledge that is not only “legitimate” but “indispensable” for building climate resilience (Polk, 2015, in Scott et al., 2019). The model adopted assumed that there were many sources of expertise in society other than scientific knowledge (Lane et al., 2011) and that co-production of knowledge was needed to understand and manage urban problems in the face of increasing complexity and uncertainty in the Anthropocene (Callon, 1999; Lövbrand et al., 2015).

Assuming that cities are an integral part of the region they are situated in, the FRACTAL project aimed to contribute to creating more climate-resilient city-regions across Southern Africa. To do this, it was necessary to engage with city decision-makers to understand the specific context of the cities, their key developmental issues and climate risks, and how climate information could be integrated into their decision-making processes. The project consisted of a large team of academics and city stakeholders working across nine cities in Southern Africa.⁶ The stakeholders included city officials and councillors, as well as a range of non-state actors such as community organisations, NGOs, and international organisations (e.g. UNDP). The engagements mainly took place through a series of Learning Labs (LLs) held in the cities of Lusaka, Maputo, and Windhoek between 2016 and 2019, as well as a series of Dialogues focusing on special issues.⁷ The research questions that guided the process were:

- Which “burning issues” facing cities need to be addressed through climate-sensitive decision-making so as to avoid exacerbation?
- What types of climate information are needed for different types of decisions?
- Which policies and legislation include climate change considerations, and which do not?
- Who are the actors who would need to be involved in the production and application of climate information?
- What are the “entry points” for climate information in each city?

Implicit in the latter two questions is a one-way mechanism of climate information moving from expert scientists to city decision-makers. This chapter aims to show how this implicit unidirectional movement of climate information was challenged through a participatory and iterative research process in the FRACTAL LLs and Dialogues, whose participants produced locally relevant climate knowledge to inform decision-making.

The LLs were set up to be a “third space” where the diverse participants would meet face-to-face and bring their own knowledge and share it with others through collaborative engagement on a level playing field (see Scott et al., 2019). The binary knowledge categories at issue in the FRACTAL project were the scientific knowledge produced in the academic domain, and the practice-based knowledge produced by government officials in the spaces in which they operate. It was assumed that in the third space, neither of these knowledges was dominant, promoting the development of new conceptual categories and creating the potential for new hybrid meanings to emerge (Wallace, 2004; Klein, 2013). As

a transdisciplinary process, the goal was to set aside the hierarchies, dominant in both government and academic workplaces, and the dualistic relations between “experts” and “practitioners”. The collaborative LLs were intended to facilitate mutual learning by creating a free and open space where participants would learn about the approaches and worldviews of the other participants. They were specifically designed⁸ to be learning spaces as well as spaces for producing knowledge products.⁹ The authors participated in the LLs and Dialogues¹⁰ and contributed to their design. Their observations and the reports produced after each event provide the evidence presented in this chapter.

Ways of engendering receptivity

This section reviews evidence from a range of processes and activities in the LLs held in the cities of Lusaka, Windhoek, and Maputo, in which participants demonstrated receptivity.¹¹ The four themes derived from reviewing the literature on receptivity are applied deductively to analyse the undertaken collaborative activities and the reactions of the participants. The fifth theme that emerged from a reading of the evidence through the lens of receptivity is then discussed. The findings for each of these themes are presented separately for analytical purposes, although the themes are overlapping and reinforcing of each other.

The Learning Lab as a safe space for engagement

At the outset of all FRACTAL LLs, the democratic principles of the open interactive “third space” were presented to give everyone equal voice, value, and respect. However, it was acknowledged that while engaging with one another in this shared, safe, third space, participants still belonged to their organisational, disciplinary, and community “home spaces”, which provided them with a sense of dignity, purpose, and solidarity (Routledge, 1996, 410).

The concept of the “third space”, as a shared space in which everyone was outside of their home spaces together, was actively used in the activities to break down binaries and the barriers between different domains, between the academic and the practitioner, state and civil society actors, and within hierarchies, to produce more constructive and transformative relationships (Scott et al., 2019). For example, the Head of the Maputo Council participated in the first Maputo Water Dialogue (Maputo Water Dialogue 1 Report) and, after the opening formalities, was observed participating on a more equal footing with the participants who were junior officials in the municipal government, than was usually the case in other meetings. Considering the municipality’s highly hierarchical culture, this was evidence that the playing field had been somewhat levelled in terms of power and rank. In this way, the goal of each LL was to work against power as a basis for sharing and producing knowledge and creating inclusive opportunities to contribute openly to new understandings (Kumagai et al., 2018).

The activities in the LLs were designed to be dialogic, interactive engagements, rather than relying on the conventional didactic approach to learning

based on “banking” abstract concepts and data.¹² Although discord, power exertion, and struggle were occasionally observed,¹³ the reflection sessions held at the end of each day provided participants with the opportunity to question and reflect on their own values, experiences, and worldviews (Kumagai et al., 2018). As the process proceeded, participants began to let go of the need to be defensive and more readily share their interpretations with others. A Lusaka participant reflected that “there was a sense of togetherness” at the LLs (Lusaka LL4 Report).

Field trips that accompanied the LLs proved successful in creating a mobile third space to explore linkages between climate, water, and urban issues in the region. Travelling together in buses and staying overnight and eating together at the LL field sites provided rich opportunities for dialogue, building bridges between participants from municipal and national governments, civil society organisations, and academia. For example, the second Maputo LL was held at the Pequenos Libombos Dam, with a field trip to view the origin of the drinking water supply for the Greater Maputo Region. Since the issue of water supply, quality, and management had been established in the previous LL as “burning issues” impacted by climate change, this visit was particularly illuminating because it showed the dam level to be critically low, only 20% of the dam’s capacity, due to the three previous years of drought during which Maputo experienced a “water crisis” (Maputo LL2 Report). Similar experiences were recorded in Lusaka and Windhoek, where participants travelled together to view the Iolanda Plant and the new pipelines to supply water from the Kafue River to Lusaka, and to inspect the Goreangab water reclamation plant as well as a groundwater injection point of the Windhoek managed aquifer recharge scheme (Lusaka LL3 Report; Windhoek LL3 Report).

The dialogic approach created excitement and participants pronounced the novel experience of the Learning Lab to be so different from the more conventional “stakeholder workshops” relying on one-way knowledge transfer that provided little potential to surprise (Scott and Taylor, 2019, 9). Reflections did not, however, exclude criticism. For example, people criticised the shortage of engagement time, the lack of participation by high-ranking officials of water institutions, and the tendency of some participants to dominate.

While the dialogue that took place in the LLs did not always lead to specific outcomes, it enabled participants to “understand [themselves], each other, and world around [them] through the asking of additional questions and possibilities” (Kumagai et al., 2018, 1179). A common and important reflection from the LLs was a new understanding of the complex linkages between water issues and climate change.

Engendering cross-sectoral dialogue in participatory forums

Beausoleil (2014) differentiates between the intellectual/cognitive approach (didactic) to knowledge and the aesthetic/affective approach (dialogic). The former is the conventional, direct form of knowledge sharing where there is a one-way stream of information presented to participants,¹⁴ while the latter involves

transactional engagement between participants, that is, dialogue. While the didactic knowledge transfer was recognised as having a place in the LLs, dialogue as a form of knowledge sharing was prioritised. It was recognised that there was a need to include both knowledge transfer and reflective dialogues in the LLs (Kumagai et al, 2018) so that participants could include their own thoughts and values and factual knowledge (Nagy et al., 2020). Dialogue, according to Kumagai and Naidu (2015, 283), allows for “the inclusion of affective and experiential dimensions... and for an emphasis on discovering new perspectives, insights, and questions instead of limiting participants solely to an instrumental search for solutions”. This dual approach was the dominant strategy applied in the LLs. The engagements lasted several days and included a number of short presentations and collaborative exercises led by various participants relating to current research, policy, and planning initiatives.

Nikulina et al. (2019) propose that differences in culture and language, and a variety of epistemic communities among participants, present barriers to dialogue. It is therefore important to include participants representing these cultural and linguistic differences and epistemic communities in the research team, as the FRACTAL project attempted to do.

Group work was also used as a dialogic method in the Maputo Learning Lab 4 (Maputo LL4 Report), where groups were tasked with building a physical model using various materials such as cardboard, string, and pipe cleaners to depict the voyage of a drop of water from the Lebombo mountains to Maputo – “from the mountains to the sea”. Again, the groups consisted of diverse participants, and the intense engagement and dialogue sessions brought about new understandings across the water institutions and highlighted the need to have institutionalised cross-sectoral forums through which these institutions could engage to understand all the implications of water governance. As in other LLs and engagements, participants voiced that they greatly valued the opportunity to engage in dialogue across the siloed institutions in the water sector, especially about the impact of climate change on water supply: “It was nice to meet colleagues from the water sector, the [water] distributors, consumers, etc. were all there, which is rare” (Maputo Water Dialogue 1, 23/2/2018).

Disrupting conventional assumptions about contentious issues

Operating in the third space as a location of knowledge co-production has the potential to foster the reconfiguring of different viewpoints (knowledge domains), lead to innovations, broaden horizons, and give rise to many possibilities for future action (Routledge, 1996; Klein, 2013). Hence, the third space holds the potential for socio-political transformation and transgression (Lotz-Sisitka, 2015). Working in the third space where conventional understandings of problems are disrupted can create a “different awareness of the problems and situations that mobilise us” (Stengers, cited in Whatmore and Landström, 2011, 583). The literature on receptivity critically debates how a heightened receptivity places the agent in a position to act in transformative ways by changing the

way they think, leading to a shift away from business-as-usual practices (Scott and Taylor, 2019). Through dialogue, agents “learn how [...] to place themselves in the shoes of others” (Mihai, 2016, 24), and in so doing make less biased judgments and decisions. With enhanced receptivity comes the potential to bring about change, allowing ourselves to be “unsettled, decentred, thereby making it possible to occupy a potentially self-critical and illuminating stance” (Kompridis, 2011, 264). Receptivity to new possibilities for the future is critical for the transformation and disruption of conventional thinking (Nedelsky, 2011). In the reflection session, when asked what they would do after the workshop, one of the participants from the third Windhoek LL said: “We will change our mindset to consider that climate change impact is a serious issue affecting everybody” (Windhoek LL3 Report).

Using the group dialogue method, an activity was explicitly designed to collectively explore what the shift from business-as-usual to transformative decision-making that integrates relevant climate information might entail. This was pioneered at the Windhoek Strategic Executive Climate Leadership Workshop (6/3/2019). In the morning session of the workshop, hypothetical case studies of urban development projects were proposed, and groups were created to work on each case. The cases were as follows: the development of a new township north of Windhoek; a circular road around the city of Windhoek; a new dam northeast of Windhoek; and the formalisation of an informal settlement in the west of Windhoek. Groups worked to describe the sequence of decision-making steps necessary in the development process. For example, the steps involved in participatory processes with local stakeholders and undertaking an Environmental Impact Assessment. Discussions often became heated as group members, made up of government officials, politicians, and civil society representatives from various sectors, teased out the sequence of steps in the decision-making process. In the afternoon session, after some briefing about the mainstreaming of climate change (see Scott et al., 2019), the groups were tasked with thinking about how they would include climate information, in what format, into decision-making steps.

In both sessions, through dialogue and debate, each participant had opportunities to engage with other team members and assimilate their frames of reference. Their receptivity was exercised through their willingness to let go of the notion that their views were the only or most valid ones, and that there were other ways of viewing the issue under discussion. This had the potential to open them to new ways of thinking and being. Many of the participants reported during the reflection session at the close of the event that it felt like they had experienced a paradigm shift and were seeing the world and the development, water, and climate challenges facing Windhoek in a completely new way.

Embodied practices: The use of performance and serious games

The cultivation of conditions that employ visual, affective, and physical aspects of communication in collaborative processes is thought to enhance the receptivity that democracy requires (Beausoleil, 2014; Justice, 2018). Theorists argue that

performative practices in which people use their bodies heighten their feelings and lead to their emotions and values influencing how they perceive the issue (Pile, 2010; Beausoleil, 2014, 2019). The affective approach differs greatly from the conventional verbal and cognitive approach that is didactic and involves the transmission of knowledge through abstract conceptual models or normative terms, such as principles of climate resilience or good urban governance. The dialogic approach, which includes embodied practices, enhances brain functioning and learning, and it improves mood, energy level, motivation, and capacity to focus (Beausoleil, 2014). It is evocative and transactive, allowing for the experience of the concrete reality of issues and for feeling the humanity within them, enabling people to connect with, care for, and be impacted by what they experience. Therefore, if receptivity is an affective state, and thus primarily one that is felt by our body, then embodied practices, such as role-playing, might be among the most direct and effective routes to encouraging and fostering receptivity.

During the LLs and Dialogues, various physical activities were used as ice-breakers and energisers, such as the paparazzi and bodyguards game¹⁵ and the broken telephone game, where a climate message is circulated among participants and, despite best efforts, becomes distorted through repeated communication.¹⁶ In addition, the project team actively sought to replace expert-led didactic presentations, with more embodied performances. A successful example of this was *Tupopyeni oClimate* (translated as Let's Talk Climate), a staged talkshow in which the host engaged a panel of invited guests (drawn from the participants) with questions and took questions from the "live studio audience" (i.e. other LL participants). This was first undertaken at the second Windhoek LL (Windhoek LL2 Report) and the format was then used again in various subsequent FRACTAL events. This was a novel way of providing information in an interactive and engaging way, allowing for improvisation and surprise.

The most overt form of embodied and performative methodologies employed in the LLs were serious games (Callon, 1999; Beausoleil, 2014; Edwards, 2019). It is argued that collaboration can be achieved more effectively through the use of serious games that have the potential "to create a safe critical space to recognise and negotiate differences, value what each partner brings, and co-create innovative research processes and outputs" (Justice et al., 2018, 1). Games have rules and are a simplified but realistic version of reality, however, the outcomes can be variable depending on the strategies adopted by the participants. They are a method of triggering discussion and social learning that can be transferred from a fictional world to the real world (Furber et al., 2018). Because participants are acting out a position in a game, it allows them to develop empathy by better understanding their colleagues' positions and goals as well as the power dynamics (Justice, 2018). Games also have the potential to reveal the importance of investing in relationships, partnerships, and collaboration to achieve goals and the need for reflective practice throughout a collaboration (Edwards et al., 2019).

One of the serious games played in the FRACTAL LLs was the spilling the beans game.¹⁷ It involves six or seven participants representing households competing for water supply (the beans) whose goal is to fill their glasses to a

certain level with beans to ensure an adequate household water supply under average rainfall conditions. Two common yet different ways of thinking about the resilience of the water supply system are presented, namely, 1) maintaining the status quo or “bouncing back” and 2) changing to a new system or “bouncing forward” (Lee et al., 2017, 1). The game produces winners and losers with winning requiring some boisterous scooping up of beans from a bowl. This is followed by a discussion of the strategies used by the two teams, after which two more scenarios are presented: a year of below-average rainfall and a water shortage due to faulty water tanks. The game is repeated for each of these scenarios. When this game was used in the LLs, it sparked lively discussion, with participants debating whether or not the water system was resilient and what adaptive measures could be considered. As one participant commented:

I have learned a lot. Sometimes we pretend to know things when we do not. We should not just go along. Should learn from others in the group. I learned we are not all at the same level and we need to accommodate each other's opinions and knowledge.

(Windhoek Transformative Leadership Workshop Report)

The use of serious games in the LLs demonstrated that with the suspension of reality, participants open up to new ways of viewing issues and become receptive to alternative solutions to problems such as drought and water security.

Expanding time horizons and thinking about the long-term future

The LLs revealed that the climate-sensitive “burning issues” in the cities of Lusaka, Windhoek, and Maputo were water-related. However, decision-making related to these water issues was largely conceived of within a timeframe of a political five-year term that conventionally frames the horizon of municipal decision-making. In the context of climate change, it is crucial to extend this decision-making time horizon by facilitating participants to think across the 25-to-30-year timeframes in which climate (and urban) trends play out. In a more general sense, thinking about the future requires a shift to more transformative and multigenerational thinking due to the pressing need for building greater resilience and sustainability to protect the environment and society.

The LLs included activities to facilitate thinking about possible climate and urban development futures and how to get from the “here and now” (i.e. business-as-usual practices) to the “there” of a climate-resilient future (i.e. adaptive and transformative practices that foster inclusivity, equity, and sustainability). The Maputo Water Dialogue 2 (Maputo Water Dialogue 2 Report) provides evidence of a series of participatory, group activities that dealt with the contemporary challenges faced by the water sector, the question of what the future climate and its impacts might be like, and building scenarios of the future (both positive and negative), including the visioning of a future city of Maputo. Sessions were designed based on the Three Horizons approach.¹⁸ The first horizon is the present

(H1), which represents business-as-usual with the shortcomings and problems of the present. The second horizon (H2) is a moving border between the present and the future. The third horizon (H3) is the long-term future. This approach, originally developed in business management, has been widely applied¹⁹ to think about and plan for long-term societal change. The Three Horizons is a model that allows for the need to manage the present while exploring the future. The idea is that the shortcomings in H1 have led to innovations that address problems in H1 and eventually become mainstream in H2. H1 is therefore the dominant system that has a managerial mindset with problems that challenge future sustainability, while H3 is the desirable state that inspires us. H2 then is a horizon of tensions and dilemmas where innovations to prolong the status quo of H1 clash with the need to achieve a more transformative vision of the future in H3 (Leicester et al., 2017, 18–19). H2 is a very important horizon as it contains the processes that “enable the transition” to H3.

Prior to undertaking the Three Horizons exercise at the LL, representatives from a range of water institutions based in Maputo collaboratively described what the future climate of southern Mozambique might be by the 2040s. They explored what impacts the climate scenarios would have on the city, developing a positive and a negative scenario for the future. A joint vision for the future water supply of Maputo was also produced. Using the information gathered in these future-orientated activities, groups mapped the situation/ problems and actions onto the three horizons (Figure 5.1).

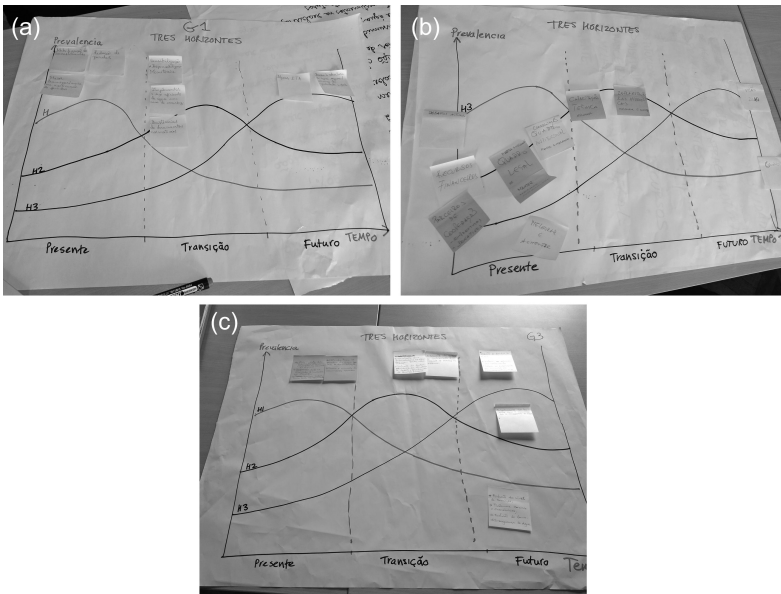


Figure 5.1 Example of one group at the Maputo Water Dialogue using stickers to add comments to the present (H1), the transition phase (H2), and the future (H3). Note the use of Portuguese to annotate the charts. (Photo source: Izidine Pinto, FRACTAL project, 2018.)

By working in groups to characterize the three horizons, participants exercised their receptivity by sharing and integrating their perspectives and expertise to grapple with trends and possible interventions operating at a decadal scale (rather than being constrained to political terms of office). Examples of some suggested actions for the transitional phase (H2) included education measures to promote water conservation, increasing investment in water treatment and recycling, and measures to increase institutional coordination.

The importance of receptivity in developing the Lusaka Policy Briefs

While the discussion of the five themes related to receptivity in the previous section provides examples of activities in the FRACTAL LLs and Dialogues, this section integrates the five themes into one example of enhancing receptivity through the development of the Lusaka Policy Briefs. The briefs were not a planned output of the LLs, but rather emerged out of the collaborative process that took place in Lusaka and culminated in a presentation of the briefs at a high-level breakfast to the Lusaka Mayor, city councillors, and ministerial representatives (see Nchita, 2019). The five LLs were “safe” participatory forums specifically designed for the engagement and collaboration of the FRACTAL team of researchers, the Lusaka Municipal officials and some councillors, national government officials, and civil society actors, explicitly established as being equals in the knowledge production and learning process.²⁰ The main activities were designed to stimulate cross-sectoral and cross-disciplinary engagement using a group method.

After agreeing that water was the burning issue in urban development in Lusaka in the first meeting, the LL participants worked through a process to identify the main water issues: the water problems as inadequate water supply and sanitation at the city level; declining groundwater levels; increased flooding; and groundwater pollution (Lusaka LL2 Report). As an important step in the process of understanding water issues, LL participants undertook a visioning exercise, where four diverse groups developed, along a rope on the ground, a set of “stepping stones” necessary to achieve the jointly agreed vision for Lusaka’s water²¹ from the perspectives of spatial planning, infrastructure, health, research, and information

The four water issues formed the “golden thread” of the group activities that took place throughout the LLs. The jointly developed policy briefs provided an understanding of each water issue, the climate change implications of each issue, and a set of recommendations (Nchita, 2019). Since most LLs were residential and included field trips, this contributed greatly to the relationship and trust-building necessary for a productive workshop. The residential nature of the LLs and the inclusion of field trips contributed to creating bonds and building trust and collegiality among the diversity of stakeholders. The trip to Lusaka’s main sources of water – the Kafue River and the Iolanda water purification plant – and

the Shaft 5 borehole in Lilayi, grounded the discussions and gave rise to much engagement and debate.

A variety of serious and fun games were woven into the LL programmes. At the outset of LL3, a game was played whereby “old LL members” had to explain to “new LL members” what FRACTAL was all about. In both the Governance Dialogue and LL4, role-playing games were successfully employed to get participants to step into the shoes of other actors to become more receptive to their mandates and perspectives. One game involved thinking about how new seasonal forecast information would be used, shared, and for what purpose by a range of actors. Another game involved groups acting out the recommendations they would make to politicians for each water issue covered in the Policy Briefs.

In LL3, groups were set up to discuss the four pressing water issues in Lusaka. Each group included participants from various government agencies, academic disciplines, and civil society groups. The groups were tasked with mapping out the water issue, including underlying causes, responsible actors, potential solutions, and where climate variability and change could be identified as having an impact. This was termed a “mess map”²² (Nchita, 2019; Reflections, Lusaka LL 3; see Figure 5.2). The task gave rise to focused engagement among group members and extended debates and dialogues about the various physical, social, cultural, and political factors associated with the water problem, and the relationships

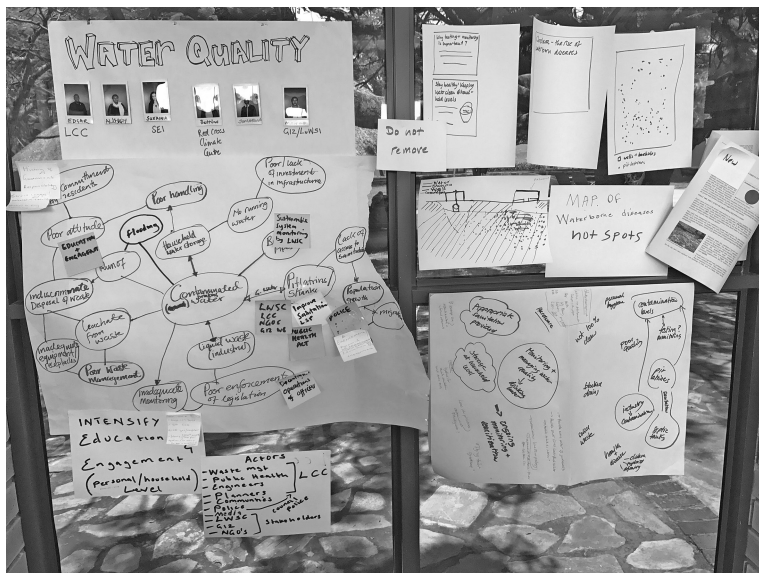


Figure 5.2 “Mess map” of the issue of poor water quality in Lusaka. (Photo source: private picture, taken by the authors.)

between them. A sense of shared ownership of the output and the understanding of how the system works was developed through the group task.

Participants were guided to think about the mid-term future as climate change issues increasingly became entangled with development issues. This led to urban planning institutions emerging as more important than previously thought in water governance. As progress was made at each successive LL, the co-produced policy briefs went through a process of review, where missing actors, important legislation, and root causes of the issues were added (Governance Dialogue, 21/8/2018) before final versions were produced and presented to senior government leaders. Through a detailed design process, each LL promoted bonding and social negotiation among participants, expanding their viewpoints and building receptivity that is central to addressing climate risks in cities.

Conclusion

Based on the evidence from the FRACTAL project, this chapter proposes that the concept of receptivity helps move away from the idea that scientific climate information can be inserted into decisions. Receptivity shifts the focus to the actors involved in shaping decisions and the actors undertaking scientific research to consider how open they are to modifying their judgements through incorporating alternative framings and working more collaboratively to co-develop new ways of thinking about and acting on the climate dimensions of urban development problems, such as water security.

At the start of the FRACTAL project, the primary focus was on building or extending scientific climate knowledge through a combination of primary research within the climate science community and “co-exploration” between climate scientists and decision-makers. Co-exploration was understood to be an iterative process of climate scientists and decision-makers working together first to identify “real” climate information needs stemming from “real” decisions, and, second, to build an understanding among decision-makers of what climate data and information was available and defensible, or could readily be developed, to meet such needs. There was a sense of co-exploration among participants involving a gradual integration of scientific research and decision-making processes, directed at reducing climate risks and impacts within a city context.

Over the course of implementing the FRACTAL project, we inductively revised the conceptual framework of co-producing knowledge and decisions in a way that can make cities more resilient to climate extremes and changing climate patterns. Actors with a stake in the climate resilience of cities operate in a multitude of home spaces (whether disciplinary, sectoral, or organisational), all of which hold, produce, and use knowledge of various kinds, and all of which make decisions that have a bearing on the climate resilience of cities (some more directly and powerfully than others). We have come to understand co-exploration as what happens in the borderlands between these home spaces, where

perspectives bump into and rub up against one another. Receptivity is what enables people (scientists, policymakers, government administrators, and business and civic representatives alike) to move from their home spaces into a third space, a transdisciplinary space, to explore the knowledge of others and work collaboratively to co-produce products and services for building the climate resilience of a city region. Receptivity is stimulated through multi-sectoral engagements in safe spaces, such as LLs and Dialogues, where knowledge and decisions about urban climate resilience can be co-produced. The example of developing the Policy Briefs in the Lusaka LLs illuminates how such a process may work. The focus is shifted from the temporal evolution of engagements that integrate knowledge from science into decision-making (assuming that a deficit of climate information is a key constraint on decisions driving urban climate resilience), to the relational space in which shared understanding and expanded judgements are built through networks of people, that in turn can nudge decisions in a direction that strengthens urban climate resilience.

The chapter presents five themes that explore the engendering of receptivity, with examples of how they played out in the FRACTAL project, particularly through a series of Learning Labs. We found that applying an affective approach, through dialogic engagement in group sessions, reduced power differentials, surfaced the voice and personal experience of participants, and suspended their existing frames of reference. This created the potential for other possible futures to be considered and potentially created. By creating democratic spaces where diverse knowledges were valued and mutual learning was encouraged, receptivity was fostered and epistemological shifts took place, giving rise to a shared and contextually relevant agenda for building urban climate resilience.

Fractal reports

Lusaka	Learning Lab 1 Report	6–7 September 2016
Lusaka	Learning Lab 2 Report	4–7 July 2017
Lusaka	Learning Lab 3 Report	27–29 November 2017
Lusaka	Learning Lab 3 Team Report	31 January 2017
Lusaka	Learning Lab 4	17–18 April 2018
Windhoek	Learning Lab 1 Report	14–15 March 2017
Windhoek	Learning Lab 2 Report	31 October 2017
Windhoek	Learning Lab 3 Report	14–15 August 2019
Windhoek	Transformational Leadership Workshop	18–19 April 2018
Windhoek	Report	6 March 2019
	Strategic Executives Transformational Leadership Workshop	
Maputo	Water Dialogue 1	23 February 2018
Maputo	Water Dialogue 2	27 September 2018
Maputo	Learning Lab 2 Report	15–17 May 2018
Maputo	Training Workshop	15–17 May 2018
Maputo	Learning Lab 3 Report	5–6 February 2019
Maputo	Learning Lab 4	21–22 May 2019

Notes

- 1 FRACTAL stands for Future Resilience for African Cities and Lands.
- 2 See Taylor et al. (2017) for a theoretical overview of co-production and transdisciplinarity.
- 3 See Scott et al. 2019 for a review of the concept of “third space”.
- 4 Beausoleil (2019, 123) proposes that receptivity is the precursor to listening, a “disposition of openness that makes listening possible” and “entails *being affected by and responding to* what one listens to” (see also Waks, 2008; Beausoleil, 2019; Hendriks et al., 2019).
- 5 Serious games are games for a purpose other than entertainment and trigger dialogue and learning (Farber et al., 2018).
- 6 The nine cities are Lusaka, Maputo, and Windhoek (Tier 1 cities), Harare, Blantyre, and Gaborone (Tier 2 cities), and Durban, Cape Town, and Johannesburg (Unfunded cities).
- 7 The FRACTAL Annual meetings held in Cape Town brought all the city teams together.
- 8 FRACTAL partners, the Red Cross Climate Centre, ICLEI, and the Stockholm Environmental Institute (SEI) provided experience, skills, and principles for the design of the Learning Labs (Arrighi et al., 2017).
- 9 See McClure, A (2020), Inclusive, participatory and reflexive learning processes for climate resilience: key lessons from FRACTAL (http://www.fractal.org.za/wp-content/uploads/2020/04/FRACTAL-learning-working-paper_layout.pdf).
- 10 Between 2016 and 2019, Lusaka held five Learning Labs. Windhoek and Maputo held four each, and there were several Dialogues in each city as well.
- 11 The Reports from the Learning Labs and other engagements provide a record of the engagement processes that took place. These are listed by city and date in the References. They will be referred to, for example, as Lusaka LL3 Report and Maputo Water Dialogue 1 Report.
- 12 A lecture is typical of the didactic approach. Didactic approaches use accepted frames of reference and require an immediate response from participants.
- 13 For example, in one of the Maputo Learning Labs, a senior official was observed pulling rank on junior officials blatantly and effectively silencing them (names and dates withheld to maintain anonymity).
- 14 See Table 1 in Scott, D. and Taylor, A. (2019) for Working Paper on Receptivity (Fractal.org.za).
- 15 Each participant is famous and has to choose (without telling them) a participant to be their bodyguard and another to be a paparazzo chasing them. As such, the movement of each participant is only dictated by their role as the celebrity, as they move to stay behind their selected bodyguard and out of sight from their chosen paparazzo. They are unaware of who may have selected them as a bodyguard or paparazzo. Everyone then moves through the crowd of participants aiming to be near their bodyguard and far from their paparazzo, resulting in a bit of chaos and much laughter.
- 16 For full explanations of these and other games see www.climatecentre.org/resources-games/games.
- 17 www.fractal.org.za/wp-content/uploads/2017/06/SpillingTheBeans_facilitation.pdf.
- 18 International Future Forum (www.internationalfuturesforum.com/three-horizons).
- 19 For example, in care for the elderly (Leicester, 2016) and education (Leicester et al. 2017).
- 20 Participating institutions in the LLs included Lusaka City Council (LCC), Ministry of Local Government, Water Resources Management Authority (WARMA), Lusaka Water Security Initiative (LuWSI) Network, GIZ, NWASCO, Lusaka Water and Sewerage Company (LWSC), Climate Change Secretariat (Ministry of National

Development Planning), academics and students from the University of Zambia, Zambia Homeless and Poor People's Federation, and Village Water.

- 21 "Accessible and affordable quality water for the present and future generation in Lusaka for all".
- 22 A "mess map" is a visual representation of the elements of a complex and uncertain social problem, produced interactively, to provide a framework for analysing and resolving the problem (see Horn and Weber, 2007).

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6 Print media coverage and the socio-contextual representation of climate change in Botswana

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Introduction

As climate change continues to be one of today's most important global issues, the media has played a crucial role in providing an arena for public debate. Furthermore, through its own logic, as well as discursive and practical mechanisms, the media has become a critical agent in framing, presenting, and representing climate change discourses and realities on the one hand, and setting a broad agenda and influencing public policies relating to local responses to the emergency of climate change on the other (Thompson, 1995). Research on climate change in Botswana has generally focused on exploring the extent to which Botswana has been affected by this global challenge (Dube, 2003; Saarinen et al., 2012; Hambira et al., 2013; Bosekeng et al., 2020). In particular, these studies have examined how agricultural development and the tourism industry, two important sectors in Botswana, have been impacted by climate change. Given the key role played by the media, questions on how the issue of global change is framed and presented by the media to the Botswana public require further exploration. This chapter presents a critical review and analysis of how various discourses and local responses to climate change are framed and presented in and by the Botswanan print media.

Media framing of climate change on a global level

Communicating climate change is a critical factor in the global effort to raise awareness and mitigate climate change. At the centre of various initiatives for communicating climate change is the media. A study conducted by Schäfer and Schlichting (2014) shows that there has been a growing number of scholarly studies in the area of media representation of climate change in recent years, particularly since the mid-2000s. Geographically, however, the representation of climate change in European and North American media has received more scholarly attention than the representation of it in the media on other continents. While the attention paid to countries in other continents has increased considerably over the years, "it is notable that research interest in media portrayals from

the ‘global south’ only grows at a low level and in the case of Latin America and Africa a very low level” (Schäfer and Schlichting, 2014, p. 154).

In Europe, the United Kingdom (UK) dominates scholarly attention to the challenge of climate change in the 2000s. In their critical discourse analysis of climate change in three UK broadsheet papers from 1985 to 2003, Carvalho and Burgess (2005) examined how risks and danger dominated the media framings of climate change over the study period. Moreover, their analysis underlines the critical role played by the media in the communication of climate change as their study found, while the UK broadsheets were responsive to scientific and social learning through the reinterpretation of scientific knowledge on climate change, they contributed to the cultural-political understanding of climate change and shaped the public debates and policymaking, the media also:

build particular images of scientific knowledge and uncertainty on climate change, and emphasise or de-emphasise forecasts of impacts, in order to sustain their political preferences regarding the regulatory role of the state, individual freedom, and the general economic and social status quo.

(Carvalho and Burgess, 2005, p. 1467)

This is to say that as far as the UK print media is concerned, climate change is not only a scientific or environmental issue but also a political one. As such, media coverage and public discourse on climate change cannot be separated from political agenda-setting and discursive strategies of social and political actors. In addition to Carvalho and Burgess’ findings, later studies of the media representation of climate change in the UK generally focus on the narratives of catastrophic effect, anthropogenic nature, scientific aspect, and moral call of climate change (Doulton and Brown, 2009; Norton and Hulme, 2019; Ruju, 2021).

In the context of the US, researchers such as Boykoff and Boykoff (2004; 2007) note the increase in the US media coverage of climate change from the 1980s to the 2000s. Scrutinising the US print and television media coverage of climate change, Boykoff and Boykoff found that commitment or adherence to journalistic norms such as dramatisation, personalisation, novelty, balance, and authority order have contributed to informationally deficient and biased coverage of climate change. In turn, this deficient and biased coverage of climate change has, “helped to create space for the US government to defray responsibility and delay action regarding climate change” (Boykoff and Boykoff, 2007, p. 1201). This echoes the findings of their previous studies focusing on *the New York Times*, *the Washington Post*, *the Los Angeles Times*, and *The Wall Street Journal* (Boykoff and Boykoff, 2004). While underlining the meeting point of climate science and politics, Boykoff and Boykoff’s study, therefore, adds journalistic norms as a new dimension to the study of media representation of climate change, as they argue that “in order to examine impediments in climate science communication via the media, research must critically scrutinise the firmly entrenched journalistic norms that profoundly shape the selection and composition of news” (Boykoff and Boykoff, 2007, p. 1191).

Just as in the UK and the US, climate change is represented as a large-scale national and international concern, a global, destructive, and anthropogenic issue, a scientific and environmental problem, and a political agenda in countries such as Canada (Young and Dugas, 2011; Ahchong and Dodds, 2012; Murphy, 2015), France (Brossard et al., 2004), Italy (De Blasio and Sorice, 2013), Russia (Poberezhskaya, 2015), and Sweden (Olausson, 2019). Apart from the above-mentioned framings, scholarly studies show that outside of Europe and the US, the media coverage of climate change in countries like India and Brazil is characterised by the narrative of “a strongly nationalistic position on climate change that divides the issue along both developmental and postcolonial lines” in the context of India (Billett, 2010) and by the relative absence of direct references to climate change in the coastal zone and particular environmental issues and themes in Brazil (Hellebrandt and Hellebrandt, 2010).

African media framing of climate change

In 2009, the BBC World Service Trust published a policy briefing under the title “Least responsible, most affected, least informed: Public understanding of climate change in Africa”. The introductory section of the document includes the following statement: “African citizens are at humanity’s climate change frontline, yet according to this research they are also among the least informed about human-induced global climate change, its causes and its consequences” (BBC World Service Trust, 2009, p. 2). This strong statement highlights the impact that climate change has on the African continent and the important role of the media in informing African citizens on issues about climate change.

Over the years, there have been several studies on the media portrayal of climate change in the African continent, particularly in countries such as South Africa (Cramer, 2008; Tagbo, 2010), Tanzania (Siyao and Sife, 2018; Elia, 2019), Nigeria (Batta et al., 2013; Nwabueze et al., 2015; Ajaero and Anorue, 2018), Ghana (Ajaero and Anorue, 2018), and Cameroon (Kay and Gaymard, 2020). As for scholarly studies on climate change communication in Africa, a recent review conducted by Okoliko and de Wit (2020) shows that climate change issues have been studied only in nine African countries. Botswana is listed as one of the countries that have not been examined, as far as climate change communication is concerned. There are at least two issues that have emerged from the studies on the African media coverage of climate change: inadequate coverage of topics related to climate change and the disconnect of African media reporting on climate change from the African realities.

As indicated, the first issue relates to the volume of climate change coverage in the African media. Examining the media coverage of climate change in Nigeria and South Africa in 2009 and 2010, Tagbo (2010) discovered that from the total stories published during the period of study, less than 1% of stories in the Nigerian and South African media focused on climate change. Similarly, Siyao and Sife’s study (2018) shows that the coverage of climate change in six Tanzanian newspapers between January 2006 and December 2015 was very low,

with only 684 articles or 0.84% of the total articles published during the period of study. In view of the inadequate coverage of climate change issues in the African media, scholars suggest that media coverage alone is not enough to set an agenda for public debate on climate change on the one hand and create public awareness of this challenging issue on the other (Nwabueze et al., 2015; Kay and Gaymard, 2020). This inadequate coverage can lead to complacency in national leaders and unwillingness to consider climate change as an important public policy item (Pralle, 2009).

The second issue is about the disconnection of the African media reporting on climate change from the local realities and the African context. In addition to the dearth of climate change stories, Tagbo (2010) suggests that the media coverage of climate change in Nigeria and South Africa in general was influenced by its international framing as the focus was on its political and scientific aspects, while its impact on local African realities was neglected. These findings echo Cramer's (2008) study on the framing of climate change in three daily newspapers in Western Cape, South Africa, from January to December 2005. In this study, Cramer found that of the 507 stories of climate change published during the study period, nearly 50% had no South African or African context and were generally framed in the context of environmental, scientific, and political reporting of climate change debates. This disconnection from African realities has been highlighted as crucial in scholarly studies on the African media representation of climate change. It often becomes a trend because the coverage of climate change in the African media seems to rely on international wire services, with little attempt to cover local realities and contexts. Researchers, therefore, suggest that rather than producing its own messages on climate change that reflect local impact, the African media in many cases tend to serve as "amplifiers of others' messages" (Gadzekpo, 2009; Kay and Gaymard, 2020). In the context of Cameroon, for example, an analysis of articles published in three newspapers between 2013 and 2016 by Kay and Gaymard (2020) indicates that, generally, the media representation of climate change in Cameroon is focused on political issues and international perspectives. As such, it seems to be disconnected from the local realities of Cameroon, "potentially opening up a spatial and social psychological distance" (Kay and Gaymard, 2020, p. 1) of understanding the challenge of climate change from an African perspective. In other words, the disconnection of climate change coverage from African realities may result in the public perception of climate change as a story that is taking place elsewhere, one that does not concern Africa, a narrative that is not African, not a story of ordinary people in the continent of Africa (Batta et al., 2013; Ajaero and Anorue, 2018).

Several factors contribute to the low coverage and the disconnectedness from the local context in the African media coverage of climate change. This includes the scientific nature of climate change and the lack of understanding among journalists (Tagbo, 2010; Elia, 2019), a lack of resources and training faced by African journalists (Elia, 2019; Kay and Gaymard, 2020), and a lack of local expertise on the issues of climate change (Tagbo, 2010; Ajaero and Anorue,

2018; Kay and Gaymard, 2020). In addition, scholars also cite the issue of media ownership and the nature of media business as possibly contributing to a common view that climate change is “a hard-to-sell” story compared with stories of African politics, economic power, and corruption (Tagbo, 2010; Siyao and Sife, 2018; Elia, 2019; Kay and Gaymard, 2020). In view of this, Siyao and Sife (2018, p. 432) suggest that:

despite the fact that print media houses are independent business enterprises which cannot be compelled to cover certain information [...] newspapers media owners, editors and journalists should, however, be environmental nationalistic enough to frequently report climate change information. The environmental citizenship spirit will enable the newspapers to consider playing an important role in providing the right amount of information on climate change in Tanzania without biases and largely being events oriented.

Theoretical lens: The theory of social representations

In order to examine the ways in which Botswanan print media represents climate change, this analysis is guided by the theory of social representations. According to Serge Moscovici, the founding father of the social representations theory:

a social representation is a system of values, ideas and practices with a two-fold function: first, to establish an order which will enable individuals to orientate themselves in their material and social world and to master it; and secondly to enable communication to take place among members of a community by providing them with a code for social exchange and a code for naming and classifying unambiguously the various aspects of their world and their individual group history.

(Moscovici, 1973, p. xiii)

In this case, Moscovici (1984, p. 24) suggests that all representations aim to “make something unfamiliar, or unfamiliarity itself, familiar”. This means that social representations theory essentially deals with how scientific knowledge is communicated to a broad audience and socialised. Or, as suggested by Hoijer (2011, p. 3), the theory of social representations specifies the communicative mechanisms to explain “how ideas are communicated and transformed into what is perceived of as common sense”. Therefore, as a point of departure, this underlines the proposition that:

knowledge is always produced through interaction and communication, and its expression is always linked to the human interests which are engaged. Knowledge emerges from the world in which people meet and interact, the world in which human interests, needs and desires find expression, satisfaction or frustration.

(Duveen, 2001, p. 2)

The theory of social representations proposes two basic mechanisms in our socio-communicative practices that generate social representations: anchoring and objectifying (Hoijer, 2010; Hoijer, 2011). As a communicative mechanism, anchoring refers to a common practice of making the unknown known by locating the new phenomenon within a well-known socio-cultural sphere that allows us to compare and make sense of it. At a practical level, the anchoring mechanism in our communicative practices manifests itself through naming the new phenomenon or attaching the phenomenon to human emotions, symbols, and metaphors in various social situations. Objectifying mechanism involves making “the unknown known by transforming it into something concrete we may perceive and experience with our senses” (Hoijer, 2011, p. 12). Through this mechanism, abstract ideas are materialised into familiar frames by representing them as concrete and objective realities that we experience in the physical world. In the context of representation, objectification is achieved by attaching various natural phenomena that we can observe to the abstract ideas we intend to communicate. Or as argued by Moscovici, “to objectify is to discover the iconic quality of an imprecise idea or being, to reproduce a concept in an image” (Moscovici, 1984, p. 38) so that “what is perceived replaces what is conceived” (Moscovici, 2000, p. 51).

There is no question that climate change is an abstract scientific idea. Translating it into everyday language is central to communicating it. The focus of the social representations theory on transforming the unknown and the unfamiliar into a known and familiar terrain makes it relevant to the study of media representation of climate change. In the context of this study, the theory of social representations is used as a theoretical lens that allows us to observe how Botswanan print media uses different communicative mechanisms in an attempt to communicate climate change to the Botswana public.

Method and material

This chapter is based on data gathered using the documentary method of content analysis. In the context of social research, content analysis is known as a documentary method that aims at analysing the content of texts or written communication as well as verbal and visual communication (Sarantakos, 2012, p. 314). In this study, content analysis is employed to examine different frames that Botswanan print media uses in communicating the issue of climate change. The 2011 population census in Botswana reveals that Botswana has a population of 2,024,787. In terms of print media circulation, scholars (Mogalakwe and Sebudubudu, 2006; Rooney, 2012) have estimated that there were 573,000 copies of newspapers circulating in Botswana every week. With the emergence of digital platforms, however, newspaper sales and circulation have declined in the past few years (Kavahematui, 2018).

To facilitate the analysis, we gathered data from articles published in *Mmegi* and *Sunday Standard*, two leading privately owned newspapers in Botswana. *Mmegi* made its first appearance in 1984 and is published from Tuesday to Friday.

A report from the Audit Bureau of Circulations of South Africa (ABC) Q1 2019 suggests that as of the first quarter of 2019, *Mmegi* had an estimated circulation of 11,415. *Sunday Standard* is a weekend newspaper published on Sunday with an estimated circulation of 22,000 (Rooney, 2012). Although the total circulation of both newspapers has clearly declined, *Mmegi* and *Sunday Standard* have embraced technological innovation by introducing news websites and circulating posts through various social media platforms. In terms of readership, *Mmegi* and *Sunday Standard* have been classified as “mid-market” and “serious-market” newspapers, respectively, aiming at readers with moderately high levels of educational qualification (Rooney, 2012).

These two newspapers, *Mmegi* and *Sunday Standard*, were not selected because they were thought to represent Botswana’s print media outlets, but rather on the basis of the volume of information on climate change they published. The selection of articles was made using the search engine on the websites of both newspapers, using “climate change” as a keyword. Our unit of analysis was an article. An article was only included for analysis only if it referred to the issue of climate change either in the headline or in the text itself. Our search resulted in the selection of 48 articles from *Mmegi* and 35 articles from *Sunday Standard* published from 2015 to 2020. The editorial content of the selected articles included news, features, and commentaries. Our method of analysis is informed by the theory of social representations, particularly the method developed and used by Birgitta Hoijer (Hoijer, 2010, 2011). Employing this method, our analysis focuses on the anchoring and objectification mechanisms in the Botswanan print media coverage of climate change.

Results and discussion

We have identified three key thematic frames that give context to the representation of climate change in the print media in Botswana: repackaging of a global issue, metaphoric framing, and representation of local realities. Our presentation of study results is based on these critical thematic themes.

Repackaging climate change

As we have already indicated, climate change has been a major global issue that attracts public debate. However, just like in other African countries, climate change has received inadequate attention from the Botswanan print media. This can be seen from the fact that from 2015 to 2020, *Mmegi* and *Sunday Standard* published around 48 and 35 articles on climate change, respectively. Although the limited space dedicated by the Botswanan print media to climate change raises concerns, our primary focus is on reviewing and analysing the quality and the modes of media representations of climate change.

Communicating a global issue such as climate change requires an imaginative approach on the part of journalists and the print media. Given the nature of the issue, knowledge and understanding of climate change are certainly fundamental

for public communication purposes. Poor performance by journalists is worsened by newsroom staff cuts due to economic pressures, and the limited number of specialist environmental journalists in mainstream media organisations of many countries (Schmidt et al., 2013). Previous studies in the African context have found that a lack of training has resulted in a lack of knowledge and understanding of climate change on the part of journalists in the continent of Africa. As a result, African journalists rely on internet sources and global information on climate change to communicate climate change on the continent. The paucity of articles on climate change in the African print media has also been attributed to a lack of training, knowledge, and understanding of climate change issues (Tagbo, 2010; Nwabueze et al., 2015; Ajaero and Anorue, 2018).

As far as the journalistic packaging of climate change is concerned, the studied newspapers frame climate change as a scientific issue, a policy issue, and a pragmatic issue. As a scientific issue, the media represented the scientific and technical aspects of climate change and how this will impact the environment globally. The framing of climate change as a scientific issue is exemplified by newspaper headlines such as “Modern sciences and climate change” (*Mmegi*, 5 February 2016), “Botswana to cross critical temperature threshold in less than a decade” (*Mmegi*, 4 May 2018), “Maybe God is angry: Science, religion and tradition at forefront of climate change” (*Mmegi*, 18 May 2018). Since climate change is framed as a scientific issue, media coverage of climate change in Botswana often relies on the opinion of scholars, researchers, and experts on environmental issues. Most of the news items included in this study generally cover the opinions of experts and scholars in the field of climate change.

Representing climate change as a policy issue is one of the popular frames in the Botswanan print media. In most media reports, such framing of climate change is informed by the common view of climate change as a real threat to Botswana and its environment. On 11 February 2020, *Sunday Standard* published a commentary article on its website titled “Climate change will decimate Botswana’s tourism, agriculture potential”. The opening statements of the article capture how the print media plays a role in advocating for a firm policy relating to climate change and its impact:

Across the world, climate change has now moved into the center of every public debate and every public policy decision making processes. It is a life and death matter. Even those termed sceptics are at least talking about it. Yet in Botswana there is not much happening around Climate Change. For many Batswana and indeed their government, it is business as usual; no preparation, no planning, no information and no strategies. Yet the structure of Botswana’s economy makes a large number of people susceptible to climate change.

(*Sunday Standard*, 11 February 2020)

Botswana’s climate change response has been influenced by the impact of climate change, informed by international practice and guided by the United Nations

Framework on Climate Change (The Republic of Botswana, 2019). While the move to draft and adopt a climate change policy is significant, the late response by the government speaks to the insignificance of climate change as a policy issue. In fact, Crawford (2016) notes that while climate change has been recognised as an important issue, it had not been expedited to the status of a priority by the Botswana government in the Second National Communication to the United Nations Framework Convention on Climate Change (SNC) submission in 2012. This explains why climate change policy has still not been mainstreamed into other government projects and programmes. Despite these limitations to climate change action, the issue is gaining momentum in Botswana's media outlets, as argued earlier. It is important to note that the different media frames adopted by Botswana's print media are likely to accelerate climate change adoption as the frames make it seem sensible to ordinary Botswana to conceptualise the significant danger posed by climate change.

Apart from the above frames, Botswanan print media approaches climate change as a pragmatic issue by focusing on its impact on Botswana's environment and people. At the global level, as we have demonstrated in the literature review, media reports have paid particular attention to the contextual realities of climate change. In the context of Africa, however, the media representation generally focuses on mediating the international framing of climate change, with limited attempts to contextualise it. As we have already shown, previous studies on African media coverage of climate change demonstrate that the representation of climate change is often detached from African realities (Tagbo, 2010; Kay and Gaynard, 2020). Botswanan print media clearly takes a different approach as in almost every single article, climate change coverage is repackaged to reflect the realities of Botswana, particularly how climate change has affected the country and its population. Although a detailed comparative analysis of Botswanan print media and the media from other African countries is not the main focus of this study, we would argue that in the context of Africa, employing the narrative of contextual impact of climate change, including how it has impacted people's livelihoods, is probably a unique contribution of the Botswanan print media to communicating climate change. As an example, *Mmegi* published a feature article on 23 January 2015 titled "Climate change brings fresh threat to local farmers". Rather than explaining what climate change is, the article focuses on its manifestation and how it has affected local farmers in Botswana. The following quote from the article highlights how *Mmegi* links climate change to the realities of Botswana: "Climate change continues to exert pressure on water resources and related sectors, especially crop production, which is mostly rain-fed in Botswana".

The pragmatic approach in climate change coverage also involves challenging popularly held traditional beliefs. In other words, through a pragmatic approach, the media takes a further step by adopting the strategy of questioning various untested local and popular beliefs and unpacking misconceptions surrounding the issue of climate change. Following the constructive theory of representation (Hall, 2003), this strategy can be called reflective representation. Reflective representation operates on the principle that meanings are contextual. Or as

suggested by Stuart Hall (2003, pp. 25, 26), “we *construct* meaning, using representational systems – concepts and signs [...] But the *meaning* depends, not on the material quality of the sign, but on its symbolic function” (emphasis in the original). As such, in the context of our discussion, the value of climate change representation is informed by how meanings are produced, constructed, and contextualised through accommodating and interrogating local perceptions, knowledge, and understanding. The following account underlines the pragmatic approach adopted by the Botswanan print media in framing the issue of climate change. *Mmegi* ran an analysis article on 1 June 2018 titled “A man is his cattle” depicting the symbolic perception of a man’s worth as a man is commonly viewed through the number of cattle he owns. The significance of cattle as a physical symbol of material wealth for individuals, citizens, and the state remains central to the history of the Republic of Botswana. The country’s coat of arms, a symbol of national pride, adopted at independence in 1966, holds the head of a bull among other items, symbolising the importance of the cattle industry in sustaining the country’s economy and the livelihoods of communities. The beef industry remains the only sub-sector of the agriculture sector that has constantly remained a significant contributor to the national gross domestic product (GDP) (Bosekeng et al., 2020). At the heart of this saying, “a man is his cattle”, lies a local philosophy that underlines the relationship between humans and nature to say that humans and nature are one as farmers continue holding onto their livestock. While this belief has its cultural value, the presence of climate change has challenged the economic value of keeping livestock. In view of this, the article argues that “understanding the complex reasons why farmers hold onto their livestock, even when it puts their investment at risk, can help countries in water-stressed regions respond appropriately as the climate becomes hotter, drier, and more drought-prone”. Another misconception challenged by the Botswanan print media is of climate change as the work of God or a sign of God’s anger as described in an article published by *Mmegi* on 18 May 2018, titled “Maybe God is angry: Science, religion and tradition at forefront climate change response”. While acknowledging the critical contribution of religion, the article advances the importance of following scientific forecasts in various agricultural and farming practices. In short, the Botswanan print media takes the route of packaging the global issue of climate change through the lens of Botswana’s realities. Climate change is, therefore, not only a global issue, but it is also a Botswanan issue.

Climate change and metaphoric framing

The representation of climate change in the Botswanan print media involves a strategic approach of placing climate change in a frame that is familiar to members of the public. In the context of social representation and the production of knowledge, this is known as an anchoring mechanism (Moscovici, 1984; Moscovici, 2000; Hoijer, 2010; Hoijer, 2011). In essence, anchoring is about “placing an object in a frame of reference” (D’Alessio, 1990, p. 71). Regarding the representation of climate change, there are two key frames of reference that

the Botswanan print media applies: climate change as a crisis and climate change as a matter of life and death.

Perhaps “crisis” is the most popular frame of reference when the Botswanan print media represents climate change. A crisis is normally defined as “a time of decision” or “an unstable or crucial time whose outcome will make a decisive difference for better or worse” (Devlin, 2007, p. 4). The framing of climate change as a crisis is related to two familiar frames that the public can easily visualise: threat and danger. As a concept, climate change is abstract, therefore understanding it requires a strong faculty of abstraction. Threat and danger, however, are two common frames that people can easily relate to. Therefore, by representing climate change as a danger and threat, the print media paves the way for accessing and understanding the issue of climate change. Interestingly, such a representation normally highlights an unstable condition that exposes public vulnerability. One of the common threats in Botswana is a threat to food security. The following excerpts accurately articulate this point:

Agriculture in Botswana is mostly rain-fed and therefore dependent on climate hence high temperatures and reduced rainfall and frequent droughts are threats to the country’s food security.

(*Mmegi*, 23 January 2015)

As a result of the global climate change, the Botswana Health sector has been identified as being highly vulnerable... The health sector is also linked to climate change through food security. Thus, with increase in extreme events such as drought, food security and nutrition will be adversely challenged by climate change and variability.

(*Sunday Standard*, 11 September 2015)

Representing climate change as a crisis is not a unique contribution of Botswana’s print media, but indeed a dominant narrative and discourse in the international media framing and communication of climate change (Brossard et al., 2004; Boykoff and Boykoff, 2007; Gadzekpo, 2009; Norton and Hulme, 2019). Nevertheless, an attempt to translate the global framing of climate change as a crisis in Botswana’s print media has been made, as discussed previously. Perhaps it should be noted, however, that while Botswana’s print media translates the dominant discourse of climate change as a crisis for local consumption, the representation often overemphasises climate change vulnerability. Consequently, responses to climate change and climate change action are often overlooked in media reporting (Shea et al., 2020). This is to say that by extending the framing of climate change as a crisis, climate change as a catastrophe remains the main focus of Botswana’s print media. As such, the translation of crisis as an event and a moment for socio-cultural transformation and climate justice is often absent from the media coverage.

The second anchoring strategy is the metaphoric framing of climate change as a matter of life and death. This frame of reference goes beyond the idea of crisis by

putting an emphasis on the urgency of climate change. This is achieved through a metaphoric turn through which climate change is compared to the familiar crises that Botswana has experienced, such as AIDS and COVID-19. In this context, metaphor is used as a functioning frame aiming at unpacking the present experience by organising the socio-cultural imagination around the experience of crisis that the public is familiar with. As proposed by Paul Ricoeur (Ricoeur, 1978; Masong, 2012), metaphor has a transformative quality because it brings reality to light by connecting facts, events, and experiences in order to open up perspectives and the figurative character of the whole of reality. This metaphoric turn is necessary as it directs the public imagination towards the need for taking critical steps and action. In Botswana and other many parts of Africa, members of the public are familiar with the HIV/AIDS crisis and COVID-19 as both pandemics present a moral choice between life and death. Losing loved ones to HIV/AIDS and COVID-19 has been an existential and devastating experience for many. It could therefore be argued that the metaphor of AIDS and COVID-19 in the media coverage of climate change restructures people's mental positioning by linking the crisis of climate change to various existential humanity crises. The following accounts underline how this metaphoric turn is adopted by Botswanan print media coverage of climate change. On 3 August 2020, *Sunday Standard* released an article on its website with an eye-catching title: "You think COVID-19 is bad for Botswana; climate change will be far worse!" This title summarises the content of the article as it emphasises the urgent nature of climate change. By comparing climate change to COVID-19, the article presents the latter as a point of reference banking on the public familiarity with this global pandemic. In providing this point of reference, the article puts across a key point through a statement that "climate change will be far worse". *Mmegi* also applies a similar approach. In one of its articles published on 28 September 2016, *Mmegi* compares climate change to the crisis of HIV/AIDS. Taking a metaphoric comparison turn, *Mmegi*'s article describes climate change as "an existential threat" that "is greater than the HIV/AIDS crisis of the 1990s".

How do we understand these anchoring mechanisms in the context of social representation and knowledge production of climate change? Throughout our analysis of the anchoring mechanism in the Botswanan print media representation of climate change, we demonstrate that anchoring strategy involves two basic communicative processes: first, a communicative process in which the common frames of reference are inserted into the knowledge mapping of climate change; and second, a communicative process in which the behaviour of individuals and groups is oriented and reoriented towards the urgent nature of the climate change issue (de Rosa, 2013). In the first process, the media presents climate change as a crisis, threat, and danger as well as a matter of life and death. Or as the Botswanan print media puts it, it is a crisis that is greater than HIV/AIDS and COVID-19. The second process is embedded in the first process as the use of common frames of reference reorients and activates individuals and groups for behavioural change in response to the climate change crisis. It could, therefore, be argued that the first process focuses on the content and semantic

value of climate change narratives. In contrast, the second process emphasises the discursive effect of the same narratives (Duveen and Lloyd, 1990). As such, in employing an anchoring mechanism, the Botswanan print media does not only attach “something new [...] to something already known” (Hoijer, 2011, p. 7) but also invites the public to instil a climate-friendly behaviour on the one hand and the policymakers to opt for climate-justice-based policies on the other.

Representing local realities

On 2 September 2016, *Mmegi* published an article entitled “It’s official: The seasons have shifted” that underlines the effects of climate change. A picture of the dry Gaborone dam was included to illustrate the content of the article with the caption “Gaborone dam ‘died’ in 2015 and resurrected earlier this year”. Indeed, a lack of rain and severe drought in Botswana have been considered major factors that have affected the flow of water to Gaborone Dam. As a result, the dam dried up for a period of two years in 2014 and 2015. Similarly, on 23 September 2020, *Sunday Standard* ran a piece titled “Climate change compromises agricultural production”. To illustrate the issue of climate change and agricultural production, the article includes an image depicting a piece of arid land with a dead animal and some helpless animals. Change of seasons, heatwaves, rainfall deficits, and severe drought are some realities that have been part of life in Botswana. While explaining climate change as a scientific and abstract concept requires substantial knowledge and creative communication skills, a picture of a dry Gaborone dam and an image of a dead animal and helpless animals on dry land capture the realities and present the effects of climate change in a powerful way. Here, the unknown climate change becomes known through images that capture and depict the familiar realities of Botswana.

In the context of social representation, the strategy employed by *Mmegi* and *Sunday Standard* in representing climate change is called objectification (Moscovici, 1984; Duveen and Lloyd, 1990; Moscovici, 2000; Hoijer, 2010; Hoijer, 2011; de Rosa, 2013). As already explained, objectification entails representing an unknown or unfamiliar concept or territory through objective realities that people are familiar with. It is indeed a common mechanism employed by the Botswanan print media in representing the issue and challenge of climate change. This is done in two related ways: visual representation and individualised communication. Through visual representations, articles pertaining to climate change are normally accompanied by images of Botswana’s realities such as long drought, crop failure, dead animals, and dry dams. Objectification of climate change through visual representations, therefore, can be considered as a reproduction of an idea through images. This is to say that the urgent nature of climate change is communicated through images of Botswana’s realities. This reflects the key proposition of the social representation theory, namely that objectification is about reproducing a concept in an image familiar to individuals and groups. In this context, objectification implies the reproduction of climate change as an

abstract idea through images that have the potential of capturing the imagination of Botswana's public.

The second objectification strategy in the Botswanan print media representation of climate change can be termed individualised communication. By individualised communication, we mean a type of journalistic communication that involves stories of ordinary people in order to optimise the discursive effect of climate change reporting. Individualised communication involves a strong emotional component through a description of the dramatic threat, danger, and disaster that ordinary people go through. Scholars such as Birgitta Hoijer (2010; 2011) call this objectification strategy emotional objectification. Emotional objectification involves the production and reproduction of stories (as well as images) that appeal to emotions for compassion (Hoijer, 2010, p. 724). For example, on 17 January 2020, *Mmegi* published an article entitled "Climate Change: A bane of the availability of mopane worms". Mopane worms, locally known as *phane*, are commonly consumed as a local delicacy as well as an important source of protein and nutrients in Botswana and many parts of Southern Africa. The Mopane worm, sometimes called the emperor moth, is a large caterpillar that is found in Southern African countries due to their warm weather. It is called *phane* because it feeds on the leaves of *mophane* trees after it hatches in summer (Madibela, et al., 2013). For many farmers and rural households, particularly in the northern part of Botswana, mopane worms have been a source of food and income. The worms, popularly known as "edible diamonds" by those who use them for commercial purposes, are now sold across borders to meet the increasing demand from livestock feed manufacturers. Climate change plays a role in the decline of the mopane worm, leaving many exposed to economic vulnerabilities and failing to sustain themselves. To describe the issue of climate change and how it has affected the livelihood of ordinary rural households, the article includes the following quotes from farmers and mopane harvesters:

I buy food, clothing and school equipment for my children using the money that I get from selling phane. This year, I started harvesting phane at Maitengwe but I came to Matobo and Goshwe after the worms were depleted at Maitengwe [...] The weather patterns have drastically changed over the years. The rains fall very late and are unreliable. We no longer know for sure when the rains would come. In the past, we were sure that we will harvest phane in December and April, but nowadays we are no longer sure.

(Mmegi, 17 January 2020)

I depend on agriculture and harvesting phane to put bread on the table and support my family. But during recent years, the rains are unpredictable and unreliable which put a strain on how we survive.

(Mmegi, 17 January 2020)

In the context of representing climate change, objectification is about projecting climate change in such a way that what is abstract is transformed into something

concrete (Duveen and Lloyd, 1990, p. 2). Objectification shapes our consciousness so that we have access to an unknown territory through our objective realities that often embody our common social concerns. Therefore, like anchoring, objectification is set in a social context. In other words, objectification involves a reflective process of the social context within which an idea is communicated. One of the contributions of the Botswanan print media towards the public understanding of climate change is the use of social context in communicating climate change. By using images of the known realities such as drought and dead animals, and the narratives of weather pattern changes such as the mopane story presented earlier, the Botswanan print media contextualises the issue of climate change. This contextualisation enables public access and awareness of the climate change issue and its impact on various sectors of Botswana's life and development. As such, climate change is naturalised and transformed into common-sense objects and realities (de Rosa, 2013) as it is presented and represented as a familiar problem. In doing so, the representation mode emphasises the existential, locative, and temporal dimensions of climate change to say that climate change exists *hic et nunc*, here and now.

Conclusion

The key objective of this chapter was to critically review and analyse various frames employed by the Botswanan print media in the representation of climate change through the lens of the theory of social representation. The chapter goes beyond the limited geographical scope popular in climate change studies and describes the unique development of national media attention bringing about domestic debate and perspectives around climate change in Botswana. Our study echoes the findings of previous scholarly studies on African media coverage of climate change, which provides limited space for communicating this issue. Qualitatively, however, the Botswanan print media takes a different turn by packaging climate change as a scientific issue, policy issue, and pragmatic issue. Unlike media in other parts of the continent, as shown by previous scholarly studies, the Botswanan print media makes a unique contribution by attaching the issue of climate change to the local realities of Botswana, such as lack of rain and severe drought. This is done through two creative, communicative mechanisms: the anchoring mechanism of framing climate change metaphorically as a crisis, danger, and threat, and an objectifying mechanism of visual representation of climate change using images such as long drought, crop failure, dead animals, and dry dams, as well as individualised representation through directly quoting those affected by climate change such as ordinary farmers and rural households. Therefore, in general, we argue that the media representation of climate change in Botswana has employed the following thematic frames: packaging of a global issue, metaphoric framing of climate change, and representing local realities. We further suggest that while media representation of climate change has the potential of raising awareness of the issue, the urgency of communicating climate change in Botswana requires a shift from an informative model of communication

to a transformative agenda focusing on the translation of global discourses for public consumption on one hand and localisation of various adaptation strategies on the other. As such, we are of the view that further research on how the media, including new media, advances the localisation of climate change adaptation and mitigation is a necessity.

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Part III

Just transition and international cooperation



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7 Climate change equity and extreme vulnerability

Steve Vanderheiden

The human response to climate change involves the ethical imperative of simultaneously mitigating the ongoing anthropogenic contributions to the environmental problem (primarily through reductions in greenhouse gas emissions and protection or enhancement of carbon sinks) while assisting those vulnerable to climate changes in adapting to them. Both aim to shield the vulnerable from the harm caused by greenhouse gas pollution, whether by reducing the causes of climate change or controlling its effects on human systems. Where mitigation is insufficient to prevent “dangerous anthropogenic interference” in the planet’s climate system (UNFCCC, Art. 2), adaptation may still prevent the actions of one group from harming members of another. For this reason, adaptation has become the second pillar of climate justice, made necessary by failed mitigation (the primary pillar). Compensation for loss and damage from the combination of failed mitigation and insufficient adaptation thus makes up the third pillar.

Because cooperative international efforts at mitigation and adaptation require solidarity, the United Nations Framework Convention on Climate Change (UNFCCC) emphasises the common vulnerabilities of all of humanity to climate change, making it a “common concern of mankind” that all must work together to address. Because the level of responsibility for causing climate change is highly differentiated between high-emitting and low-emitting states, and since national capacities to reduce emissions or to transition away from fossil fuels in mitigation efforts are also highly differentiated, the UNFCCC (Art. 3) calls upon state parties to the convention to take action to combat climate change “in accordance with their common but differentiated responsibilities and respective capabilities” (a principle known in the climate justice literature as CBDR+RC). Those countries that are more responsible for causing the harm or are better able to prevent it are charged with doing more to prevent it, whether through mitigation or adaptation.

Vulnerability to climate change is also highly differentiated among and within states, with the world’s most disadvantaged countries also being among the most vulnerable to climate change, but little attention is paid in the UNFCCC text to the ethical implications of this differentiated vulnerability, despite the several mentions in the text of the convention. The Preamble notes that “arid and semi-arid areas or areas liable to floods, drought and desertification, and developing

countries with fragile mountainous ecosystems are particularly vulnerable to the adverse effects of climate change". Principle 2 calls for "full consideration" of "the specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change", but does not further specify what this consideration may involve. Principle 4 calls upon developed country parties to "assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects". Finally, Commitment 1(e) calls for international cooperation in preparing for and financing of adaptation in vulnerable regions, including "the protection and rehabilitation of areas, particularly in Africa, affected by drought and desertification", where this mention may be viewed as connoting exceptional vulnerability.

None of this provides a clear basis for differentiating vulnerability among states or regions, and the document does not go beyond merely noting that some are more vulnerable than others. The treaty text suggests that greater vulnerability may require more adaptation resources to achieve a given level of protection against climate-related harm but does not call for any such baseline level of vulnerability or resilience as an adaptation objective. Normative motivations for differentiating vulnerability have likewise not featured in the climate justice literature, which has focused primarily on principles for differentiating responsibility (in terms of contributions to climate change and remedial burdens related to preventing climate-related harm) rather than addressing any implications of differentiated vulnerability. While climate justice scholars have considered extreme vulnerability as generating distinctive obligations, they have largely focused on small island and atoll states that are highly vulnerable to sea level rise, with displacement from inundation (and related impacts of territorial loss) the paradigmatic theorised harm, paying little attention to other forms of extreme vulnerability.

For reasons detailed elsewhere in this volume, extreme vulnerability to climate change can manifest itself in forms other than territorial loss to sea level rise, many of which are concentrated in sub-Saharan Africa. According to the Intergovernmental Panel on Climate Change (2001, p. 89), vulnerability is defined as "the extent to which a natural or social system is susceptible to sustaining damage from climate change" and is

a function of the *sensitivity* of a system to changes in climate (the degree to which a system will respond to a given change in climate, including beneficial and harmful effects), *adaptive capacity* (the degree to which adjustments in practices, processes, or structures can moderate or offset the potential for damage or take advantage of opportunities created by a given change in climate), and the degree of exposure of the system to climatic hazards.

Conversely, the IPCC defines resilience as "the flipside of vulnerability – a resilient system or population is not sensitive to climate variability and change and has the capacity to adapt". With its high sensitivity to climatic change, low

adaptive capacity, and projected high exposure levels, sub-Saharan Africa has extremely low resilience to climate change. But this extreme vulnerability differs from that of small island and atoll states (whose problems have received more attention in the climate justice literature), which warrants its further consideration here. In this chapter, I will consider what resources may be available for theorising climate justice obligations that arise from issues of extreme vulnerability, first in all such contexts and then in view of the distinctive issues for regions like sub-Saharan Africa.

Climate justice and vulnerability

In exploring normative questions about the obligations of states in responding to climate change, climate justice scholars have focused primarily on contributing states and their “common but differentiated responsibilities and respective capabilities” rather than on vulnerable states and their differentiating characteristics. Indeed, the CBDR+RC principle has been widely explored and variously developed by scholars as a remedial liability principle to be used to guide burden-sharing efforts through which decarbonisation targets or adaptation finance could be assigned, but no corresponding principle has been proposed to guide the disbursement of climate finance or other adaptation resources. Apart from vaguely connecting the allocation of such resources to vulnerability by defining adaptation in terms of averted harm, little work has been done to differentiate the vulnerability of states and connect this to justice obligations.

Several factors account for this oversight. Following the lead of other observers of the climate treaty development process, scholars initially focused on equity issues in mitigation rather than exploring questions of adaptation, with mitigation also featuring more prominently in international negotiations. Mitigation objectives also appealed more to the kinds of global justice theories that scholars had been applying to problems of persistent poverty and underdevelopment in previous decades. Those who viewed mitigation as a resource-sharing problem saw distributive justice theories as useful for developing the principles on the basis of which to assign national emissions shares, whereas remedial justice theories (which were not as well-developed in the scholarly literature) would inform problems associated with allocating scarce adaptation resources.

The UNFCCC text also provides little basis for developing principles for differentiating vulnerability in prioritising adaptation resources, despite its several references to vulnerability noted earlier. Building on the disparity among states in their “respective capabilities” to address climate impacts on their own may have provided such a principle, since this phrase captures a key element of differential vulnerability – or rather it would if it was operationalised in terms of governance capacity rather than some index of economic wealth – but the “+RC” to the CBDR principle was clearly identified as an additional burden-sharing principle for mitigation, where relatively less capable (i.e. poor and underdeveloped) countries would not be expected to shoulder burdens comparable to those assigned to high-capacity states, regardless of their past or ongoing

responsibility for the problem through their emissions. Lacking an explicit principle to develop from the treaty and apply, and with a different kind of justice theory needed for the task, climate justice scholars largely cast their attention elsewhere.

In addition to this lack of normative resources for differentiating vulnerability in the convention text, climate justice scholars have been reluctant to focus on vulnerability for several other reasons. Comparable to how the turn to adaptation from mitigation was thought to signal a failure in efforts to mitigate climate change, delaying a shift of focus onto this secondary imperative, considerations of differentiated vulnerability may also be thought to signal a failure to secure just allocation of adaptation finance. Scholars may be reluctant to theorise a basis for prioritising scarce resources between multiple deserving recipients if this is thought to permit or excuse such failures. Theorising along these lines may, as Gardiner and Fragnière (2018) claim about research into geoengineering technologies and mitigation imperatives, confer a kind of political legitimacy on denying some groups the adaptation resources to which they may otherwise be entitled if others could be shown (on the basis of differentiated vulnerability) to be more deserving. By developing a priority scheme to differentiate between various entitlements of justice, it risks being seen as enabling the denial of some such entitlements.

This reluctance may also be related to some conceptual implications of vulnerability as a differentiating characteristic. As Cuomo notes, vulnerability “focuses attention on the supposed weaknesses or limitations of those who are in harm’s way”, which, in emphasising their powerlessness against a pernicious threat, “tends to obfuscate the agency, knowledge, and resilience of members of disempowered or marginalized groups” (2011, p. 695). Insofar as differentiated vulnerability may cast would-be recipients of adaptation assistance as passive victims rather than active agents, invoking a paternalistic international response that is managed and directed by outside rescuers rather than empowering the vulnerable to enhance their own resilience, scholars may be reluctant to develop justice principles around such a characteristic.

However, a focus on vulnerability as a defining climate justice principle need not have this effect. Indeed, Ribot (2011) attributes the risk to conceptualising such activities in terms of adaptation, which, as he suggests, can draw “attention away from underlying social causes of vulnerability – exploitation, exclusion, marginalization, socially stratified societies in which the poor have no access to representation, education, healthcare and basic social security” (p. 1160). He urges that adaptation instead be conceptualised as “vulnerability reduction”, which highlights the causal drivers of vulnerability and so avoids the “social-Darwinist ethic” associated with adaptation, which “burdens and blames the victim by devolving the onus of adjustment to the organism or effected unit”. Similarly, in a study of local-level use of adaptation finance in Malawi, Barrett finds that devolving control over such resources leads to “more climate risks and consistently elicit[s] greater agency, security, and a more sustainable lessening of climate vulnerability” (2013, p. 1826). In both cases, a focus on vulnerability reduction

is seen as enhancing the agency of recipients of adaptation assistance rather than undermining it.

When recipients are able to exercise control over resources targeted for vulnerability reduction, their agency may be enhanced along with their resilience to climate change, whereas donor control over such resources (rather than focusing on vulnerability) may diminish that agency, as Cuomo suggests. However, it is often the case that those most vulnerable to climate change are also least able to exercise effective recipient control over such resources, given that adaptive capacity is a key variable in differentiating vulnerability, and those with less capacity to adapt typically also lack both governmental and civil society capacities for effectively managing resources. Under such conditions, as Duus-Otterström notes, rather than insisting on recipient control, it may be better to allow for more donor control over funds but assess adaptation in terms of how well it protects basic rights, since “vulnerable individuals should not be penalized for living under nondemocratic and ill-functioning governments” (2016, p. 668).

Such considerations again associate extreme vulnerability with a lack of state capacity for effective self-government, calling upon outside agents to exercise a paternalistic managerial control over resources used to reduce this vulnerability. Insofar as such an approach relies on what Duus-Otterström calls “severely non-ideal circumstances” while academic justice theorising often rests on ideal theory presumptions about functioning institutions having some ability to address existing injustices, this tension may again deter climate justice scholars from developing climate justice principles for cases involving extreme vulnerability. While scholars have treated several questions in climate justice through nonideal theory, applying principles of ideal theory to issues of non-compliance with national mitigation obligations and issues regarding the transition to a clean energy economy (Brandstedt, 2019), the “severely nonideal circumstances” of extremely vulnerable states may result in an unbridgeable gap between a conception of justice developed for a “nearly just” society and one which could prevail where such circumstances are sufficiently far from reality. Together, factors such as these have deterred scholarly research into climate justice obligations associated with differentiated responsibility or into the features of extreme vulnerability.

Climate justice and differentiating vulnerability

Despite this relative lack of scholarly interest in differentiating vulnerability, one can identify resources within justice theory that could constructively address this challenge. Distributive justice theory has long embraced *prioritarian* premises about evaluating allocative arrangements in terms of their effects on the most disadvantaged, and such premises could readily be repurposed for analysing differentiated vulnerability. For example, Rawls (1971) employs the “maximin” principle to flesh out his difference principle, where inequality in individual holdings of social primary goods is justified only if this inequality was to benefit society’s most disadvantaged to a greater extent than some more equal distribution. The Rawlsian priority for the claims on scarce resources by the most disadvantaged would be

consistent with a principle that allocated scarce adaptation resources to the most vulnerable (presuming that any alternative distribution of such resources would be worse for them, which is plausible). Scholars have marshalled versions of the difference principle on behalf of climate change mitigation (Kunnas, 2009), as well as reductions of environmental inequality in climate change (Mason, 2011) and advocated for environmental justice more generally (Bell, 2004), but have yet to develop a similar prioritarian scheme for weighing claims on adaptation resources.

Prioritising in favour of the most disadvantaged could yield several different principles for addressing the problems of those most vulnerable to climate change. Procedurally, the decision-making process could use weighted votes that lend greater weight to claims of the most vulnerable, given their disproportionate exposure to harm from collective decisions, or perhaps even give those residing under conditions of extreme vulnerability a veto power over decisions that would affect them adversely. For example, in debating a temperature target for cooperative mitigation action, the representatives of the low-lying small island states facing a loss of territory could have their extreme vulnerability to sea level rise recognised by allowing them to veto targets that allow for such inundation. An informal version of this priority scheme is on display in the foregrounding of spokespersons from small island states in climate negotiations, allowing the most vulnerable greater influence over decisions like those on temperature targets (Ourbak and Magnan, 2018). Here, prioritarianism is used to shape the decision-making processes in the interest of giving greater weight to those most affected by some decisions, incorporating a measure of proportionality into democracy (Brighouse and Fleurbaey, 2010).

Along with the procedural means by which extremely vulnerable parties could potentially oppose or veto insufficiently ambitious mitigation targets, one may defend more ambitious mitigation targets through a priority scheme about rights. Following Shue's (1980) prioritisation of what he terms "basic" rights (including fundamental security and subsistence rights necessary for survival) over their non-basic counterparts such as various social, political, and economic rights, one could limit the right to further emissions by less vulnerable states (which involves limiting the ability of less vulnerable peoples to exercise a non-basic economic right) in order to keep the territory of the more vulnerable ones inhabitable. Indeed, Shue gestures towards such an argument in his recent analysis of the distinction between subsistence and luxury emissions but does not specifically develop it in terms of differential vulnerability (2019). Such a scheme would justify constraining the exercise of less basic rights if needed to protect the more basic ones, which could be applied to constraining greenhouse emissions at levels compatible with the objective of avoiding the worst impacts of climate change. Doing so would result in greater protections for the vulnerable and would thus prioritise their needs over the less basic interests of those more resilient to climatic disruption, but on the basis of a priority scheme among different kinds of rights, not differential vulnerability.

Debates over the adoption of a 2°C target or one set at 1.5°C have invoked a similar priority scheme in which differential vulnerability features prominently.

The Alliance of Small Island States (AOSIS) has emphasised their special vulnerability to sea level rise in various advocacy efforts, including their “1.5 to Stay Alive” campaign for the adoption of a more ambitious temperature target. In addition to having this lower target mentioned in the text of the Paris Agreement at the behest of AOSIS and other vulnerable allies, the effort resulted in an invitation to the IPCC to prepare a report on the impacts of 1.5°C of warming; the report, as its supporters have anticipated, has thus far shown that even this reduced target had devastating consequences for the vulnerable countries (Bolon, 2018). Such special consideration of extreme vulnerability is also codified under Article 9.4 of the Paris Agreement, which calls for additional financial support for the “priorities and needs of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change and have significant capacity constraints, such as... small island developing States”. These financial resources would include additional adaptation assistance, as well as funds to be used to compensate for loss and damage (the mechanism for these disbursements has been among AOSIS priorities), in addition to urging more ambitious mitigation. In recognition of this prioritisation of the most vulnerable states, the Green Climate Fund Board opted to allocate at least half of its adaptation resources to particularly vulnerable states like those threatened by sea level rise (Green Climate Fund, 2021).

Climate justice and vulnerability

What are vulnerable parties entitled to as a matter of climate justice, and what is owed to those extremely vulnerable to climate-related harm? As far as the main objective of the range of activities now referred to as “adaptation” is to reduce vulnerability or enhance resilience, the latter question may simply collapse into the former. Those living under conditions of extreme vulnerability may require more resources to attain a given level of resilience to climatic disruption, but these amount to differences in quantity of aid or degree of assistance required rather than differences in the objectives for such assistance. In all cases, it would be unjust to expose vulnerable persons or peoples to external anthropogenic risks of harm (as opposed to a person or people voluntarily and knowingly exposing themselves to harm), so those imposing this external risk owe the actions or resources necessary to mitigate that risk to those on the receiving end of this imposition. Since the most reliable means of reducing such risks would come from actions that reduce the causes of climate change, mitigation should be prioritised in discharging this duty of justice, but if it fails to prevent climatic disruption, the imperative of reducing risk through adaptation becomes a secondary obligation. In both cases, the objective is to avoid the imposition of an excessive or unreasonable degree of risk, however that is defined.

But this does not mean that extremely vulnerable states or peoples are not entitled to some unique remedies as a matter of climate justice, only that such remedies are designed to reduce their vulnerability to a common baseline. Specific remedies are likely to be a function of their specific vulnerability factors.

Insofar as the vulnerability of a specific people is related to their exposure to some threatening environmental changes – for example, inundation from sea level rise or significant declines in agricultural productivity from persistent drought – those factors may present opportunities for intervention to reduce that vulnerability. To a limited extent, the construction of seawalls and other coastal infrastructure can enhance resilience against sea level rise and a combination of water reclamation and conservation projects can maintain harvests during times of drought. Beyond these limits, however, such infrastructural interventions are unlikely to be effective, with some territories inevitably being lost to flooding and others to desertification. Extreme vulnerability may be defined in part by such limits.

On the other hand, vulnerability that results from low adaptive capacity could potentially be addressed by enhancing that capacity, whether through the enhancement of civil society or state-based management and governance systems (Engle, 2011). Like efforts to reduce exposure to climate impacts, such enhancements are likely to be of limited benefit in cases where extreme vulnerability is the result of state corruption or failure. Where necessary, temporary external assistance can remedy some of the failings of the domestic adaptive capacities, as when aid agencies deliver food or assist in the rebuilding of energy or water systems destroyed in a storm or flood, but such external assistance only reduces vulnerability on a temporary and reactive basis rather than providing for the kind of permanent resilience that climate justice requires. In the context of extreme vulnerability, however, the international community must be prepared to deploy this kind of reactive emergency assistance where needed, while also seeking to build more robust domestic adaptive capacity and otherwise reduce the need for such assistance in future.

In order to begin to identify adaptation measures that may be needed to respond to the extreme vulnerability of sub-Saharan Africa, we may first consider another kind of extreme vulnerability that has been more directly treated in the climate justice literature: that of small island or atoll states threatened by sea level rise. Here, the vulnerability is primarily the result of exposure, with low-lying territories prone to inundation even after small rises in sea level, which threatens to render those territories uninhabitable and turn their residents into stateless “climate exiles” without a territory of their own. As noted previously, beyond some limits it will no longer be possible to defend those territories from the rising sea levels, and their population will likely become necessitous migrants that require resettlement. Here, the vulnerability of a people is initially connected primarily to the exposure of its territory to sea level rise. Loss of territory causes an increase in vulnerability and is accompanied by reduced prospects for continued self-determination and cultural integrity. While members of the group could potentially be allowed to separately resettle into existing communities, enhancing their individual resilience, the group’s collective resilience depends on its ability to remain a cohesive and self-determining people, which may require some new territory into which the entire community could be resettled. Until viable options for collective resettlement are made available, peoples residing in

potentially uninhabitable territories are extremely vulnerable to climate change in this collective sense.

Climate justice approaches to vulnerability from sea level rise could be used to address extreme vulnerability in sub-Saharan Africa. De Shalit (2011) casts territorial loss in terms of relationships between connection to territory and the maintenance of group identity, claiming that “the very threat of forced evacuation harms one’s potential psychological ties to one’s place and therefore one’s identity” (p. 322). In his view, the loss of place would be so injurious that it could not be compensated for, even if displaced peoples were somehow able to acquire new territories and thus maintain their sovereignty and collective identities. Characterising territorial loss as a special kind of climate injustice that defies all loss and damage compensation schemes, he claims that only sufficient mitigation to avoid such outcomes would meet the demands of climate justice, given the exposure to sea level rise that low-lying and small island states face. Notably, he relies on a capabilities-based approach to establish this relationship, claiming that forms of environmental change like the sea level rise can be so disruptive that they undermine core collective capabilities like those linking place-based attachment, identity, and cultural integrity.

Other scholars have argued for migration rights or compensation schemes involving the creation of new territories in response to the threat of displacement from sea level rise. In anticipation of widespread displacement, Byravan and Rajan (2010) argue for “the individual right to migrate to safe countries for those who will be displaced forcibly” by sea level rise in the short term, given the need to reduce that facet of vulnerability for those now facing potential displacement due to the existing levels of warming, and they call for an international treaty to “begin to address this issue so that climate migrants and future exiles will be able to find homes well in advance of the actual emergency” (p. 242). While ignoring the collective interests of communities facing displacement in maintaining their sovereignty and self-determination, which would require the resettlement of the group as a whole into a new territory that it could control, rather than individual migration, they recognise the need to provide certainty for those whose vulnerability is now largely tied to an uncertain territorial future. Such considerations could also apply to extreme vulnerability in sub-Saharan Africa, where measures undertaken now could provide contingency options for those in the region likely to be most affected by expected climatic impacts in the intermediate future.

Page and Heyward argue that compensation for loss and damage from climate change is intended to redress “the unjustified disruptions in the lives of individuals and communities, whether permanent or otherwise, that are attributable to anthropogenic climate change and which remain after mitigation and adaptation efforts have been attempted” (2017, p. 359). Applying the principles of corrective justice to problems such as territorial loss from sea level rise, they propose “means-based compensation” for those whose instrumental means to some end or valuable objective are adversely affected by climate change in order to render them “whole again”. Under this corrective justice frame, injured parties would be made whole again in that they would be “able to pursue all of the important

human ends that they affirmed before the climatic impact” (p. 363). For those more seriously affected, “ends-displacing compensation” would be required for victims in cases where “there is no means-substitution, restitution or repair that will suffice” to make them whole again, providing them with “the resources necessary for them to pursue substitute *ends* that deliver the same satisfaction but which do not fulfil the exact same role as the previously endorsed ends” (p. 364). Substitute ends might include new territories that yield important social and cultural connections (as de Shalit argues) rather than merely serving as a fully replaceable means for economic production or hosting political sovereignty.

As they note, some forms of disruption may be so injurious that it would be inappropriate to conceptualise them in terms of adequate compensation – non-economic damage like territorial loss being one example – but the possibility of such a “residue of injustice” should strengthen and prioritise the imperatives of mitigation and adaptation so that such imperfect compensation (which they regard as a “third pillar” of remedial imperatives) need not be required. Notably, the authors recognise a “threat of the loss of a unique and valued form of life” as involving “greater injustice” (p. 368) than the loss of a mere means to such an end. They therefore prioritise the needs of those whose losses are permanent and irreversible and therefore likely to defy compensatory remedies (whether of ends or means).

Theorising extreme vulnerability in sub-Saharan Africa

Having considered climate justice responses to extreme vulnerability to sea level rise, and seen from these responses how justice theory may be applied to differentiated vulnerability, we are now in a position to return to the case of climate justice responses to the specific vulnerability of sub-Saharan Africa. Indeed, this region shares high sensitivity to global temperature increases with small island states, but with exposure to increasing heat and drought rather than sea level rise as the primary threat. Combined with the region’s endemic poverty, limited adaptive capacity, and the exposure of regional economic sectors to climatic variability, its high physical exposure to extreme weather events and chronic heat or drought threatens to exacerbate existing human insecurities and create new ones. Unlike the shared social vulnerability common to small island states in which sea level rise threatens to displace entire peoples, vulnerability to climate change is highly differentiated in sub-Saharan Africa, with the most disadvantaged (many of whom subsist at bare subsistence levels now and so have no resilience to shocks) being most at risk.

On the basis of this shared interest in avoiding further climatic disruption, delegations from sub-Saharan Africa are allied with AOSIS in efforts to increase mitigation ambitions to 1.5°C rather than 2°C to increase adaptation funding for extremely vulnerable states and create a financial mechanism for climate-related loss and damage compensations. Their drivers of vulnerability are similar in that both experience greater impacts from the increasing concentrations of greenhouse gasses and both have fragile territorial systems that stand to be

severely affected by temperature increases of even 1.5°C, even if the dynamics of their respective vulnerabilities differ. That sub-Saharan Africa experiences these impacts primarily through the collapse of food systems, catastrophic losses to fresh-water systems, or deadly heat impacts rather than through flooding from sea level rise has not prevented the region from finding a common cause with other extremely vulnerable state parties.

Considerations of climate justice would ensure that several claims on behalf of both kinds of vulnerable parties are treated similarly in some respects. Both groups, for example, have a case for greater weight being attached to their voices or their interests in negotiations on the basis of an affectedness criterion in democratic theory, or perhaps of what Fraser (2010) terms an “all-subjected principle”. Power within the UNFCCC system is at present largely proportional to national responsibility for climate change, with the largest greenhouse polluters exercising the most influence over negotiations, whereas a more just procedure would either allocate power equally or assign it in proportion to the severity of the potential impacts of a given decision on various parties. It seems obvious enough that parties that are highly vulnerable to the effects of decisions such as mitigation temperature targets or ambitious adaptation efforts should be given a more prominent voice in the making of such decisions.

Climate-related threats to food systems in sub-Saharan Africa include threats to the livelihoods of farmers and the food security of entire peoples. Both are aspects of the region’s extreme vulnerability and both warrant response as a matter of climate justice. In seeking to reduce the economic impacts of climatic disruption, remedies of the kind that Page and Heyward refer to as means-based compensation would adequately correct the injustice imposed by climate change and could take the form of economic aid or development assistance. Losses of arable land to desertification from climate-induced drought could, at least in principle, be remedied through the creation of alternative livelihoods for those affected, making such terrestrial impacts less severe than the insular territorial losses of small island states, but correcting for lost agricultural productivity would be another matter. A people on the edge of food insecurity that faces prospects of increasing crop failures and losses of arable land is made significantly more vulnerable than one that merely faces the loss of livelihoods in agriculture or one that currently produces large surpluses for export. Remedies that avoid increasing this vulnerability of food insecurity would not only need to address the short-term needs of affected persons through the delivery of emergency food aid during future droughts but would also need to restore food security itself, enabling the people to produce their own food rather than leaving it dependent on international humanitarian efforts.

In cases where the loss of arable land is so significant that food security would be impossible to restore through domestic production, some global redistribution of access to farmlands may need to be considered, similar to Armstrong and Corbett’s (2021) call for redistributing access to global fisheries in response to island and atoll states losing their own capture fisheries along with their territories. Desertification of farmland entails loss of use value of land without loss of territory, and permanent loss of agricultural productivity within a territory

may not be amenable to Page and Heyward's means-based compensation through standard economic aid or development assistance. Since it would need to replace lost agricultural productivity and not merely lost livelihoods, compensatory justice for sub-Saharan Africa may involve transfers of land for the purpose of maintaining food systems or basic food security rather than resettling those displaced by inundation. In addition, the large numbers of potentially affected persons in Africa would require vastly more land resources than the proposals for resettling vulnerable small island peoples who would require relatively small transfers of territory to accommodate their affected populations. Rather than merely scaling up remedies that have been proposed for small island states, climate impacts on sub-Saharan Africa may call for some different kinds of remedies altogether. Such remedies may include measures to rectify lost agricultural productivity in order to maintain food security, build governmental capacity, and prevent climate impacts from undermining ongoing anti-poverty efforts.

Finally, extreme vulnerability in sub-Saharan Africa may warrant consideration of rights to migrate where impacts on food and other social and economic systems are so severe that reducing vulnerabilities caused by climatic change becomes unfeasible. Such rights may parallel those of peoples threatened by sea level rise, albeit without the same threat of full territorial loss, as both would be economic migrants displaced by anthropogenic environmental change, and climate justice would require their individual or collective resettlement. In proportion to their culpability, states responsible for causing climate change may be held liable for burdens associated with internal or international resettlement of climate migrants, with eligibility for such assistance being assigned according to differentiated vulnerability. In some cases, these burdens may include obligations to accept climate migrants as temporary or permanent residents and/or the granting of economic or full citizenship rights to those displaced.

Looking at issues of extreme vulnerability through the lens of corrective justice typically generates compensatory obligations of the kind proposed by Page and Heyward, along with recognition of the limits of compensatory justice. Treating extreme vulnerability in regions like sub-Saharan Africa thus requires a layered approach to climate justice that starts with mitigating climate change, follows this up with efforts to insulate affected persons and peoples from harm through adaptation, and finally considers compensation, first of lost means and then of ends. In cases where even ends-based compensation cannot adequately correct the injustices associated with anthropogenic climate change, the limits of climate justice imperatives become evident. Where injustices are severe, there may be no remedy, making their prevention an overriding imperative. Where neither redress nor prevention is possible, only climate tragedy remains.

Conclusion

Just like the threats of sea level rise, extreme vulnerability to climate change in sub-Saharan Africa requires the extension of existing justice theories to new

problems, or indeed new theories to reflect the unique nature of such climate injustices. The differential vulnerability of states and peoples requires consideration of injustice from the perspective of its victims or those exposed to risks of injustice because this particular injustice arises from the exacerbated risk of harm in conjunction with minimal accountability. Unlike climate justice principles that are developed from the perspective of contributors to harm (e.g. burden-sharing principles for mitigation or adaptation that allocate such burdens on some version of CBDR+RC), taking the perspective of (potential) victims requires a primary focus on vulnerability reduction and only a secondary focus on ensuring that measures undertaken to reduce these vulnerabilities involve a fair allocation of burdens to the responsible parties. However, this shift of focus need not entail that questions of responsibility be left entirely aside.

Even though its focus is on compensating the victims rather than punishing the perpetrators, the link between those responsible for causing climate change and those suffering its harmful effects remains relevant for the assigning of compensatory liability as well as other measures associated with vulnerability reduction or resilience enhancement. Victims that share a high level of responsibility for the effects that they may suffer in the future may have some claim on loss and damage compensation, but in such cases being made “whole again” would also need to take into account their contribution to the problem. While countries can be both highly responsible for and highly vulnerable to climate change, in which case their just compensation for loss and damage may be attenuated by any remaining liability to such compensatory funds, a more compelling case involves a victim that has only minimal (or no) responsibility for climate-related harm.

Indeed, the injustice of climate change is largely a product of the asymmetries existing between its causes and effects, and the stark disparities between the perpetrators and the victims. Those most vulnerable to climate change are not only also among the world’s most disadvantaged in most other respects, but many of them are also among the least responsible for causing the environmental harm they now suffer. If not for these facts, climate change would lack key elements of the injustice that it is properly understood as involving. Unlike pure accidents, where harm is suffered without anyone being responsible for that harm, climate injustice involves the culpable (or at least complicit) imposition of harm upon its victims, where the already vulnerable are made worse off by the harmful actions of the advantaged. Mitigation and adaptation imperatives can be regarded as trying to prevent existing inequities from being widened by anthropogenic climate change, whereas compensatory responses can be conceived in terms of efforts to narrow or close those that have been opened. In cases of extreme vulnerability, a victim-centred focus is required to ensure that vulnerability is reduced to a tolerable level, and is properly guided by affected parties, but given the resources required to redress extreme vulnerabilities, it need not preclude such imperatives from being situated within larger burden-sharing imperatives.

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8 Adaptation to climate change in Southern Africa

Challenges for sustainable development and the role of international cooperation

Matthias Rompel

Introduction

The world is facing an unprecedented climate crisis. The annual Global Risks Report describes the global risk landscape, its changes, and the interconnectedness of risks. The 2020 report, for the first time in its history, relates all top five risks by likelihood and three out of five by impact to environmental and climate events (extreme weather, natural disasters, etc.). As the report points out:

climate change is striking harder and more rapidly than many expected. The last five years are on track to be the warmest on record, natural disasters are becoming more intense and more frequent, and last year witnessed unprecedented extreme weather throughout the world. Alarming, global temperatures are on track to increase by at least 3°C towards the end of the century – twice what climate experts have warned is the limit to avoid the most severe economic, social and environmental consequences. The near-term impacts of climate change add up to a planetary emergency that will include loss of life, social and geopolitical tensions and negative economic impacts.
(World Economic Forum, 2020: 6–7)

The concept of vulnerability seems helpful in trying to understand the impact of climate change on communities and societies. It has been developed in the field of disaster risk management since the 1970s (IPCC, 2012: 32). According to the Intergovernmental Panel on Climate Change (IPCC), the UN's body for assessing the science related to climate change, vulnerability is the predisposition to be adversely affected. This includes the characteristics of a person, group, or society, and their situation that influences their capacity to anticipate, cope with, resist, and recover from the adverse effects of physical events. Vulnerability is a result of diverse historical, social, economic, political, cultural, institutional, natural resource, and environmental conditions and processes (Wisner et al., 2004; IPCC, 2012).

Climate science has produced three key terms that help determine the extent of climate change vulnerability and serve as means to assign indicators to measure this vulnerability. These key terms are *exposure*, *sensitivity*, and *adaptive capacity*.

Exposure describes the external effects on the system, that is, climate events from outside that are impacting. Hence, *exposure* describes the nature, scope, and pace of climate impacts, and to which extent certain regions are subject to changes in certain parameters like average temperature, rainfall, and extreme weather events. *Sensitivity* is the degree to which the system is affected by exposure to risks or more general changes in climate. Drawn together, *exposure* and *sensitivity* to climate events describe the *climate impact* on the region in question. *Adaptive capacity* refers to the ability of an individual, household, community, or society to build up resilience and adjust to climate risks. This adaptive capacity also reflects access to financial, technical, educational, and community resources. It is therefore subject to socioeconomic conditions (e.g. income distribution, poverty) and their institutional context (governance, institutional capacities, political economy).

Climate impact in relation to the adaptive capacity defines the *vulnerability* to climate change of a given system, be it a community or a sector like agriculture in a specific region. In other words, a high climate change vulnerability can be found where climate impact is high and the adaptive capacity is low (Brooks, 2003; IPCC, 2012).

Through an epistemological lens, climate science is applying global perspectives and trying to develop a homogeneous understanding of climate change on a global scale (Heymann, 2019). The dynamics of climate change are modelled from the vantage point of natural science with a rather technical perspective on assessing contributing factors and impacts on regions and national states (Conrad, 2008). In this sense, the IPCC can be seen as the engine for scientific knowledge production on climate change. The question remains whether such knowledge is sufficient to drive adaptation efforts on a country level.

Climate change in Southern Africa: Changing landscapes – transforming societies

Africa has been identified as the continent most vulnerable to the impacts of climate change, despite contributing least to greenhouse gas emissions. Among the numerous continental-level impacts of climate change Africa is facing, the following seem to be of particular relevance:

- Water resources are at risk, especially in international shared basins where there is a potential for conflict and a need for regional coordination in water management.
- Food security is at risk from declines in agricultural production due to changing rainfall patterns.
- Natural resources are at risk, hence biodiversity might be irreversibly lost.
- Vector- and water-borne diseases may increase, especially in areas with inadequate health infrastructure.
- Coastal zones are vulnerable to sea level rise, particularly roads, bridges, buildings, and other infrastructure that is exposed to flooding and other extreme events.

- Exacerbation of desertification by changes in rainfall and intensified land use.

(IPCC, 2014; IPCC, 2008: 489)

Historical climate records for Africa show a warming of approximately 0.7°C over most of the continent during the 20th century, a decrease in rainfall over large portions of the Sahel, and an increase in rainfall in east central Africa. This warming is greatest over the interior of semi-arid margins of the Sahara and central Southern Africa (IPCC, 2008: 489).

According to IPCC's Fifth Assessment Report, temperatures have increased faster than the average global warming rate across Africa, and this is projected to continue. Today, they have already reached 1.5°C above pre-industrial levels in many African regions (IPCC AR5, 2014).

If we narrow the focus to Southern Africa, we see a predominantly semi-arid region with high rainfall variability, characterised by frequent droughts and floods. There is robust evidence that warming is greater here: the average temperature in the region is rising at 2°C, as compared with the African average of 1.5°C of warming. Areas in the south-western region, especially in South Africa and parts of Namibia and Botswana, are expected to experience even larger increases in temperature (IPCC SR15, 2018).

In addition to the high *climate impact*, the *adaptive capacity* is low as well, particularly in rural communities (IPCC AR4, 2007; IPCC AR5, 2014).

Hence, the *vulnerability* of most countries in Southern Africa is even higher than in other regions on the continent. It is Southern Africa's rural communities that have been identified as most vulnerable (Stern, 2006; IPCC, 2007). These communities are generally under-resourced to adequately adapt to extreme changes in climate, and are highly dependent on rain-fed agriculture (Hansen, 2002; Nkem et al., 2010).

The impact of warming and climate change in Southern Africa is seen and projected in multiple areas:

- A reduction of about 10–20% in the annual mean rainfall, accompanied by an increase in the number of consecutive dry days (Maure et al., 2018).
- The risk of severe droughts in the region is projected to increase threefold in the next five decades (Otto et al., 2018).
- The drought in 2019 was reported to be the worst drought in decades and has been affecting 45 million people in 14 countries across Southern Africa (The New Humanitarian, 2019).
- The reduction of rainfall decreases water availability (Mekonnen & Hoekstra, 2016).
- A decrease in surface water availability leads to the depletion of underground water.
- In agriculture, yield losses are expected, and a reduction in maize and sorghum cropping area suitability (Kuivanen et al., 2015).
- Stress in agricultural systems and reduced yields will substantially reduce food security in the region.

- Livestock will experience increased water stress.
- Increased conflict potential between smallholder farmers and commercial farmers seems likely.
- Larger demand for water for wildlife and human consumption may lead to human-wildlife conflicts.
- Despite reduced annual average rainfall, rainfall intensity is expected to increase, leading to regular flooding.
- The Zambezi and other rivers are projected to see reductions in stream flow of 5–10% associated with increased evaporation and transpiration rates (with expected consequences for hydroelectric power production across the region).
- Higher evaporation will lead to the salinisation of soils.
- An increase in temperature will impact organisms and terrestrial and aquatic ecosystems.
- In urban areas, increased temperatures will lead to human health deterioration.
- A rise in mean temperatures will allow for the expansion of vector-borne diseases (e.g. malaria, dengue fever) further south and in higher altitudes.

(IPCC SR15, 2018)

It is not surprising that the observed changes in the climate of the region are reflected in local discourses and wisdom. However, these local epistemologies of climate change differ from the global epistemological vantage points established (e.g. by the IPCC). Everywhere the author of this chapter went while doing fieldwork with smallholder farmers recently in countries like Malawi, Zambia, Zimbabwe, or Namibia, local observations on climate change and the insights into their own vulnerability to changing climate were expressed as part of the local knowledge and vernacular epistemologies by farmers and herders alike. This is underscored by a number of studies on smallholder farmers' perception of changing climate conditions, for example, the one by Vincent et al. (2013), which covered a range of Southern African countries and found that farmers across all countries had observed a change in climate over the last ten years, unlike in the 1990s. The most widely observed change was the unpredictability of rainfall and the changes in the timing, duration, and intensity of rain. Lower rainfall was observed in some places, as well as higher temperatures (Vincent et al., 2013).

At the same time, these observations of a changing climate do not necessarily translate into a clear attribution of causes of the change. In a literature review, Kuivanen et al. (2015) provide a compilation of studies and show that local farmers' perceptions reveal a more complex picture of the causes and effects of climate-related change than is suggested by the scientific viewpoint on climate change alone. This underscores that there are epistemological trade-offs between the global scientific knowledge on climate change as represented by institutions like the IPCC, and the social construction of climate change in local worldviews.

The study also shows both consistencies and inconsistencies between farmers' perceptions and climate data (Kuivanen et al., 2015: 23ff).

After all, farmers' perceptions of climate change are potentially influenced by a range of social and cultural factors, including personality, pre-existing beliefs, values, spiritual worldview, emotions, social experiences, and other contextual factors (also compare Clayton et al., 2015). More generally, perception might be described as referring to a range of beliefs, judgements, and attitudes that depend on one's context and characteristics (Slegers, 2008). And beyond these characteristics of local knowledge on climate change, it is also important to consider that knowledge and insight is a necessary but not the only precondition for behaviour and action. We know from a range of studies that associating risks with climate change is different from the pure reflection that the climate is changing. It has been argued that the *psychological distance* of climate change is an indicator of willingness to act on climate change. And despite a generally accepted societal risk posed by climate change, the perceived risk of it varies greatly from individual to individual, and especially from community to community (Steynor, 2020). It is interesting to note the absence from the local climate change discourses and epistemologies of the fact that African countries contributed least to greenhouse gas emissions, and therefore also to global climate change, but have been most severely impacted by them.

Returning to the discussion of vulnerability, it seems important not to investigate climate-related vulnerabilities in isolation. More recent research has enabled a more detailed understanding of the interacting roles of social factors, including poverty, inequality, and other stress factors that increase vulnerability to climate risks (IPCC, 2018: 436). These interlinkages are important to keep in mind when designing policy frameworks for climate-change adaptation and development.

The burden of extreme poverty is already high in Southern Africa. It is estimated that nearly 88 million people (amounting to 45% of the population) live in extreme poverty across the region. Southern Africa accounts for 9% of extreme poverty globally, even though it only accounts for about 2.5% of the world's population (Porter, 2017).

It must be noted that this generalised poverty persists in an environment of extremely high-income disparities. Income inequality within a society can be measured using the Gini index. According to the World Bank (2019 data), South Africa has the highest income inequality in the world, as measured by the Gini coefficient, immediately followed by Namibia. In total, seven countries of the region are placed among the 11 highest-ranking on the Gini index list (South Africa first place, Namibia second, Zambia fourth, Lesotho sixth, Mozambique seventh, Botswana eighth, and Eswatini 11th).

Macroeconomic modelling for South Africa suggests that the effects of global warming will not only lead to reduced economic growth but will also increase these inequalities further. Based on a moderate climate change projection (climate modelling according to RCP4.5 scenario, which projects greenhouse gas (GHG) emissions to peak around 2040 and then decline; IPCC AR5, 2014), macroeconomic modelling suggests an increase of the Gini index by three to four

points compared with a scenario without warming (Dasgupta, 2020). Poverty and inequality already define the livelihoods of the majority of the population in Southern Africa. The recent COVID-19 pandemic has made poverty worse in most countries of the region, exacerbating many of the underlying issues surrounding poverty. Hunger and food insecurity have, in particular, become much more pressing issues due to the effects of COVID-19. It is therefore obvious that climate change in many instances drives poverty and inequality even further.

Impacts on agriculture and food security

Looking at the societal and economic structures of the countries in the region, we see that agriculture is a key sector, accounting for more than 50% of employment. Agriculture is also most affected by climate change. Due to their high dependence on rain-fed agriculture, smallholder farmers are particularly vulnerable to the impacts of climate change. While mixed crop-livestock farming is widely used as an effective adaptation practice, we see limited economic and institutional capacity among smallholders to respond to climate variability.

The agricultural sector in the region can be roughly divided into commercial agriculture and smallholder farming, the latter being in fact mainly subsistence farming. Commercial farmers occupy relatively large land areas and tend to be more integrated with the market. Furthermore, they make more intensive use of technologies such as improved seeds, fertilisers, and mechanisation (Wiggins, 2009). South Africa, in particular, has a well-developed commercial farming sector (Hachigonta et al., 2013). Smallholder farmers, on the other hand, commonly cultivate two hectares or less. In Malawi, for instance, 25% of smallholder farmers use less than 0.5 ha and only 14% cultivate more than 2 ha (Rompel, 2020). The majority of all farms in the region (i.e. around 80%) are smallholdings that contribute up to 90% of the production in some countries. In Botswana, for example, 76% of the population depends on small-scale subsistence agriculture; in Kenya 85%, in Malawi 90%, and in Zimbabwe, 70%–80% (Kandji et al., 2006).

Smallholder production is characterised by low input and output levels. Smallholder farmers have limited access to financial capital and inputs, which places them at higher risk than commercial farmers. Of course, smallholders are not a homogenous group – their circumstances and strategies vary across spatial scales (Zinyengere et al., 2014). In many countries in Southern Africa, smallholders combine crop farming with animal husbandry. Nevertheless, the arid western parts of Southern Africa (e.g. Botswana and Namibia) have little crop farming due to unfavourable climatic conditions, although the livestock sector is very important. The largest croplands in the region are located in Zambia, Zimbabwe, and South Africa. However, crop yields – staples include maize, millet, and sorghum – remain low compared with other regions of the world (Chauvin et al., 2012). While agricultural production relies strongly on rain-fed cultivation in most countries, South Africa has a huge percentage of irrigated farmlands (Hachigonta et al., 2013). The reliance on rain-fed agriculture makes smallholder farmers vulnerable to increasingly variable weather patterns and

other climate-related changes. This adds to non-climatic stressors (e.g. depleted soils, failed economic policies) that occur simultaneously and interact in complex ways. Changes in temperature, rainfall, and humidity are also affecting the emergence, spread, and distribution of livestock and crop diseases (Abdela and Jilo, 2016). Temperature increases and increased frequency of extreme weather events are projected to have significant direct impacts on the productivity of cropping and livestock production systems, thus having repercussions on food security in the region (Kuivanen et al., 2015). Of course, climate-related challenges to agricultural production directly translate into impacts on food systems, leading to increased food insecurity. Successful adaptation strategies point to diversification and adoption of different crops and cultivars or incorporating different farming or livelihood activities. Commercial farmers can afford to invest in technologies to reduce risks. Responses to climate-related stress by smallholder farmers traditionally address short-term needs rather than build long-term adaptive capacity.

International frameworks and government responses

Generally speaking, there are two approaches in responding to climate change: *Mitigation*, defined as “a human intervention to reduce the sources or enhance the sinks of greenhouse gases” (IPCC, 2014). Hence mitigation aims at reducing emissions and reducing the magnitude of climate change. The other is *adaptation*, the “adjustment in human and natural systems, in response to actual or expected climate stimuli or their effects, that moderate harm or exploit beneficial opportunities” (IPCC, 2001). In other words, adaptation aims at reducing the vulnerability to climate change impacts.

As outlined earlier, countries on the African continent contribute least to global warming in both absolute and per capita terms: Africa accounts for the smallest share of global greenhouse gas (GHG) emissions, 3.8%. Therefore, the potential for mitigation remains low in most countries in Southern Africa. However, South Africa contributes considerably to GHG emissions, as the 14th largest emitter of CO₂ in the world and one of the largest emitters on the African continent, accounting for about 1% of global CO₂ emissions (Ritchie & Roser, 2017). This compares to the largest emitters like China, the US, and the European Union, which account for 23%, 19%, and 13% of global emissions, respectively (Sy, 2016). This also means that the mitigation efforts of the African continent will not account for much globally. As a consequence, in Southern African countries, the focus of climate change action is on adaptation, even in South Africa, the only country in the region that contributes substantially to climate change.

As has been mentioned, adaptation refers to adjustments in ecological, social, or economic systems in response to climatic impacts. It refers to changes in processes, practices, and structures to moderate potential damages or benefit from opportunities associated with climate change. In simple terms, countries and communities need to develop adaptation solutions and take action to respond to the current and future impacts of climate change. The aim of this adaptation

process has been frequently described as resilience, and in a way, climate resilience has become the guiding concept to describe the ultimate goal of adaptation measures. There are a number of different definitions of resilience, but all of them speak in broad terms to the continued ability of an individual, group, society, or system to adapt to climate impacts (stress), so that it may continue to function, or quickly recover its ability or function, during and after stress (Bahadur et al., 2013).

The United Nations Framework Convention on Climate Change (UNFCCC), which entered into force in 1994, introduced a number of comprehensive policy instruments. The regular Conferences of Parties to the United Nations Framework Convention on Climate Change (known as “COP”) further defines these instruments. From a national climate policy perspective, the most important among them are the National Adaptation Plans (NAPs) and Nationally Determined Contributions (NDCs) linked to UNFCCC processes and procedures.

The COP established the NAP process at COP16 in 2010 to enable parties to formulate and implement NAPs as a means of identifying medium- and long-term adaptation needs as well as developing and implementing strategies and programmes to address them. Under the Paris Agreement of 2015, governments also agreed to reduce greenhouse gas emissions. NDCs are essential for achieving the long-term goals of the Paris Agreement. They embody efforts mounted by each country to reduce national emissions and adapt to the impacts of climate change. At COP24 in 2018, the parties further agreed on a comprehensive rule-book for the implementation of the Paris Agreement. From 2024 onwards, global reporting on climate action has followed the same standards. By the end of 2020, all countries must update their NDCs, make them more ambitious and formulate long-term strategies (LTS).

However, despite all the policy frameworks in place, national politics in the region never really paid much attention to climate issues. The political response to climate change has been slow in Southern Africa, with climate-relevant planning and mainstreaming of climate change adaptation in government policies, programmes, and investments lagging behind. This has started changing only in recent years, with climate impacts in the region becoming more and more visible and putting adaptation to climate change high(er) on the political agenda – at least in some countries. Unfortunately, the role of different epistemologies and local knowledge about climate change on the pace of political change in Southern Africa remains widely under-researched. It seems important to address this gap in the future.

Linking climate change to the development agenda

In 2015, the international community adopted two major new political frameworks, the 2030 Agenda for Sustainable Development and the Paris Climate Agreement. The Sustainable Development Goals (SDGs) replace the Millennium Development Goals (MDGs), which were launched in 2000 and served as the overarching global policy framework for sustainable development. However, the

MDGs focused on poverty alleviation and development objectives for developing countries and emerging economies. Unlike the MDGs, the SDGs take account of the economic, social, and ecological dimensions of sustainable development and broaden the focus beyond alleviation of poverty. Another distinction is that while the MDGs were designed to guide development for developing countries and emerging economies in the Global South, the SDGs apply to all countries, including those of the Global North. With the SDGs, the international community has created a policy framework for transformation to be implemented by industrialised and developing countries alike. As such, the SDGs form a global framework to guide international development efforts.

The Paris Climate Agreement is a treaty within the UNFCCC. Its central goal is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2°C above the pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5°C. Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change, and is therefore the latest binding international framework to guide action against climate change.

With these two agreements in effect, a coherent global policy framework has in the meantime been put in place, and it reflects the close link of the global agendas on climate change and development. The Paris Climate Agreement makes explicit reference to the 2030 Agenda, which in turn contains a specific goal on climate action (SDG 13). At the same time, other SDGs involve climate goals, for example, urban development (SDG 11), and are therefore interlinked with the Paris Agreement. Sustainable development and climate action depend on each other, and the former must aim at making societies more resilient to climate change and promote a climate-friendly transformation of economies. Without climate action (mitigation and adaptation), the progress towards development may be reversed and future progress put at risk.

Both agreements provide a binding framework for national governments, multilateral financing institutions (e.g. World Bank, International Monetary Fund), multilateral organisations (e.g. UN agencies like UNDP, FAO, WFP), and bilateral development agencies (e.g. USAID, KfW, GIZ). In general, there is consensus that the successful implementation of the Paris Climate Agreement, as well as the Agenda 2030, not only depends on governments but also on the active engagement of a range of stakeholders (including national, regional, multilateral, and international organisations, the public and private sectors, civil society, and other relevant stakeholders).

At country level, national development priorities, policies, or plans usually reflect the SDGs, while the commitments of the Paris Accord are contained in each country's NDCs. In the best-case scenario, synergies between the two sets of objectives can be achieved on a country level. However, a gradual re-orientation of country-level public policy towards international objectives, as enshrined both in the SDGs and the Paris Agreement, is not a trivial process (Dzebo et al., 2019). Furthermore, no blueprint can be applied: country specifics matter and many trade-offs and path dependencies have to be negotiated.

One especially prominent question is how macroeconomic and industrial policies should be adapted in light of a looming climate crisis. From a development economics point of view, Pegels and Altenburg (2020) offer an interesting analysis of existing evidence for “greening the economy now” versus “cleaning up later”, particularly for “latecomer countries”, meaning low-income countries still in the process of developing their economies (usually with entrenched poverty and a pressing need for short-term growth). When they talk about “cleaning up later”, they refer to a set of motives that might guide policymakers to delay the transition to a green economy due to political economy reasons, for instance, delaying environmental action to avoid political resistance or high political costs of the introduction of a carbon price and taxation of various other environmental “bads” (Pegels & Altenburg, 2020: 2).

Many low-income countries and emerging economies find themselves at exactly this juncture, in that they are operationalising their NDCs to the Paris Agreement, and/or have committed to green growth strategies. In reviewing the existing evidence, Pegels and Altenburg found that “early greening” is likely to bring economic co-benefits, for example, in terms of efficiency-induced competitiveness and in gaining a foothold in the markets of the future. Delaying action, in contrast, risks permanent environmental damage, lock-in of polluting socio-technical pathways, and losses from asset stranding (Pegels & Altenburg, 2020: 1). This is good news for many developing countries that might want to leapfrog “classic” development pathways.

And there may be further opportunities emerging in the middle of the crisis. The global COVID-19 pandemic brought national economies to a forced halt in 2020. This shock has brought new perspectives. While the focus of government responses was initially on the immediate health effects and social and economic impacts, it has become clear that the pandemic will have medium-term and long-term effects on economic, social, political, and ecological development, particularly in developing and emerging countries, and may jeopardise the achievement of the SDGs. However, the responses to rising infection rates, as well as those to the economic fallout of the crises, have led to unprecedented action: trillions of euros of public investments were made available globally. This gives hope for further tailoring of responses to climate change, which will certainly have much stronger impacts than COVID-19 in the long run. At the same time, they opened a window of opportunity to accelerate change and orientate it in a certain direction: governments, particularly in the Global North, took the chance to steer measures for coping with the fallout of the pandemic in the medium to long term towards a transformation of economies, employment, and society that is orientated towards the Agenda 2030 and the Paris Agreement and increases resilience to future crises and disasters. Recovery measures in this sense set the course towards environmentally friendly, gender-equitable, and socially inclusive societies (also referred to as *just transition*). Investments and policy directions are known for the tags *building back better*, *building forward better*, *green recovery*, or *greening economy*. Green recovery has become a term widely used for packages of measures which address the social, economic, and political consequences of the

COVID-19 crisis in a way that sets a course for long-term structural reforms and a transformative shift towards sustainability, biodiversity protection, resilience, climate neutrality, and social cohesion. Such transformation can be pursued through a range of institutions and legal and policy approaches, including drawing upon existing tools developed through established green economy approaches. And it includes a range of financing options – both public and private (GIZ, 2020b). Green recovery measures are geared towards the opportunities and risks for the environment, climate, and economy. This is meant to lead to long-term green growth while ensuring that natural resources are preserved for future generations. In this sense, immediate responses to the COVID-19 crisis offer a unique opportunity for an accelerated transition to a sustainable economy and society in the long run (double dividend). At the same time, however, there is a risk that these investments will flow into carbon-intensive, linear economic models. In addition, the level of ambition for climate protection and sustainability goals might be lowered and environmental laws and participation rights could be sacrificed to allow short-term effects on the economic cycle. In the end, measures to overcome the economic consequences of the pandemic could therefore, in the worst case, prove to accelerate the climate crisis, which could have far worse consequences for the world community and increase global and social imbalance.

Internationally, the following areas, sectors, and directions for green recovery measures have been discussed:

- 1) In the energy and transport sector, green recovery measures should accelerate an energy and transport transition, preserving the chance of achieving the Paris climate objectives and avoiding a long-term carbon lock-in.
- 2) In the area of economic and trade promotion, green recovery measures should aim at strengthening the sustainability of international value and supply chains and increasing resilience to external shocks (such as future pandemics and climate-induced shocks), especially for export-orientated small and medium-sized enterprises.
- 3) In the agricultural sector, green recovery measures to strengthen the resilience of sustainable agricultural production systems and adaptation to climate change should focus on local and regional markets, reducing international dependence on food and equipment. The aim is to ensure national food security and use the available natural resources in an ecologically efficient manner.
- 4) In a future-orientated risk management, which considers environmental and climate risks and is based on the Sendai Framework for Disaster Risk Reduction, green recovery measures can contribute to strengthening resilience and adaptation to climate change by using data and digital solutions, among other things.
- 5) In natural resources management, climate-friendly land and water use, and ecological and sustainable food systems, should be explicitly promoted to ensure the preservation of ecosystems, nature and biodiversity conservation, and health.

- 6) Green recovery measures should pay particular attention to sustainable urban development since more than half of the world's population lives in cities and produces two-thirds of energy-related global greenhouse gas emissions. The vast majority of infrastructure investments are implemented in urban areas. The danger of lock-in effects is particularly high here, while at the same time, urban infrastructure investments can quickly absorb the social effects of the crisis by creating jobs (GIZ, 2020a, b).

Bilateral cooperation to support climate change resilience in Southern Africa

This section discusses selected technical cooperation projects that showcase the bilateral cooperation efforts of the German government on climate change in the region. All presented projects are implemented by the German International Cooperation Agency, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. GIZ is a federally owned enterprise and supports the German government in achieving its objectives in the field of international cooperation for sustainable development. GIZ implements these projects on behalf of the German government, specifically the German Federal Ministry for Economic Cooperation and Development (BMZ), the German Federal Ministry for Economic Affairs and Climate Action (BMWK), and the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV), partly with funding contributions by the Green Climate Fund (GCF). All projects have been jointly agreed upon by the donor government (Germany) and partner governments (countries in the region and/or SADC as the regional economic community).

GIZ's technical cooperation projects generally focus on capacity development. The term "capacity" here means the ability of people, organisations, and societies as a whole to manage their affairs successfully and continuously adapt in response to changing environments. In turn, capacity development refers to a process through which people, organisations, and whole societies create, strengthen, adapt, maintain, and deploy capacity over time and continuously realign it with changing conditions. This involves identifying development constraints, designing solutions, and implementing them successfully. On a project level, this approach usually includes policy and technical advice, but also the management of complex change processes at different levels of institutions and society at large. German cooperation's specific approach to capacity development is rooted in the concept of sustainable development. Sustainable development is understood as a holistic process that strikes a balance between social responsibility, ecological soundness, political participation, and economic performance. Moreover, capacity development by its very nature is a stakeholder-owned process. While this ownership can grow over time, stakeholders – usually Global South governments – must have a vested interest in the process, assume responsibility for it, and be actively engaged in achieving the change objective (GIZ, 2013: 3–5).

Along these lines, technical cooperation projects cannot be implemented by an international organisation or agency on its own; instead, a project of this type will support the partner in realising change by itself. Capacity development projects usually follow a multi-layer approach, meaning they address different levels of intervention at the same time: macro-levels (e.g. national government), meso-levels (intermediaries), and micro-levels (e.g. municipalities or citizens themselves). The approach relies on successful integration of different knowledge sets into the transformation. Unless it includes their own insights, offers the possibility to relate to the subject, and is designed to be integrated into their livelihoods, the local population will not buy into any broader change.

Example 1: Supporting governments on multiple levels to implement coherent strategies, policies, and programmes

The Climate Support Programme (CSP) in its current phase four is implemented by GIZ on behalf of the Federal Ministry for Economic Affairs and Climate Action (BMWK) together with the government of South Africa. The programme supports the South African Department of Forestry and Fisheries and the Environment (DFFE) in developing and implementing its national policy on climate change consistently, and in achieving the department's mitigation, adaptation, and biodiversity objectives. CSP contributes to South Africa's transition to a decarbonised economy and a climate-resilient society. The ongoing fourth phase of the project started in early 2022 and ends in 2026, with a total value of up to €10 million.

South Africa plays an important role in achieving the goals of the Paris Agreement and the emerging post-2020 Global Biodiversity Framework. The country is one of the 14 largest carbon dioxide emitters in the world. As the domestic economy relies heavily on the production of electricity from coal and fossil-based liquid fuels, South Africa's per capita emissions are among the highest in the countries of the Global South. At the same time, South Africa's economic sectors, population, and ecosystems are particularly vulnerable to the impacts of a changing climate and extreme weather events such as floods, fires, and drought. In unmitigated GHG emissions scenarios, warming of up to 5–8°C is projected over the interior of the country by 2100, severely impacting human and biophysical systems that underpin socioeconomic development as well as human and biodiversity well-being. South Africa is already negatively impacted by climate change directly and indirectly in all sectors and throughout society. Extreme weather events such as droughts (e.g. 2015–2018 Cape Town region drought), extreme heat, flooding, and wildfires have been more frequent and intense in recent years. In early 2022, devastating floods occurred in KwaZulu-Natal, killing over 400 people and leaving over 40,000 homeless. Since 2016, the government has allocated R6.3 billion (€350 million) for drought relief projects and R660 million (€38 million) for flood relief. As a signatory to the United Nations Framework Convention on Climate Change (UNFCCC), South Africa is committed to combating climate change and building resilience to its impacts. For

example, the South African government submitted an update of its first NDCs to the UNFCCC in September 2021. Compared with the first NDC, the new 2030 target represents a significant change with the lower emission range cut by 12% and the upper range by 32%.

The previous phase of CSP was implemented by GIZ on behalf of the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety, and Consumer Protection (BMUV) together with the government of South Africa. It has supported the DFFE in the implementation of several measures that aim to improve South Africa's climate change policy framework for the transition to a low-carbon and climate-resilient economy and society.

By providing technical expertise, the project contributed to the development of national climate change policies, such as the Climate Change Bill. It has further supported the development of a national mitigation system that sets sectoral emission targets (SETs) and, carbon budgets for companies with a high carbon footprint, as well as a tax for large greenhouse gas emitters. The CSP has also supported the Low Emission Development Strategy (LEDS) for South Africa, which sets the goal of net-zero emissions by 2050 and the establishment of the Presidential Climate Commission.

CSP also supported the DFFE in implementing all the strategic interventions of South Africa's National Climate Change Adaptation Strategy (NCCAS) and realising its goals. The NCCAS aims to integrate climate change adaptation into policies, planning, and implementation; build climate resilience; and ensure resources and systems are in place to enable implementation. In this way, CSP contributed to South Africa's ability to meet its mitigation and adaptation goals, as well as its national and international reporting obligations, and to accelerate the desired transformation to a lower carbon economy and climate-resilient society.

Besides strengthening South Africa's policy framework, CSP also worked on building capacity and rising awareness for climate change responses by co-implementing the Local Government Climate Change Support Programme (LGCCSP). In this programme, 1,236 stakeholders in 40 workshops were trained in risk and vulnerability assessment of their district municipalities' vulnerability to climate change impacts, developing climate change adaptation strategies and integrating climate change into integrated development plans. In addition, 1,131 local municipality representatives from all nine provinces of the country were trained in climate finance for adaptation and mitigation activities and in developing project proposals.

In another workstream, the CSP implemented DFFE flagship projects (renamed to the Climate Change Response Support Programme) to showcase pilot and existing initiatives demonstrating strong mitigation and adaptation actions across sectors.

The current phase of the CSP continues the previous work to implement and enhance climate action and achieve South Africa's NDC. However, it has a stronger focus on supporting up-scalability and access to sustainable finance and carbon markets, as well as supporting DFFE in its catalytic role in climate action

and biodiversity protection. It also focuses on green jobs and sustainable value chain creation.

Another major endeavour of CSP and other GIZ projects in the country is their continued contribution to the cross-sectoral process of just transition in South Africa's energy sector. With coal accounting for about 72% of South Africa's total GHG emissions, a just and sustainable energy transition is regarded as urgent in economic, social, and ecological terms. South Africa is the largest electricity market in Africa, but its power generation is heavily dependent on coal, accounting for around 90% of the country's electricity generation and 74% of its total primary energy supply; coal has been a critical part of South Africa's economy for decades. It also provides employment for some 200,000 miners and power-generation workers.

While the transition from coal presents numerous economic, social, and political challenges, it also offers opportunities, since South Africa is exceptionally well-endowed with renewable energy resources, scientific and technological know-how, an active private sector with a sound industrial basis, and a highly developed network infrastructure.

A Just Energy Transition Partnership (JET-P) between South Africa, Germany, the UK, the European Union, France, and the US was launched at COP26 in Glasgow to support South Africa's accelerated transition to a clean energy economy. An initial \$8.5 billion is to be provided over the next three to five years through multiple financial instruments, including grants, concessional loans, guarantees, private investments, and technical support. JET-P is an ambitious partnership and the first of its kind, supporting South Africa's path to a low-carbon economy and climate resilience and helping build a secure and sustainable electricity system. It focuses on the power sector but also drives new economic opportunities such as green hydrogen and electric mobility.

National, provincial, and local government, businesses, workers and their unions, and civil society have all acknowledged the importance of just transition for South Africa. A number of key policies have already been aligned to manage just transition in the energy sector: the objectives of bridging the energy gap (the economy has been adversely impacted by supply interruptions over the years), enhancing energy efficiency, and reducing GHG emissions and local air pollution feature prominently in policies, as does the National Development Plan (NPC, 2012; amended in 2020 with a chapter on just transition), the Low-Emission Development Strategy 2050 (DEFF, 2020), the NDCs, the Integrated Resource Plan (DMRE, 2019), and the roadmap for the national energy utility ESKOM (DPE, 2019).

The drive for action in South Africa continues to gather momentum, thanks not only to the newly established JET-P, but also to the already operational Presidential Climate Commission (PCC), which was announced by President Cyril Ramaphosa in December 2020. The commission is a coordinating body that oversees and facilitates the just transition process in the country. As a multi-stakeholder body, comprising all levels of society, it is tasked with defining South Africa's vision for a just transition, monitoring the country's progress towards

achieving its mitigation and adaptation goals, as well as engaging with a wide range of stakeholders. CSP closely collaborates with the PCC in areas relevant to the just transition process.

In South Africa as in the rest of the world, the COVID-19 pandemic has had a tremendous impact and is exacerbating the country's triple challenge of unemployment, poverty, and inequality. The South African Reserve Bank estimated an economic downturn of -7.3% of GDP in 2020 with approximately 3 million jobs lost. The national government has introduced several support programmes and emergency funds in direct response to the impact of the pandemic. In October 2020, the government introduced an Economic Reconstruction and Recovery Plan (ERRP, cp. PSA, 2020b). The plan follows the concept of green recovery as outlined previously and is presented as an opportunity

to address long-term structural deficiencies in the South African economy and place the economy on a new path to growth and job creation. In this regard, reconstruction from COVID-19 should be seen not in terms of recovery to what was, but in terms of transformation to what is next.

(PSA, 2020a: 4)

The ERRP includes a plan to create and support over 800,000 jobs, seeks to confront previously existing poverty, unemployment, and inequality that is exacerbated by the impact of COVID-19, and involves “stretch targets” for individual ministries. The plan follows the concept of green recovery; some of the suggested measures also refer to just transition in the energy sector, for example, green construction and retrofits that include, among other things, energy efficiency building codes, minimum energy performance standards, energy audit and benchmarking schemes, green building or infrastructure rating schemes, and renewable energy. On behalf of the German government, GIZ supports the just transition process through various projects including the CSP.

Example 2: Building resilience among players in the agricultural sector and the food industry to safeguard food security

The project “Farming for Resilience (Competitive and Climate-Resilient Agricultural and Food Sector in Namibia)” is implemented by GIZ on behalf of BMZ together with the government of Namibia. The project is scheduled to run from late 2020 until mid-2024, with a value of up to €9 million.

The project is implemented in a context in which the food and agriculture sector plays a vital role in the development of Namibia's economy, with 70% of its population directly or indirectly depending on agriculture for sustenance, and one-third of the total workforce working in agriculture. At the same time, Namibia meets only 43% of its national food demand domestically, despite significant potential to increase self-sufficiency at the local and national levels. Recent figures on food and nutrition security indicate that more than 800,000 people (more than 30% of the population) are considered food insecure, and 24%

of children under five years of age are stunted. These figures are alarming for a middle-income country and are rising further due to the COVID-19 crisis.

Recurrent droughts are a result of changing climate patterns in Namibia and have shown the extent of the agri-food sector's vulnerability to the impacts of climate change. Particularly in communal areas with smallholder farming structures, agricultural production is still largely characterised by subsistence practices with low yields, high rainfall dependency, limited water access, significant post-harvest losses, and poor rangeland management practices. Traditional knowledge and farming practices no longer seem to be suitable for the changing climatic conditions. The challenge is therefore to reach out to the local farmers and enable them to adapt their farming practices. Moreover, the sector lacks processing capacities, marketing opportunities for smallholder farmers are limited, and they sometimes operate at a loss due to the distance from the markets. It was especially the effects of the 2018–2019 droughts and the COVID-19 pandemic in 2020–2021 that revealed the necessity to strengthen the sector's resilience to external shocks, not only of smallholder farmers but of production systems and the sector in general in order to ensure sustainable livelihoods in both rural and urban areas.

The project therefore advises and provides technical support to the Ministry of Agriculture, Water, and Land Reform (MAWLR) and other partner institutions including individual farmers and producers' associations with the objective to strengthen the resilience of the agri-food sector in Namibia. The holistic approach employed by the project is based on a refined understanding of resilience which takes into account the dimensions of climate, economic, and individual physical resilience. Key focus areas are the diversification of production systems, the promotion of climate-sensitive cultivation methods and technology, sustainable water use and management systems (including rainwater harvesting), entrepreneurial skills, and innovation along the value chain. In addition, awareness of the importance of healthy and well-balanced nutrition is improved through the establishment of school gardens, improved school meals, and extracurricular activities involving playful learning and parental education.

Through these measures, the project strengthens the capacities of Namibia's food and agriculture sector to adapt to the effects of climate change and fosters market-orientated production, processing, and marketing, while protecting the country's natural resource base. Tapping into the abundance of underutilised agricultural potential in Namibia, the project enables smallholder farmers, women, and young farmers in particular, to produce in a resilient, nutrition-sensitive, and productive manner by conveying good agricultural practices and entrepreneurial and management skills, as well as introducing climate-smart technologies. The project further encourages improved processing and marketing competencies among small and medium-sized agricultural enterprises and thus supports local business cycles.

Key strategies to strengthen resilience are to tap into local knowledge and apply climate-adapted cultivation and irrigation methods, as well as to diversify production systems to minimise risks and create new revenue streams. The project design is informed by successful pilots and the experience gained in the

implementation of preceding initiatives of GIZ in Namibia. For example, conservation agriculture as a cultivation method allowed smallholder farmers to double their yields in regular years and quadruple them in drought years compared with conventional farming practices, while farmers engaging in diversifying their production systems increased their income by 70% over a period of four years.

Expected impacts of the project are improved conditions for the production and multiplication of seeds (including climate-resilient varieties); improved competencies in and application of climate-resilient agricultural practices and know-how among smallholders in the country; strengthened capacities for the management of agricultural enterprises, agro-processing, and marketing of products; increased knowledge of balanced nutrition as well as food and nutrition security among the population; enhanced and diversified agricultural production; and increased productivity and income levels in agriculture.

Example 3: Mobilising private sector players to develop climate risk insurance

The project “Climate Risk Insurance and Information in Zambia (CRIIZ)” is working to enhance climate resilience through innovative climate risk insurance. The project is implemented by GIZ together with the Ministry of Agriculture of Zambia, and on behalf of BMZ. The approach of the project is to mobilise the private insurance sector to develop insurance products tailored for smallholder farmers and adapted to the realities in Zambia. The project has a value of €2 million and runs from early 2020 until the end of 2022. Its objective is to improve the access of agricultural workers to private-sector climate risk insurance and information

The project is centred around the fact that extreme weather events such as drought and heavy rainfall threaten the livelihoods of many people in Zambia. Every year, around 11% of the population is affected by drought. Estimates indicate that this figure will rise to 25% by 2050. Smallholder farmers are especially affected by climate risks, given that they have little access to capital, financial services, and weather information. On the other hand, climate risk insurance has the potential to hedge against risk in agricultural production but is not widespread yet in the region. In Zambia, it has so far largely been provided via the Farmer Input Support Programme (FISP), a state-sponsored programme that can only be accessed by some agricultural actors. Private sector business models for climate risk insurance have mainly covered the cotton industry. To date, smallholder farmers have shown limited demand for agricultural and weather insurance as they are often unfamiliar with such products and their mechanisms. Other types of insurance are not widely used either. Moreover, smallholder households often cannot afford to pay insurance premiums, especially before the start of a new agricultural season. Although climate risk information, such as weather forecasts, is prepared and disseminated in the country, it largely fails to reach the people working in the agricultural sector. In addition to the lack of insurance products, there are also the problems of insufficient knowledge and limited demand for

them. The low uptake of climate risk insurance and poor dissemination of information on climate risk are the result of shortcomings on both the supply and demand sides.

The project takes a private sector approach to support the market for climate risk insurance and the dissemination of climate risk information. Through its capacity development strategy, the project supports the ability of individuals, organisations, and society as a whole to act. It offers training in the area of climate risk insurance to the employees of insurance companies, brokers, and governmental institutions, as well as to selected providers of climate risk information. Companies and government institutions receive advice on integrating insurance into their business and developing sustainable implementation plans. At the societal level, cooperation is established and strengthened between insurance companies and brokers, and between the private and public sectors. This cooperation is supported through advisory services and workshops, especially through the provision of data and the preparation and dissemination of climate risk information. The approach considers that women are more severely affected than men by the negative effects of climate change and are disadvantaged in agricultural and financial systems.

Since its inception, the project supported three agro-enterprises, two financial institutions, and four insurance companies with capacity development, providing 9,000 climate risk insurance policies to their farmers by early 2022. The policies offered are index-based and provide pay-outs in the case of drought or excess rainfall, with rainfall estimates based on satellite data. In the case of the two financial institutions, the insurance is linked to agricultural loans, and the farmers who are unable to pay insurance premiums upfront do not have to do so. When adverse weather triggers a pay-out, the insurance company will provide a pay-out to the financial institution, which in turn deducts the pay-out from the farmer's outstanding loan. These pay-outs reduce the smallholders' financial stress resulting from adverse weather events and allow them to make agricultural investments in the following season.

The project aims to ensure that by the end of 2022, more than 30,000 climate risk insurance policies for agricultural actors are provided by private insurers outside of government programmes. In addition, it aims to provide 100,000 smallholder farmers, including 30% women, with climate risk information tailored to their needs.

Example 4: Building regional platforms for knowledge exchange and strengthening regional value chains

The “SADC/GIZ Adaptation to Climate Change in Rural Areas (ACCRA)” programme is an example of building capacity on a regional level through regional economic communities (RECs). RECs in Africa group countries into subregions for the purpose of achieving greater economic integration. The Southern African Development Community (SADC) is the respective intergovernmental organisation for Southern Africa, headquartered in Gaborone, Botswana. The goals of

SADC are to achieve economic development, peace, security, and growth, alleviate poverty, enhance the quality of life of the peoples of the 16 SADC member states, and support socially disadvantaged groups through regional integration.

The ACCRA programme, running from early 2015 until mid-2021, has been implemented by GIZ on behalf of BMZ with SADC member states. The programme is worth €8.1 million, which, in addition to the funding from BMZ, also includes readiness funding contributions by GCF.

As a subsidiary institution of SADC, the Centre for Coordination of Agricultural Research and Development for Southern Africa (CCARDESA) has a mandate to coordinate agricultural research and development among the SADC member states. Just like the SADC secretariat, CCARDESA is located in Gaborone, Botswana. Its objective is to increase productivity through the development and scaling-up of market-orientated technologies and innovations creating an enabling environment and brokering of Agricultural Research for Development (AR4D) knowledge and information in the region. This contributes to an increased rate of growth of the agricultural sector in the SADC member states, improved livelihoods of the rural population, and increased productivity of smallholder farms and enterprises, reducing the proportion of poor rural households.

The ACCRA programme was designed to increase the capacities of the SADC member states to integrate climate change into agricultural programmes and investments through CCARDESA. Its approach was to support CCARDESA and national agricultural research and extension services in SADC through three main action areas: (i) regional dissemination of knowledge for climate change adaptation in agriculture and climate-smart agriculture; (ii) climate-proofing of agricultural value chains; and (iii) enabling access to climate finance. These action areas support the implementation of climate-relevant elements of the SADC Regional Agricultural Policy. The programme has strengthened the capacity of CCARDESA to act as a knowledge broker, coordinator, and moderator for agricultural research and development in the region.

The programme has implemented capacity-building measures for more than 7,000 male and female farmers, research and extension officers, and technical and managerial staff of different national, regional, and local organisations, improving their capacities in the fields of climate change and agriculture, strategic foresight, gender, proposal writing, and climate finance. It supported closer cooperation between global, regional (SADC level), and national governmental and non-governmental institutions for agricultural development, research, and networking. At the regional level, it disseminated climate change and agriculture information and technologies tailored for different target groups, while in some member states, this was done at the national level as well under the auspices of the programme's value chain sub-projects.

In the area of regional knowledge dissemination on climate-smart agriculture, the programme facilitated improved access to agricultural information and research for the SADC Member States by developing and supporting CCARDESA's regional digital knowledge-sharing and communication system.

The system consists of the CCARDESA website including its Southern Africa Agricultural Information Knowledge System (SAAIKS), where users can download a continuously increasing number of knowledge products, training materials, tools, and information briefs on a range of topics, including climate-smart agriculture. These products are partly developed by CCARDESA and ACCRA, but also offer a wealth of curated content from various sources in the region and beyond. The system furthermore contains an interactive discussion group forum, a Facebook page, and a mobile application on climate-smart agriculture. It is managed by CCARDESA with a network of 24 national focal points from 15 SADC member states. Input to the tool was provided by international experts and stakeholders from the region, including national agricultural research and extension services, universities, and development programmes. The programme also used conventional knowledge dissemination channels such as print media, workshops, training, and conferences, as well as exchange visits. Through SAAIKS, information on how to improve climate change adaptation in agriculture has been made available to a wide range of stakeholders across the region. Since its beginning in 2016, the CCARDESA website and SAAIKS regular users have increased more than tenfold. By the end of 2019, a total of 700 resources were uploaded. In 2019 alone, at least 5,247 people visited the CCARDESA website 22,339 times. The increasing number of users is a testimony to the utility of the system. Around 40% of the visitors are returning users, and 45% of them are female.

Moreover, the programme was successful in the climate proofing of agricultural value chains. In collaboration with the relevant ministries of agriculture, the Zambia Agricultural Research Institute, the International Maize and Wheat Improvement Centre, the Rural Self-Help Development Association, Conservation International, and Peace Parks Foundation, ACCRA supported SADC member states in increasing their capacities to disseminate and finance climate-smart practices in agricultural value chains. The programme analysed the vulnerability of selected agricultural products and production systems, tested climate-smart agriculture technologies, and prioritised local stakeholders' best practices. The aim has been to stabilise their value chains against the effects of climate change, reduce greenhouse gases, and increase carbon sinks. Climate proofing was successfully implemented in the sorghum value chain in Lesotho and Botswana, including climate risk analysis, as was the climate proofing of the maize-legume systems in Malawi, Zambia, and Zimbabwe and the livestock value chain in Botswana, Lesotho, Mozambique, Zambia, and Zimbabwe. CCARDESA's new climate change programme CAADP XP4, implemented on behalf of the European Union in a consortium with the International Fund for Agricultural Development, among others, puts the regional organisation in an excellent position to maintain its climate-related services throughout the region.

Outlook and conclusion

This chapter discussed how Southern Africa has been impacted by climate change. As a region that is already one of the world's poorest and where land

and water resources have already been under stress, it is warming up faster than in other regions in Africa and the world, with significant changes in rainfall patterns and extreme weather events. Productivity in the agricultural sector – the backbone of the economies in Southern Africa – is expected to be substantially impacted, at both commercial and subsistence levels.

International frameworks like the SDGs and the Paris Agenda have been created and adapted to be responsive to both the challenges of sustainable development and those presented by climate change. What is more, during the COVID-19 pandemic, concepts that turn crisis into opportunity have emerged (e.g. green recovery), and have been applied in the countries of the region. It is incumbent upon the governments to act and further translate the international frameworks into national strategies and policies, but also to implement and enforce them. This entails the involvement of further stakeholders, such as the private sector and civil society. The stakes are high, yet government responses seem to be slow. Different epistemologies and local knowledge and their impact on the political response to climate change remain widely under-researched. It seems important to address this gap in the future.

International cooperation, with its bilateral and multilateral agencies, has taken on the new global frameworks on climate change to guide projects with partner countries. Supporting governments, advancing appropriate policies, developing capacities of local institutions, and managing change within sectors and society at large are key domains for international cooperation aimed at supporting partner countries in reducing the vulnerability of people, livelihoods, and ecosystems to manage adaptation and ultimately build climate-resilient societies. The time for action is now, but international cooperation can only lend support to their counterparts. It is national governments, along with their civil societies and private sector, who need to be in the driver's seat.

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