



Social Dynamics

A journal of African studies

ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/rsdy20>

Rethinking river resilience: the lower Orange/ Gariep river

Sindi-Leigh McBride

To cite this article: Sindi-Leigh McBride (2022): Rethinking river resilience: the lower Orange/
Gariep river, Social Dynamics, DOI: [10.1080/02533952.2022.2017602](https://doi.org/10.1080/02533952.2022.2017602)

To link to this article: <https://doi.org/10.1080/02533952.2022.2017602>



Published online: 15 Feb 2022.



Submit your article to this journal [↗](#)



Article views: 12



View related articles [↗](#)



View Crossmark data [↗](#)



Rethinking river resilience: the lower Orange/Gariep river

Sindi-Leigh McBride

Centre for African Studies, University of Basel, Basel, Switzerland

ABSTRACT

This article investigates a new dam proposed on the lower Orange/Gariep river at the Vioolsdrift/Noordoewer border between South Africa and Namibia, an arid borderland region vulnerable to the effects of climate change. The proposed dam is employed as both a material object and a boundary concept to contribute to geographical imaginations of this understudied area. By speculatively submerging the concept of resilience in the river, the article revisits the Anthropocene thesis and rethinks resilience theory, revealing a nexus of issues that open questions about the meaning and potential of the term resilience in the context of the climate crisis.

KEYWORDS

Resilience; anthropocene; lower Orange/Gariep river; dam; climate change

1. Introduction

In January 2020, I visited the lower Orange/ Gariep River in the arid South African/ Namibian border region, the historical Namaqualand. In Namibia, the official name is the “Orange” river, however in Khoekhoegowab it is called the “!Garip” river.¹ Since the end of apartheid, the name “Gariep” (an Afrikaans derivative of “!Garip”) has had greater favour in official correspondence in South Africa, despite the name “Orange” having greater international recognition.² In this paper, I refer to the river as the lower Orange/ Gariep river (LOR). The visit was in preparation for a workshop convened by the Space in Time research project, a joint endeavour between the University of Cape Town, University of Namibia and University of Basel. The project merges different data produced by distinct research practices from geography, history, and environmental science to develop interdisciplinary “landscape archives” that consider the materiality and discursiveness of landscape (University of Basel 2021). My interest had been piqued by one of the project team members waxing lyrical about a proposed dam on the river, at the Vioolsdrift/Noordoewer border between the two countries. Swayed by his enthusiasm, I joined the intrepid researchers with my camera in tow, hoping to learn more about the motivations for and prospects of this new dam, one of many on the highly built-up river. My on-site findings were less than encouraging. Not only has the planned dam been promised for decades with no sign of progress, but along both borders of the river, awareness of and interest in talking about the dam was middling at best. Additionally, the region around the border area has not been the focus of much research, particularly not its recent history, making it difficult to pursue the small-scale, historicised approach to the dam that I had in mind without longer-term intensive field and

archival research. Despite this, my participation in the research trip and subsequent workshop between January 21–24, 2020 in Oranjemund, Namibia proved invaluable for fostering a unique geographical imagination, germane for rethinking the concept of resilience.

An initial draft of this paper was discussed at the workshop *Rethinking Resilience*, hosted by Rhodes University and held online between October 5–9, 2020. The workshop brought together scholars and artists to engage with the concept of resilience and complicate problematic prevailing narratives. Thinking about the LOR in this space was equally fruitful, especially given the diversity of applications of and approaches to resilience theory. This article therefore begins with an explanation of how I use the notion of geographical imagination to first describe my analytical attention to spatiality, the space in question being the understudied LOR region. The river is used as an epistemic environment to situate a rethinking of the concept of resilience. This is done in two ways: first, the proposed dam is approached as both a material object and a boundary concept: something that creates discursive space for (re)interpretation, (re) negotiation and consensus formation among different domains of discourse (Westerink et al. 2017). Second, a speculative methodology of “conceptual dislocation” (Jue 2020) is employed to plunge the concept into the river. In this way, resilience is both removed from its usual contexts and juxtaposed with a brief consideration of another critical concept that has shaped environmental studies/humanities over the last decades: the Anthropocene. This article is primarily exploratory in nature, rethinking resilience via an investigation of the proposed dam at the border between Namibia and South Africa.

Interspersed throughout are photographs, intended as a companion visual essay. Joan M. Schwartz argues that since “photographs participated in the construction of imaginative geographies,” they also merit attention in historical geography (1996, 19). She draws on Edward Said’s claim that, “the struggle over geography is . . . not only about soldiers and cannons but also about ideas, about forms, about images and imaginings” (Said 1994, 7) to suggest that, across space and time, photographs support the “virtual witnessing” of landscape (Schwartz 1996, 36). The photographs stand as a visual record of the LOR that can be measured against future changes but also contribute to conveying “an overarching appreciation of the significance of space, place and landscape in the making and meaning of social and cultural life” (Harvey 1990, 418) (Lower Orange River views).

2. Imagining an imaginary dam

In his analysis of visualised imaginaries of the South African military campaign into German South West Africa in 1914/1915, Miescher (2012) discusses the term “geographical imagination” by describing the shift within the discipline of geography from “the positivist conception of space as a given, i.e., as an unmediated empirical reality, towards the idea of space as a socially constructed and mediated category of thought” as facilitating interdisciplinary dialogue by questioning “how space is seen, perceived, visualized and mediated.” Useful for tracing this specific to the LOR is Linton’s (2014) research on the idea of “modern water” as a way of understanding and relating to water, tracing the history of how modern water came to be a way of knowing, accounting for and representing water. Leaning on these two concepts, I approach the LOR as socially

constructed with the aim of expanding how this understudied area is imagined and to juxtapose a historicised, concrete case of the proposed Noordoewer/Vioolsdrift dam with broader globalised discourses of resilience and the Anthropocene. After a closer description of the river and proposed dam, I contextualise both in terms of regional climate vulnerability before moving onto historical issues and opportunities to rethink resilience.

The LOR rises in the highlands of Lesotho (where it is known as the Senqu river) and discharges in the Atlantic Ocean at Oranjemund, Namibia. South Africa and Namibia share a 600 km border along the lower and western reaches of the river, which falls within the winter rainfall area of southern Africa, forming a floodplain of islands and sandbars, a linear oasis in the arid southern Namib desert. The sole perennial river in the region, the lower part of the river is flanked by especially torrid landscapes as it approaches the coast.⁴ Historically, the flow regime of the river has been highly seasonal, characterised by strong variability: very low discharges during the dry winter months, high discharges and flood events during the wet summer months. Over time, this has been drastically changed by urban, industrial, agricultural and hydropower demands, and river regulation has resulted in an artificial hydrological regime characterised by both a lack of flow variability and decreased total water volume (Putteman and Schepens 2010). An environmental assessment study by Luger and Brown (2005) investigated measures to improve the management of the river system, noting that regulation of the LOR is largely determined by dams in South Africa, resulting in socio-economic and environmental inefficiencies and reduced water security for Namibia. In the river's catchment area, South Africa has twenty-five dams compared to Namibia's five, each exceeding twelve million m³ storage capacity. The proposed site for the planned dam is approximately 300 km upstream of the river estuary and about 6 km downstream from the border post between Namibia (Noordoewer) and South Africa (Vioolsdrift).

Try to imagine the location: if you stand on the South African side of the river and enter an estimation of the proposed coordinates into Google Maps for a sense of where exactly this dam will be, it will lead you on a rugged dirt road. After passing through both large, lush commercial grape farms and tiny kraals marked by sticks stuck into the hard orange dirt, a rickety metal gate will appear, announcing open waterworks. Swift and fast, you will find yourself stranded. This is where the satellite signal disappears and with it, any further indication of where this dam will be. However, if you walk a little bit further, the road starts to narrow and is soon shouldered to the left by a very wide stretch of river and to the right by a slender artificial canal. To the left, the river is shallow but fast. To the right, the still canal is very deep. The incongruent symmetry of the channel, neatly corseted in concrete and interspersed with broad-crested weirs, against the craggy rocks with the Richtersveld mountains shimmering in the distance is a stark reminder of the resilience of this body of water. There is no colour change, no difference in the eddies rippling along the river's surface. But below it lurks the grim prospect of the planned dam altering its flow, like so many dams further up the river and further back in history (Lower Orange River views).

The dam was first recommended in 2004, either as a small balancing dam or a large storage dam just above Vioolsdrift, an outcome of the joint South African and Namibian Lower Orange River Management Study, better known as LORMS.⁵ According to the South African Department of Water and Sanitation, the purpose of the dam is to replace loss in yield due to impact of the Lesotho Highlands Water Project Phase 2 (Polihali

Dam), which will transfer water to the Vaal River in 2024; compensate for impact on yield due to implementation of the reserve in the Orange River; provide re-regulation storage in the Lower Orange River to allow releases to correct seasonal flow distribution in accordance with the ecological reserve; and provide additional system yield to meet demands in the Orange river system, especially for large-scale Namibian irrigation and some RSA demands in the Lower Orange River.⁶

At the time of writing in October 2021, the most recent publicly available information on the prospects of the dam comes from a presentation by the Department of Water and Sanitation (South Africa) to the African Union Development Agency (AUDU)-NEPAD in May 2021. Sixty-nine transboundary infrastructure projects were adopted by Heads of State at the African Union Summit in February 2021, of which sixteen are water infrastructure projects. The water sector meetings were intended to provide water sector project owners the opportunity to present on the status of project implementation and to discuss the level of support needed. Below is an extract from the report, detailing the status of the project:

8.5.1. The Noordoewer-Vioolsdrift Dam is a joint project between the governments of Namibia and Republic of South Africa, which is still in planning stage and currently managed by the Permanent Water Commission (PWC) for the two countries. In September 2015, Namibia, and South Africa, under the auspices of the PWC, commissioned the Noordoewer/Vioolsdrift Dam (NVD) Feasibility Study, which is aimed at identifying and optimising the best development dam size(s), site(s) and sequence of dam developments in the Orange River System (ORS) needed to achieve the overall catchment objectives, of re-regulating the flows for ecological needs and increasing the yield in the ORS for use by both RSA and Namibia. The study was completed in May 2020, at a cost of over US\$2.1 million.

8.5.3. Many options for the dam's technical specifications were investigated and 17 volumes of reports containing valuable and usable information produced. The level of completed studies by far exceeds definitions for pre-feasibility stage, however, the study remained inconclusive about the exact recommended optimal size, site, and type of dam.

8.5.4 The project strength is that it enjoys high priority in the development agendas of the two countries, and in the entire basin. The two governments are fully committed to its implementation. The project is technically viable, economically feasible, and can be made ecologically sustainable. The latter is subject to further studies to finalise the exact optimal dam size, site, and type, to update the environmental impacts and their mitigations, and to obtain environmental authorisations in both Namibia and SA (AUDU-NEPAD and Global Water Partnership Africa 2021).

By this account, it appears that research into the construction of the dam is proceeding, with project needs specified as being further feasibility studies and funding for this. My visit to the LOR, a year and half before this meeting, coincided with the 2019 drought. Protracted dry spells are a common feature in the region, but this one was different. On both national and international news platforms, drought reports started as early as April 2019; by May 2019 the drought was declared a national emergency (Tjitemisa 2019); and by July 2019 it was being reported that 36% of the Namibian population were at risk of hunger and dependence on drought relief support systems (Reliefweb 2019). Across the country, the drought was touted as the most severe in the last ninety years: rainfall in Windhoek was the lowest recorded since 1891 (New Era 2021).

3. Vulnerability to climate change

Like many areas characterised by extreme weather, “since eternal times this region is subject to the eroding might of the weather” (Demhardt 1990, 356). Nakanyete, Shikangalah, and Vatuva (2020) explain that drought has been prevalent in the region for a long period of time and Namibia, known as the driest country in Sub-Saharan Africa, has been particularly hard hit, with variations in severity per season and variations in climatic conditions between regions. Namibia is an example of a country dominated by drylands with intensifying aridity and drought conditions testament to rising temperatures and rainfall variability. As climate change intersects with and augments existing structural vulnerabilities, a corollary is that the natural characteristics of drylands, like those found in the Northern Cape and Namibia, further threaten vulnerable communities.

In the borderland region of the LOR, perhaps better described as the thirstlands, both South Africans and Namibians are haunted by severe poverty (Ngatjiheue 2021; Ngam 2021). Spear et al. (2018, 3) show how vulnerability to climate change is exacerbated by underlying structural factors, including histories of inappropriate economic policies, gender disparities and colonisation, which have led to chronic poverty and inequality. The authors explore the impacts of and responses to climate change in different economic sectors, social and ecological systems, and observe that the LOR is particularly water-stressed without climate change; with it, the situation is dire. Barnes, MacGregor, and Alberts (2012) confirm this by predicting that surface water flows in the south of the Orange River system will decline by up to 15% by 2080. According to Jane Turpie et al. (2010), this situation will be further worsened by increased water demand from population growth, irrigation needs and urban centres struggling with heat stress.

When viewed along a continuum of climate adaptation actions addressing root causes of climate vulnerability, reported responses to climate change in both South Africa and Namibia have been largely short-term responses to hazards posed by droughts, floods and sea-level rise, often focused on commercial agriculture and project-based, rather than focused on the system level (Spear et al. 2018, 27). For example, a report by the Bank of Namibia outlined opportunities for ensuring food security in the context of persistent drought conditions inhibiting agricultural practices and recommended rivers, boreholes and dams as water sources – despite these already being in use and failing during drought periods (Bank of Namibia 2017). This suggests that the complex longer-term impacts of climate change are either not prioritised, or not well understood.

Nakanyete, Shikangalah, and Vatuva (2020, 380) analyse secondary data from various existing publications to explore the causes and forecasting of the 2019 drought, chronicling drought-related headlines in online news reports to assess the impacts of the drought. The authors primarily focus on the impact of the drought, but also briefly discuss drought susceptibility in Namibia. This is explained as being caused by a combination of geographic positioning, land degradation, desertification and overall climate change. In the LOR area, like in many other areas around the world, these three effects are often human-induced or exacerbated by human activity in areas that were once not regarded as “permanently arid” but have since begun to develop desert-like conditions due to consistently decreasing or no rainfall. Aside from that brief mention, climate change is not referred to again in Nakanyete, Shikangalah, and Vatuva’s (2020)

paper. Much like the discourse I experienced from farmers and business owners during my research visit, both reportage and research on the 2019 drought in southern Africa is seldom contextualised in broader climate discourse.

Yet to the untrained eye (like my own) the river looked healthy enough meandering between the South African and Namibian banks. Perhaps this was wishful thinking, but resilience, or the ability to spring back into shape, seemed coded into the way that the river was coursing along powerfully, seemingly oblivious to the drought. Wishful thinking indeed: Shikangalah (2020) observes that analyses made over the last decade show a continuous rise in temperatures in tandem with decreases in the annual rainfall from December to March, resulting in shorter seasons in Southern Africa. A further decline in rainfall of up to 5% is expected over the southern African region, and future projections for the Namibian climate show further, highly variable drops in rainfall amounts (Lower Orange River views).

Worryingly, despite the arid conditions of the border region where the Noordoewer/Vioolsdrift dam would be built, existing studies about water use in the Orange River basin suggest that there is insufficient information about the potential for increased efficiency of water use, through dams or otherwise (see, e.g., Mahasa, Palamuleni, and Ruhiga 2015). This complicates efforts to understand the impact of both dams and climate change on the lower part of the river system. This is problematic because the area is likely to experience significant impacts from rising temperatures and changing rainfall patterns; but if there is little publicly available research on this topic, it follows that there is probably a gap in local knowledge about plans to build the new dam and water resource management more generally. The implications of limited awareness include limited opportunity for individuals adversely affected by water resource management (in both countries) to raise their concerns. It is also important to note that most research on or about the river concentrates on the upper reaches; making the dearth of readily available information for the LOR a significant barrier to understanding resilience in the region, both empirically and at a more abstract level.

4. Historicising the river

With this initial description of the LOR, the planned dam and the context of vulnerability to climate change, it is possible to historicise the LOR. As the most developed of all the rivers in southern Africa, the (hydro)history of the river is both complex and long: the earliest remains of humans were found in the basin, near Taung in the North West province, but “it was only much later, about 1.5 to 3 million years ago, that the exploitation of the river started on a grand scale” (Turton et al. 2004, 88). The most prominent example of this was Orange River Project (ORP). Launched in 1962 (and publicised as “Taming a River Giant”), the ORP aimed to promote and stabilise irrigation along the Orange River and in the Eastern Cape, as well as to generate hydro-power, to supply water to towns and industries, and to limit flood damage. Key structures from the project include South Africa’s largest reservoir, the 88 m high, 5500 m³ Gariep Dam, completed in 1971; the 107 m high, 3200 m³ Vanderkloof Dam 130 km downstream, completed in 1977; and the world’s longest continuous water tunnel at the time, the 82.8 km, 5.35 m diameter Orange/Fish Tunnel to the Eastern Cape, completed in 1975 (Conley and van Niekerk 2000, 136).

The historiography of Namibian-South African relations on regional/national levels is as compelling as the infrastructural development of the river. Saunders (2016) surveys both historical and contemporary aspects of the multifaceted relations between the two countries, noting that despite South Africa having more bilateral treaties and agreements with Namibia than any other country (over 60 in all); there is limited literature on the ambivalent, sometimes contradictory relationship between South Africa and Namibia. He observes that,

on the one hand there are close ties, arising especially from perceptions of a common history and close economic links, while on the other there is, and has been in the past, tension and mistrust because, it is here suggested, of the unequal nature of the relationship, a long-standing concern by Namibians to assert their independence from South Africa, and South Africa's failure to prioritise its relationship with Namibia. (Saunders 2016, 348)

Specific to the LOR, this ambiguity manifests in interesting ways. First, the unresolved border dispute between the two countries. In 1990, at the time of Namibia's independence, South Africa claimed that the border between the two countries ran along the northern bank of the Orange River and not the middle of the river, which was the accepted position in international law. As this was based on the 1890 Heligoland treaty drawn up by the German colonial government, the issue was referred to a joint technical committee which resulted South Africa accepting the middle of the Orange River as the boundary in 1992, but with no consensus reached on the boundary out to sea (Saunders 2016). While this border dispute does not directly relate to accessing water resources on the river, as there exist numerous binding international contracts defining the rights to the water that are not contested by South Africa nor Namibia, the course of the river and where one country ends and another begins is relevant in respect of land rights, infrastructure development and the offshore use-rights at the mouth of the river.

Reporting on the intensification of tension in regions where rivers form borders, especially when the lack of political intervention can create decades of conflict, Kings (2016) notes how rivers became convenient borders in the Southern African Development Community (SADC) region during the colonial divvying-up in the late 1800 s. Twelve SADC states share twenty-one river basins, with most of these crossing more than two countries, and, increasingly, climate change is testing their water agreements. Today, South Africa maintains that the border is on the high-water mark on the Namibian side while Namibia maintains that the border is in the middle of the river. Namibia, however, relies on its larger southern neighbour for trade and food imports, so has little political capital, especially when compared with the economic clout wielded by South Africa which maintains the status quo (relative hegemony over water resources) in respect of transboundary water sharing in the SADC region (Kings 2016). Carmel Rickard (2015) explains that Namibia is unlikely to push this issue at the level of international law after taking a similar border dispute to the International Court of Justice (ICJ) to decide which side of the border between Namibia and Botswana a mid-river island fell. After the ICJ's 1999 ruling in favour of Botswana, Windhoek is probably not keen to go up against Pretoria, leading to an "incongruous status of political suspense" (Hangula 2010, 195). Border dispute negotiations between the two countries

are treated as top secret by Namibia's Ministry of Foreign Affairs, while in South Africa opposition parties have called on the Department of International Relations and Cooperation to speed up these negotiations (Polity 2018).

This border dispute is particular to the colonial and apartheid history of South Africa and Namibia, but the fact of it being situated in the river raises broader questions about rivers as non-human entities. How they are embroiled in politics, despite resisting the boundaries of ownership or citizenship. How finding the exact middle point of a river to demarcate its international boundary might make sense to political geographers but appears ludicrous to those navigating its surface or drawing from its depths for daily use.

Beyond these questions, the relevance of this historical dispute to resilience along the river is well articulated in a study by Grainger and Conway (2014) who highlight the paradox between the stability needed for a boundary and the dynamism of fluvial landscapes in times of climate variability. Their work on the historical and legal role of International River Boundaries (IRBs) is useful for understanding the consequences of climate change for transboundary water resources, particularly through the effects of extreme events such as droughts. The authors assess the potential challenge that climate change represents for physical and socio-political risks associated with IRBs and identify the LOR region as a situation where aggregate regional risk is high. Based on the assessment of the biophysical and socio-political characteristics of the region, they observe that the LOR is "clearly vulnerable to climate change given its geo-graphical configuration, extreme climatic regime" and warn that "in the future, states may undertake hard engineering measures to secure access to increasingly scarce water resources, and simultaneously 'x' their boundary" which is of concern for the high potential for knock-on environmental and social effects downstream (Grainger and Conway 2014, 843).

Rivers are dynamic systems, and the natural variability of fluvial processes has historically led to a number of riparian responses and disputes, and with continuing human modification of the environment the resilience of political structures is uncertain. These natural landforms serve as catalysts to connect, but also separate people, cultures, and communities. (Grainger and Conway 2014, 846)

This relates to the second hydropolitical history issue in the LOR: experiences of displacement caused by dam construction on the river have been devastating for those displaced. The hearings from the World Commission on Dams held in November 1999 are a window into the social implications of dam construction, in particular community accounts of the impact of dams in the region (World Commission on Dams 2000). For example, members of communities affected by the Gariep and Van der Kloof Dams higher up on the river stated that they were not consulted when the dams were planned. They were simply told to move from the farm they were living on, forced to sell or leave their cattle behind; and because of the pass laws of the time, farmworkers on impacted farms could not readily resettle in the towns. White farmers were, of course, consulted in good time (Turton et al. 2004, 258). While the hearings highlighted some of the positive aspects of the dams for communities who were not displaced, for example, reliable water and electricity supply, the negative impact on the people living in the areas affected by the dams raises red flags for future dam projects.

Already, the residents of Goodhouse on the banks of the Orange River are unhappy about the planned construction, wary that it will change their way of life forever given the risk that the town may disappear as it lies directly in the dam's flood plain. Residents are especially unhappy at not having been consulted or considered despite being the most affected (Hendricks 2018). Writing on the impact of major dams in Africa and how they affect local communities, Hitchcock (2011) notes that even when resettlement is an option, this is a complicated process, often extremely hard on the people who are relocated. A major problem with the dislocation that comes with many dam constructions is that planners tend to focus attention on loss of residences (i.e., homes) rather than on loss of access to the means of production (especially land, grazing resources and wild resources on which people depend for subsistence and income) (Hitchcock 2011). This is especially true for regions characterised by extreme climate conditions, where whole sections might dry up. As Arundhati Roy states in her polemic against the big dam industry:

Anyone who has loved a river can tell you that the loss of a river is a terrible, aching thing . . . for the people who've been resettled, everything has to be re-learned. Every little thing, every big thing: from shitting and pissing . . . to buying a bus ticket, to learning a new language, to understanding money. And worst of all, learning to be supplicants. Learning to take orders. (Roy 1999)

The river itself is ordered by the mechanisms mastering it. But in changing climate conditions, observing the impact of this is tricky. Distinguishing between differences in variation of water flows due to dams and due to climate change is difficult because, like river communities forced to reckon with the impact of both dams and climate change, river morphology continuously adapts to changing discharge conditions. According to Grainger and Conway (2014, 844), "climate change could therefore exacerbate underlying weaknesses and in some cases dramatically alter political and social landscapes at boundaries." This particular boundary, the site of the proposed dam, is plagued by both drought and subject to erratic weather variability. Indeed, in late 2020 and early 2021 long and heavy rains led to flooding, affecting both southern Namibia and parts of the Northern Cape. While this does not directly impact the long-term effects of the drought, expectations of normal to above-normal rainfall between October 2021 and March 2022 across the bulk of the Southern African Development Community (SADC) region (WMO 2021) are likely to influence perceptions of risk associated with the building of the dam, as an increase in water reserves is likely to deter resistance to dam construction.

5. Rethinking resilience

Imagining the impacts of the proposed dam on the future of the LOR requires a close look at how, to lean on O'Brien's (2013) description, it edges territories and margins, "zones of social interaction, cross-fertilization, and synergy." Here, the field of elemental media (which thinks about how elements themselves function as media and what this means for questions of representation) is useful, in particular, Jue's (2020) science fictional strategy of "conceptual displacement" developed in *Wild Blue Media*, which proposes imaginatively submerging familiar terms into the ocean to see how they hold up and how our understanding of them necessarily shifts. Following this, I similarly submerge resilience into the epistemic environment of the LOR. But rethinking resilience in the dynamic context of

a marginalised fluvial landscape under climatic and economic pressure requires a brief consideration of the Anthropocene, the contested geological time period advanced in 2000 by Nobel Prize-winning atmospheric chemist Paul Crutzen and ecologist Eugene Stoermer (2000) who argued that the Earth is now in a new, unprecedented geological epoch, triggered by human actions. Haraway (2016) explains that the Anthropocene thesis gained purchase in popular and scientific discourse in the context of urgent efforts to find ways of talking about, modelling and managing globalisation while Satgar (2018) similarly demonstrates how Anthropocene discourse is ideological, with serious consequences for how we understand the contemporary climate crisis (Lower Orange River views).

While Yusoff's (2018) highly influential critique problematises the politics of the Anthropocene, deflating the heady politically infused geology and scientific/popular discourse that has accompanied it, considering resilience within this discourse has its benefits. First, Fagan (2019) questions the "who" of the Anthropocene to demonstrate the mobility of the human/nature border and the ways in which the non-human (like rivers) can/should be brought into Anthropocene politics and acknowledged as integral to dominant political conceptual structures (like resilience). Secondly, Nixon (2014) describes the Anthropocene's transition from an interdisciplinary idea to one that has permeated the public sphere, as filmmakers, curators and public intellectuals use the concept as a prism "to give immense biomorphic and geomorphic changes a granular intimacy." It is in granular attention to a proposed new dam, a non-human object brought into being by human activity with significant implications for the future of the river, that resilience can be conceptually rethought. Thirdly, Andrew Goudie and Heather Viles's (2016, 130) work on direct and indirect human actions influencing geomorphological change in the Anthropocene is useful for thinking about the implications of building a new dam in an arid area like that surrounding the LOR from the perspective of the Anthropocene hypothesis. For example, the authors observe that it can be difficult to recognise human impact on geomorphological processes because this often manifests as an acceleration of natural processes. To emphasise this point, it is helpful to think about the historical power of this river, which has sculpted both human and non-human environments historically, affecting everything from religious practices to industrial development. The counterpoint to this is the widespread evidence of human dominance in fluvial records. Antony Brown et al. explain this back and forth as a major challenge in demarcating the Anthropocene, because

the balance between human-influenced and natural processes varies over spatial and temporal scales owing to the inherent variability of both human activities (as associated with culture and modes of development) and natural drivers (e.g., tectonic activity and sea level variation). (Brown et al. 2017, 73)

Dams are hydrological disturbances that act as both a direct influence on the morphology of the river (by changing its annual run-off, sediment load and channels) but can also be an indirect influence on the future of the river in a multitude of ways, ranging from modifications of river flow regimes and channel dimensions to riverbed aggradation (Brown et al. 2017, 73). Goudie and Viles (2016) suggest that geomorphological change is often neglected in accounts of human impact in discussions of the Anthropocene, especially when looking at changes in the riverine landforms, which have no ubiquitous markers – every river must be recognised as unique in its response to the human disturbance. This brings to mind Joan Didion's obsessive interest

not in the politics of water but in the waterworks themselves, in the movement of water through aqueducts and siphons and pumps and forebays and afterbays and weirs and drains, in plumbing on the grand scale (Didion 1979).

Looking into the river's complex system of reservoirs, transfer schemes and irrigation canals to explain the impact of a new dam is perhaps beyond the ambit of this paper, but it is an interesting place to situate a theoretical investigation of what exactly resilience represents in this instance. Here this allows for thinking beyond human activity (i.e., things done on or to the river) but also thinking also about the river's own agency and the interplay between the two in the context of the Anthropocene thesis and resilience as a theoretical/conceptual structure (Lower Orange River views).

Joseph (2013) argues that the conceptual basis of the term "resilience" amounts to very little because not only is it a shallow concept, but it is also a shifting concept. This is a useful reminder that conceptual frameworks are grounded in changeable cultural specificities, historical underpinnings and of course, geographical imaginations. Illustrating this, Fraile-Marcos (2020) discusses the complexity of resilience as a narrative by foregrounding its specific imbrication with a plurality of temporal, geographical, and cultural contexts and concepts; all of which demand that the very idea of resilience is considered on a case by case basis in tandem with other formulations of adaptation, survival and persistence.

Pendall, Foster, and Cowell (2010) survey literatures from disciplines including ecology, psychology, disaster studies, geography, political science and economics to understand how they see resilience. They reveal that resilience is broadly understood as a buffer capacity for preserving normality, or what we have, and recovering to where we were, without much thought to or questioning of what exactly *normality* entails. Specific to this investigation of resilience in and of the LOR, it is not easy to define "normality," given the precarious weather conditions in the region and the long history of human activity on the river steadily increasing the river-system's vulnerability to the effects of climate change. In their critique of neoliberal resilience, Evans and Reid (2013) lament how *normal* vulnerability and precariousness have become, with both appearing not only as endemic and inevitable but also as *necessary* to the recovery part of the resilience schema. But for both river systems and the human and more-than-human communities that depend on them, what used to be normal is long past: whole natural drainage basins, which once responded to grand seasonal cycles of summer floods and winter droughts now respond meekly to the whims of water managers seated in control rooms that govern sluice gates in tens of thousands of large dams (Lynas 2011). The resilience of naturally occurring watercourses is no longer only determined by seasonal change but shaped by human consumption and human construction (Lower Orange River views).

6. In conclusion

Like the harnessing of natural springs for holiday resorts, the construction of dams is an intervention that fundamentally changes the biophysical properties and geomorphology of a river system. How can we make known the resilience of fluvial forms, with complex politics and long histories, in the face of these changes? How can we understand and relate to the context of increasing climate variability and plans to further change the geomorphology via inventions like dams? How can we trace the history of modern dams on ancient

ivers? This paper meditated on these questions to rethink the LOR as more than just an environment under climatic stress, but also an epistemic environment to situate a rethinking of the concept of resilience. Speculatively historicising and theorising the LOR and submerging the concept of resilience into this milieu contributes to geographic imaginations of this area, by paying attention to an understudied area in southern Africa. Additionally, focusing on the proposed Noordoewer/Vioolsdrift dam at the border between South Africa and Namibia revealed a nexus of issues that open questions about the meaning and potential of the term resilience, ranging from community impacts to landform transformations. Accompanying photographs contributed by speaking where words cannot, articulating that “resilience is a narrative, a collective fiction of the possibility for surviving present and future disasters” (O’Brien 2017). The enormity of thinking in planetary scales imposed by the climate crisis often makes it difficult to imagine the impact of human interventions of earth-systems, like rivers. As such, the exploratory insights discussed in this article reveal the importance of small-scale studies when exploring water infrastructure resourcing issues (like plans to build a dam) in the bigger picture of global climate change. This is true for rethinking the meaning of resilience on the lower Orange/Gariep River, in this region and in the world at large.

Notes

1. Khoekhoegowab is the last surviving language of the Khoekhoe branch of the Khoe languages and is spoken almost exclusively in Namibia. For more see Haacke (2018).
2. The river was named the Orange River in 1779 by Colonel Robert Gordon, a commander of the United East India Company (VOC), see Earle et al. (2005).
3. All images taken by author.
4. For more, see Ramsar Sites Information Service (2021).
5. For more on water management at Noordoewer-Vioolsdrift see Matthews (2014).
6. For more see the briefing on the Noordoewer/Vioolsdrift Feasibility Study (Department of Water and Sanitation 2019).

Acknowledgments

This research was kindly supported by Space in Time: Landscape narratives and land management changes in a Southern African cross-border region, an interdisciplinary joint research project between the University of Cape Town, University of Basel and University of Namibia.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Notes on contributor

Sindi-Leigh McBride is a researcher and writer from Johannesburg, and a PhD candidate at the Centre for African Studies, University of Basel. Her research looks at the politics and poetics of climate change in South Africa and Nigeria. She has an MA in International Relations, University of the Witwatersrand (2011) and an MA in Political Communication, University of Cape Town (2015).

References

- AUDU-NEPAD and Global Water Partnership Africa. 2021. “NEPAD REPORT: Webinars on PIDA-PAP II Priority Water Projects.” Accessed 16 November 2021. <https://www.gwp.org/contentassets/fafaa232ca884d9db3c1d71c8276add8/pap-ii-regional-water-meeting-report-final.pdf>.
- Bank of Namibia. 2017. *Feeding Namibia: Agricultural Productivity and Industrialisation*. Windhoek: The Research Department of the Bank of Namibia. Accessed 11 January 2021. <https://www.bon.com.na/CMSTemplates/Bon/Files/bon.com.na/52/52c35978-5912-4429-9052-3c8f5cc7971e.pdf>
- Barnes, J., J. MacGregor, and M. Alberts. 2012. “Expected Climate Change Impacts on Land and Natural Resource Use in Namibia: Exploring Economically Efficient Responses.” *Pastoralism: Research, Policy and Practice* 2: 22. doi:10.1186/2041-2223-2-22.
- Brown, A., S. Tooth, J. Bullard, D. Thomas, R. Chiverrell, A. Plater, J. Murton, et al. 2017. “The Geomorphology of the Anthropocene: Emergence, Status and Implications.” *Earth Surface Processes and Landforms* 42 (1): 71–90. DOI:10.1002/esp.3943.
- Conley, A.H., and P.H. van Niekerk. 2000. “Sustainable Management of International Waters: The Orange River Case.” *Water Policy* 2 (1–2): 131–149. doi:10.1016/S1366-7017(99)00026-4.
- Crutzen, P., and E. Stoermer. 2000. “The ‘Anthropocene.’” *IGBP Newsletter* 41: 17–18. Accessed 11 January 2021. <http://www.igbp.net/download/18.316f18321323470177580001401/1376383088452/NL41.pdf>
- Demhardt, I.J. 1990. “Namibia’s Orange River Boundary – Origin and Reemerged Effects of an Inattentive Colonial Boundary Delimitation.” *GeoJournal* 22: 355–362. doi:10.1007/BF00711348.
- Department of Water and Sanitation. 2019. “Noordoeuwer/Vioolsdrift Dam (NVD) Feasibility Study: Briefing to the Continuation of the Integrated Vaal River System Reconciliation Strategy Study (Phase 2) Meeting.” Accessed 16 November 2021. https://www.dws.gov.za/iwrp/Vaal/documents/2019/Strategy%20Steering%20Committee%202%20of%20the%20Vaal%20River/9_%20Item%209.6%20NVD.pdf
- Didion, J. 1979. *The White Album*. New York: Simon & Schuster.
- Earle, A., D. Malzbender, A. Turton, and E. Manzungu. 2005. *A Preliminary Basin Profile of the Orange/Senqu River*. Pretoria: INWENT in cooperation with AWIRU, CIPS. Accessed 16 November 2021. https://www.anthonyturton.com/assets/my_documents/my_files/Orange_Profile_4_Apl_2.pdf
- Evans, B., and J. Reid. 2013. “Dangerously Exposed: The Life and Death of the Resilient Subject.” *Resilience: International Policies, Practices and Discourses* 1 (2): 83–98. doi:10.1080/21693293.2013.770703.
- Fagan, M. 2019. “On the Dangers of an Anthropocene Epoch: Geological Time, Political Time and Post-human Politic.” *Political Geography* 70: 55–63. doi:10.1016/j.polgeo.2019.01.008.
- Fraile-Marcos, A., ed. 2020. *Glocal Narratives of Resilience*. New York: Routledge.
- Goudie, A., and H. Viles. 2016. *Geomorphology in the Anthropocene*. Cambridge: Cambridge University Press.
- Grainger, S., and D. Conway. 2014. “Climate Change and International River Boundaries: Fixed Points in Shifting Sands.” *WIREs Climate Change* 5 (6): 835–848. doi:10.1002/wcc.306.
- Haacke, W.H.G. 2018. “Khoekhoegowab (Nama/Damara).” In *The Social and Political History of Southern Africa’s Languages*, edited by T. Kamusella and F. Ndhlovu, 133–159. London: Palgrave Macmillan.
- Hangula, L. 2010. “Constitutional Democracy in Namibia: A Critical Analysis after Two Decades.” In *The Constitutionality of Namibia’s Territorial Integrity*, edited by A. Bösl, N. Horn, and A. Du Pisani, 191–199. Windhoek: Konrad Adenauer Foundation.
- Haraway, D. 2016. *Staying with the Trouble, Making Kin in the Chthulucene*. Durham: Duke University Press.
- Harvey, D. 1990. “Between Space and Time: Reflections on the Geographical Imagination.” *Annals of the Association of American Geographers* 80: 418–434. doi:10.1111/j.1467-8306.1990.tb00305.x.

- Hendricks, U. 2018. "N. Cape Water Project Set to Boost Water Security." *SABC News*, February 18. Accessed 11 January 2021. <https://www.sabcnews.com/sabcnews/n-cape-water-project-set-boost-water-security/>
- Hitchcock, R.K. 2011. "The Lesotho Highlands Water Project: Water, Culture, and Environmental Change." In *Water, Cultural Diversity, and Global Environmental Change: Emerging Trend, Sustainable Future?*, edited by B. Johnston, 319–338. Dordrecht; Jakarta: Springer; UNESCO.
- Joseph, J. 2013. "Resilience as Embedded Neoliberalism: A Governmentality Approach." *Resilience International Policies, Practices and Discourses* 1 (1): 38–52.
- Jue, M. 2020. *Wild Blue Media*. Santa Barbara: Duke University Press.
- Kings, S. 2016. "Climate Change Is Testing Southern Africa Water Agreements." *Climate Change News*, December 2. Accessed 11 January 2021. <https://www.climatechangenews.com/2016/12/02/climate-change-is-testing-southern-africa-water-agreements/>
- Linton, J. 2014. "Modern Water and Its Discontents: A History of Hydrosocial Renewal." *WIREs Water* 1 (1): 111–120. doi:10.1002/wat2.1009.
- Luger, M.K., and C. Brown. 2005. "Environmental Assessment of the Proposed Dam Sites on the Orange River." *DWAF Report No. PB D000/00/4503*. Accessed 11 January 2021. <http://the-eis.com/elibrary/sites/default/files/downloads/literature/Environmental%20Assessment%20of%20the%20proposed%20dam%20sites%2%A0on%20the%20Orange%20River.pdf>
- Lynas, M. 2011. *The God Species: Saving the Planet in the Age of Humans*. Washington, DC: National Geographic.
- Mahasa, P.S., L.G. Palamuleni, and T.M. Ruhiiga. 2015. "The Upper Orange River Water Resources Affected by Human Interventions and Climate Change." *Hydrology Current Research* 6 (3): 1–10.
- Matthews, S. 2014. "South Africa and Namibia Ensuring Enough Irrigation Water Together." *The Water Wheel* (November/ December): 26–29. Accessed 16 November 2021. <https://journals.co.za/doi/pdf/10.10520/EJC162538>
- Miescher, G. 2012. "Arteries of Empire: On the Geographical Imagination of South Africa's Railway War, 1914/1915." *Kronos* 38 (1): 22–46.
- Nakanyete, N.F., R.N. Shikangalah, and A. Vatuva. 2020. "Drought as a Disaster in the Namibian Context." *International Journal of Science and Research (IJSR)* 9 (3): 377–386.
- New Era. "Namibia's Devastating Drought: Our Strategy so Far." *New Era*, June 7. Accessed 11 January 2021. <https://neweralive.na/posts/namibias-devastating-drought-our-strategy-so-far>
- Ngam, R. "The Thirstland Years are Here – Prepare for Four More Years of Crippling Drought." *Daily Maverick*, November 11. Accessed 16 November 2021. <https://www.dailymaverick.co.za/opinionista/2020-11-11-the-thirstland-years-are-here-prepare-for-four-more-years-of-crippling-drought/>
- Ngatjiheue, C. "Severe Poverty Still Haunts Namibians." *The Namibian*, August 2. Accessed 16 November 2021. <https://www.namibian.com.na/191489/archive-read/Severe-poverty-still-haunts-Namibians>
- Nixon, R. 2014. "The Anthropocene: The Promise and Pitfalls of an Epochal Idea." *Edge Effects*, November 6. Accessed 11 January 2021. <https://edgeeffects.net/anthropocene-promise-and-pitfalls/>
- O'Brien, S. 2013. "On the Edge of Resilience: Postcolonial Ecologies in Arundhati Roy's Work." Paper delivered at Global Ecologies: Nature/Narrative/Neoliberalism Conference, UCLA, UCLA Institute of the Environment and Sustainability, March 8–10.
- O'Brien, S. 2017. "Resilience Stories: Narratives of Adaptation, Refusal, and Compromise." *Resilience: A Journal of the Environmental Humanities* 4 (2–3): 43–65. <https://doi.org/10.5250/resilience.4.2-3.0043>
- Pendall, R., K. Foster, and M. Cowell. 2010. "Resilience and Regions: Building Understanding of the Metaphor." *Cambridge Journal of Regions, Economy and Society* 3 (1): 71–84. doi:10.1093/cjres/rsp028.
- Polity. 2018. "DA Calls on Government to Give Clarity on the Namibia Border Dispute." *Polity*, November 1. Accessed 11 January 2021. <https://www.polity.org.za/article/da-da-calls-on-government-to-give-clarity-on-the-namibia-border-dispute-2018-11-01>

- Putteman, J., and B. Schepens. 2010. "Hydraulic Modelling of the Lower Orange River and Evaluation of Integrated Water Resources Management in the Orange-Senqu-Fish Catchment." MA diss., Universiteit Gent.
- Ramsar Sites Information Service. 2021. "Orange River Mouth." *Ramsar Sites Information Service*. Accessed 11 January 2021. <https://rsis.ramsar.org/ris/744>
- Reliefweb. 2019. "Namibia: Vulnerability Assessment Committee Results." *Reliefweb*, July 31. Accessed 11 January 2021. <https://reliefweb.int/report/namibia/namibia-vulnerability-assessment-committee-results-2019>
- Rickard, C. 2015. "A Borderline Case that Never Was" *Legalbrief*, October 21. Accessed 11 January 2021. <http://citizenshiprightsafrika.org/a-borderline-case-that-never-was/>
- Roy, A. 1999. "The Greater Common Good." *Frontline*, May 22. Accessed 11 January 2021. <https://frontline.thehindu.com/other/article30257333.ece>
- Said, E. 1994. *Culture and Imperialism*. New York: Vintage Books.
- Satgar, V. 2018. *The Climate Crisis: South African and Global Democratic Eco-Socialist Alternatives*. Johannesburg: Wits University Press.
- Saunders, C. 2016. "South Africa and Namibia: Aspects of a Relationship, Historical and Contemporary." *South African Journal of International Affairs* 23 (3): 347–364. doi:10.1080/10220461.2016.1243073.
- Schwartz, J.M. 1996. "The Geography Lesson: Photographs and the Construction of Imaginative Geographies." *Journal of Historical Geography* 22 (1): 16–45. doi:10.1006/jhge.1996.0003.
- Shikangalah, R. 2020. "The 2019 Drought in Namibia: An Overview." *Journal of Namibian Studies* 27: 37–58.
- Spear, D., M.A.H. Zaroug, J.D. Daron, G. Ziervogel, M.N. Angula, E.N. Haimbili, S.S. Hegga, et al. 2018. "Vulnerability and Responses to Climate Change in Drylands: The Case of Namibia." *CARIAA-ASSAR Working Paper*. Cape Town: University of Cape Town. Accessed 16 November 2021. http://www.uct.ac.za/sites/default/files/image_tool/images/138/Publications/ASSAR%20working%20paper%20on%20vulnerability%20and%20responses%20to%20climate%20change%20in%20Namibia%20-%20July%202018.pdf
- Tjitemisa, K. 2019. "President Declares State of Emergency over Drought." *New Era*, May 7. Accessed 11 January 2021. <https://neweralive.na/posts/president-declares-state-of-emergency-over-drought>
- Turpie, J., G. Midgley, C. Brown, J. Barnes, J. Pallett, P. Desmet, J. Tarr, et al. 2010. *Climate Change Vulnerability and Adaptation Assessment for Namibia's Biodiversity and Protected Area System*. Windhoek, Namibia: Ministry of Environment and Tourism, Directorate of Parks and Wildlife Management.
- Turton, A., R. Meissner, P.P. Mpampane, and O. Soremo. 2004. "A Hydropolitical History of South Africa's International River Basins." *Report to the Water Research Commission WRC Report No. 1220/ 1/04*. Pretoria: African Water Issues Research Unit (AWIRU), University of Pretoria.
- University of Basel. 2021. "Space in Time: Landscape Narratives and Land Management Changes in a Southern African Cross-border Region." Accessed 16 November 2021. <https://zasb.unibas.ch/en/research/research-projects/space-in-time/>
- Westerink, J., P. Opdam, S. Van Rooij, and E. Steingröver. 2017. "Landscape Services as Boundary Concept in Landscape Governance: Building Social Capital in Collaboration and Adapting the Landscape." *Land Policy* 60: 408–418. doi:10.1016/j.landusepol.2016.11.006.
- World Commission on Dams. 2000. *The Report of the World Commission on Dams*. London: Earthscan. Accessed 11 January 2021. http://awsassets.panda.org/downloads/wcd_dams_final_report.pdf
- World Meteorological Organization (WMO). 2021. "Normal to Above-normal Rainfall Forecast for Much of Southern Africa." WMO, September 6. Accessed 16 November 2021. <https://public.wmo.int/en/media/news/normal-above-normal-rainfall-forecast-much-of-southern-africa>
- Yusoff, K. 2018. "Politics of the Anthropocene: Formation of the Commons as a Geologic Process." *Antipode* 50 (1): 255–276. doi:10.1111/anti.12334.