7 Afromontane Community's Dependence on the Water and Climate Change Nexus of the Maloti-Drakensberg Mountain Range: The Case of Phuthaditjhaba

Ntebohiseng Sekhele and Patricks Voua Otomo

Abstract

Phuthaditjhaba is situated at the foothills of the Maloti-Drakensberg, one of southern Africa's primary water-producing regions. Nevertheless, the region suffers from a recurring lack of sufficient water for domestic and agricultural use. Since 2015, this chronic water crisis has created a state of conflict between the inhabitants of the region and the local government. Against the backdrop of the United Nations' Sustainable Development Goals, this paper provides a commentary on the contrasting realities of this town nestled within one of South Africa's most biodiverse regions, yet lacking in the very resource for which it is supposedly famous. We identify both gross mismanagement and neglect by local municipal authorities and climate change as compounding factors leading to the recurring lack of sufficient good quality water in the region. These are some of the major threats to sustainable development in Phuthaditjhaba, which may exacerbate poverty and escalate social tensions that often burst into spontaneous social unrest in the town and its surroundings.

Keywords

Afromontane living · Ecosystem services · Maluti-A-Phofung municipality · Montane Sustainability · QwaQwa · Rural mountain communities

7.1 Introduction

The town of Phuthaditjhaba (Fig. 7.1) is located at nearly 1,650 m above sea level (masl). It lies in the eastern part of the Free State Province of South Africa at the foot of the Maloti-Drakensberg Mountain Range, which rises above 3,000 masl in some areas (Zunkel 2010). The climate of Phuthaditjhaba is best described by the *Cwb* climate subgroup of the Köppen-Geiger climate classification (Köppen 1936; Geiger 1954). Also known as subtropical highland climate, the *Cwb* climate subgroup is temperate with dry winters and warm summers. Annual temperatures in the region range from 35 °C in midsummer to − 5 °C in midwinter (Department of Water Affairs 2011). Rainfall

N. Sekhele (✉)
Department of Geography, University of the Free State, Natural and Agricultural Sciences, Private Bag x13, Phuthaditjhaba 9866, Republic of South Africa
e-mail: sekhelenm@ufs.ac.za

N. Sekhele · P. V. Otomo
Afromontane Research Unit, University of the Free State, Private Bag x13, Phuthaditjhaba 9866, Republic of South Africa

P. V. Otomo
Department of Zoology and Entomology, University of the Free State, Natural and Agricultural Sciences, Private Bag x13, Phuthaditjhaba 9866, Republic of South Africa

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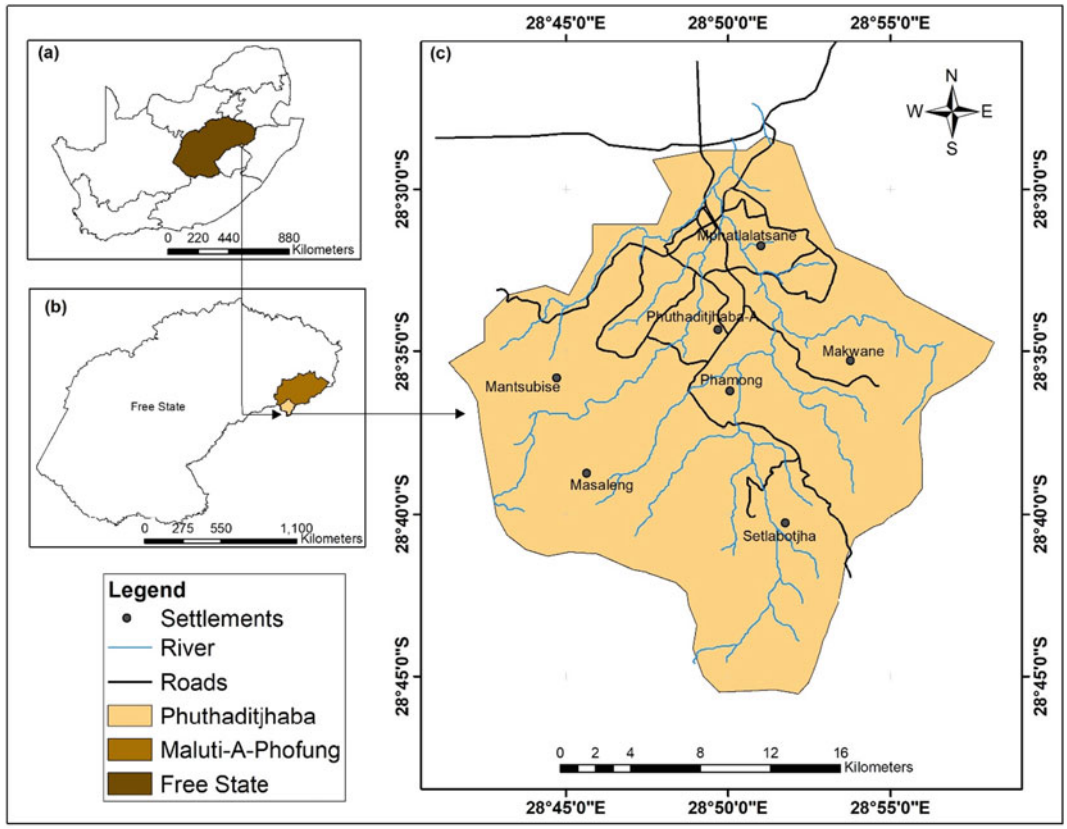

Fig. 7.1 The spatial location of the Phuthaditjhaba region, in the Free State Province of South Africa (Map by Dr. Gbenga Efosa Adagbasa)

precipitation is typically the scarcest in July, in the middle of winter, with an average of 9 mm and peaks in the summer month of January, with an average of 141 mm (Climate data 2021).

Phuthaditjhaba is traversed throughout by the Namahadi River, which has its headwaters above the town and beyond the Fika-Patso Dam in the mountainous regions of western KwaZulu Natal and the Lesotho Highlands (Fig. 7.2). The river flows northwards from the south end of the town where its tributaries include, the Sekoto, the Malemahole and the Metsi-Matsho Rivers (Fig. 7.2). By the time it reaches the north end of Phuthaditjhaba, the Namahadi River becomes the Elands River (Fig. 7.2). Indeed, Phuthaditjhaba lies in the heart of a water catchment area comprising more than half a dozen perennial rivers and streams that ultimately form the Elands River. The Elands River is itself a tributary of the Wilge River, which it joins in the farmlands nearly 30 km northwest of the town of Harrismith. This river network forms part of the Vaal River basin, whose water is used for the domestic, agricultural and industrial needs of part of the Free State and the adjoining provinces of Gauteng, Mpumalanga, and North-West (Moloi et al. 2020).

In this paper, we will provide a brief commentary on Phuthaditjhaba in light of its complex relationship with water as a commodity and an ecosystem service. Against the backdrop of the United Nations' Sustainable Development Goals (SDGs), we will discuss the existing and increasing threat of climate change on this important natural resource and provide an insight into how the problematics of water have shaped social dynamics in the region.

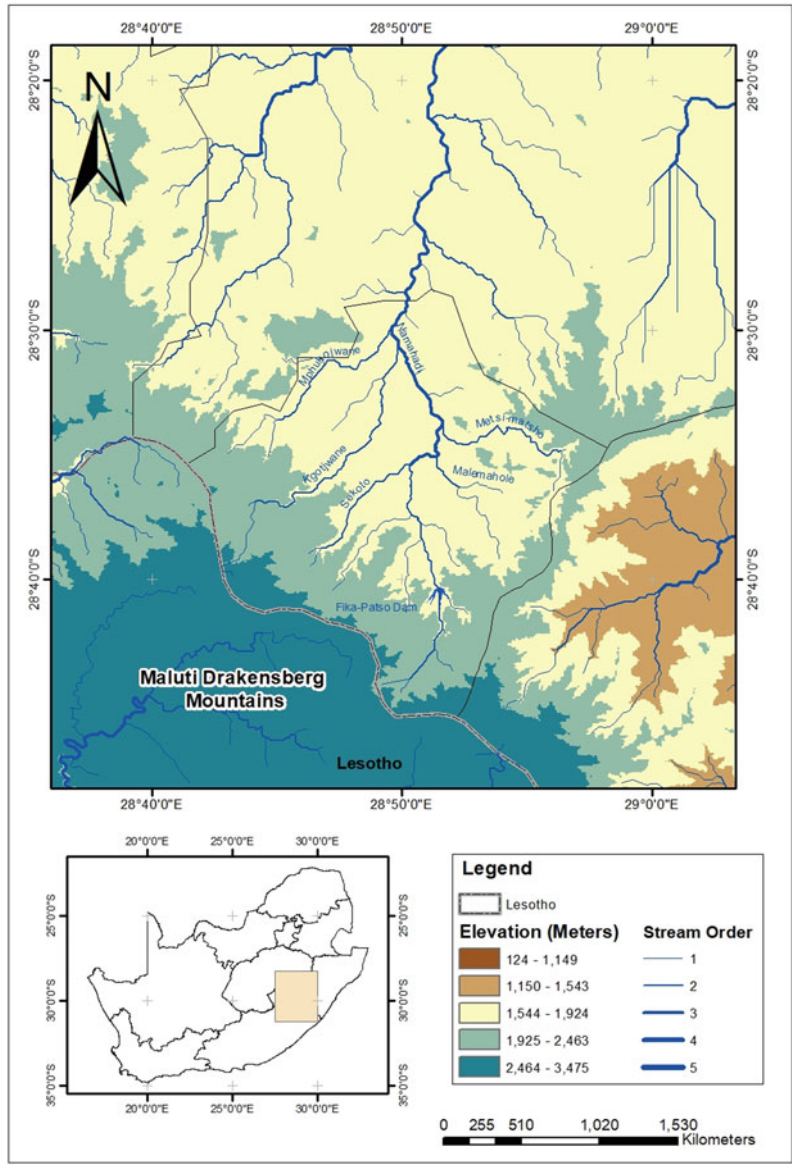

Fig. 7.2 Major rivers of the water catchment area of Phuthaditjhaba. The Namahadi River is at the centre of this river network that turns into the Elands River. This river network forms part of the Vaal River basin, which drains lands in the Free State, Gauteng, Mpumalanga, and North-West Provinces. (Map by Dr. Gbenga Efosa Adagbasa)

7.2 Methodology

The present commentary is informed by a review of the available literature. It analyses the literature on four themes; namely, the synopsis of climate of the Maloti-Drakensberg range; secondly, Phuthaditjhaba as a water deprived water catchment area despite its geographical proximity to the Maloti-Drakensberg mountains; thirdly, the relationship between ecosystem services in Phuthaditjhaba with those of the greater Maloti-Drakensberg range; and lastly, social tensions in Phuthaditjhaba influenced by water resources. These four focus areas have evolved independently despite being fundamentally interconnected and influential. The primary goal was to review these themes distinctly, in a robust and unbiased manner, so that common trends and links can be drawn. Fundamentally, the review intends to contribute to the meteorological, ecological and social discussions on the limited

research of the Maloti-Drakensberg Mountain range and its contribution to the water supply in Phuthaditjhaba.

A comprehensive exploration through triangulation of multiple search methods that includes electronic databases, hand-search and citation search was applied. Thus, relevant peer-reviewed research of qualitative and quantitative findings was obtained from universal scholarly databases that were accessible to the authors (on condition that the database was available on the university's electronic library catalogue). Thus, from the lengthy catalogue of the university's electronic library, the following scholarly databases were randomly selected—ýGoogle scholar, EBSCO Host, ResearchGate, Academic Search Ultimate, Scopus, SpringerLink and ScienceDirect. Grey literature from the South African government reports and gazettes, official departments' websites and online newspaper articles were sourced to outline and demonstrate water dynamics between the Phuthaditjhaba communities and Maloti-Drakensberg mountain range, which is deemed the primary water tower of South Africa.

In order to retrieve relevant studies, it was important to identify and define keywords to encapsulate the research topic. Therefore, the Boolean search technique was applied. The key terms combinations and Boolean operators used in the search string were as follows: (Maloti AND Drakensberg) OR range, Phuthaditjhaba AND water AND catchment AND area, Ecosystem AND services AND Phuthaditjhaba, (Climate AND Maloti AND Drakensberg) OR mountain, (social AND tensions) OR over (AND water AND Phuthaditjhaba). The search parameters had no time-limits, because of the scarce research that exists around the topic. Once the search parameters which were greatly influenced by keywords combinations from the themes of this chapter were decided to identify relevant studies, the process of selecting appropriate articles involved scrutinizing the title, perusing abstracts of all saved articles, and lastly, inspecting the introduction and discussion of results.

Ultimately, the selected literature included peer reviewed articles, reports, book chapters and grey literature. Overall, a total of 56 sources were analysed, to build a narrative of four interdependent themes in the following order: Providing a synopsis on the climate of Maloti-Drakensberg mountain which influences water supply to Phuthaditjhaba and the neighbouring areas; exploring Phuthaditjhaba as a water catchment area of water derived mostly from the Maloti-Drakensberg mountain range; ecosystem system services in Phuthaditjhaba that are impacted by the water supply from the source; and finally, social tensions that emanate from the causal relationship between climate change and water availability in the area.

7.3 The Climate of the Maloti-Drakensberg Range

"Mountains are centres of global biodiversity, endemism and threatened species" (McCain and Colwell 2011:1236). Mountain environments experience unique climate conditions over long periods. This consequently promotes mountain-adapted biodiversity and habitats with specific weather conditions. Important to note is that mountains are classified as sensitive systems (Mukwada et al. 2018), since mountainous regions are more exposed and vulnerable to changes in climate compared to, for example, boreal regions (Thuiller et al. 2005; Pepin et al. 2022). In light of the background above, a change in regional climate patterns has been recognised as a causal challenge to rural, mountainous communities who rely heavily on primary activities such as agriculture, farming and hunting (Babcicky 2013). To some degree, the degradation of ecological services and natural resources of mountainous regions has been attributed to climate change, which subsequently affects the livelihood of communities (Gentle and Maraseni 2012).

Climate change is a global challenge; however, its impacts are most severely experienced in Africa, compared to other continents of the world (Mbiriri et al. 2018). Moreover, the nations that are most vulnerable to the effects of climate change include arid and semi-arid regions. The

former category represents South Africa the best. Therefore, Africa has become hotter and drier, with unprecedented changes experienced along Southern Africa (Buhaug 2010). Verhoeven (2014: 9) cautioned that "As early as 2020, up to 250 million people in Africa were projected to suffer from increased lack of water due to climate change". Subsequently, strained water resources may lead to a collapse of the agricultural sector. Coincidental to the projection made by Verhoeven (2014), Thomas and Gillingham (2015) attest to the adverse effects of climate change on the hydrological cycle, whereby water availability is reduced, resulting in conflict outbreaks within and between societies. Lack of natural resources heightens the vulnerability of dependent societies and strains sensitive ecosystems (IPCC 2018). The occurrence of extreme weather conditions associated with the changes in the climate, such as increased heat, droughts, floods and storms, compromise society's livelihoods by impacting negatively on the availability of freshwater and arable agricultural sources. Communities become increasingly vulnerable and such conditions can lead to instability and conflict (Wapner 2013).

The Maloti-Drakensberg range is associated with decreasing temperature as altitude increases, frequent episodes of rainfall and severe wind currents (Brand et al. 2019). Nevertheless, observed temperature rates over the Maloti-Drakensberg Mountains are estimated to have increased at a rate of 1.6 to 2 °C between 1961 and 2010 (Engelbrecht et al. 2015). Mohamed and Mukwada (2019) performed a quantitative study on the Maloti-Drakensberg Region to analyse temperature change trends using the Mann–Kendall test for the period 1960 to 2016. Annual average minimum–maximum temperatures for the Maloti-Drakensberg Region were examined for variability and trends for the 57-year period. The results of the study detected change in the climate of the area, particularly of increasing temperatures. The maximum temperature increase trends were discovered to be statistically significant at $p = 0.001$, annually, monthly and sub-seasonally, whereas, minimum temperatures indicated significant variability at different temporal scales. Holistically, temperature shifts were also detected in the Maloti-Drakensberg region. For maximum temperature, significant shifts occurred in 1983, 2003 and 2015, whereas for minimum temperatures, sudden changes were recorded in 1982 and 2016 (Mohamed and Mukwada 2019).

Kruger (2006) and Taylor et al (2016) however reported a statistically insignificant difference in the rainfall variability and trend in the region over the last century. Additionally, Engelbrecht et al. (2009) points to the uncertainties around the occurrences of snowfall episodes in the Maloti-Drakensberg due to lack of sufficient climate modelling studies to investigate this form of precipitation. Nonetheless, precipitation of snow in the region would be in response to the warm Agulhas ocean current, which glides southward along the Indian Ocean coastline in the east for several months of the year. In the same token, the decrease in frontal rainfall associated conditions, reduces cut-off low pressure systems and prolongs warm temperatures thus contributing to less occurrences of snowfall (Engelbrecht et al. 2013).

The state of climate in Maloti-Drakensberg region is best addressed by SDG goal 13, whereby urgent action to combat climate change and its impacts is essential. The changing climate in the area has already proven to have dire impacts on water resources, ecosystems, and livelihoods of surrounding communities who depend on sensitive mountain environments.

7.4 Phuthaditjhaba, the Water-Deprived Water Catchment

Because of the seemingly abundant water resources within and around the town of Phuthaditjhaba (see Fig. 7.1), one might believe that access to water, for domestic, recreational, agricultural and industrial uses, is the least of the challenges for the people of the region. However, water related issues constitute one of the greatest challenges to sustainable development in Phuthaditjhaba. For instance, issues related to water quantity and quality have dominated

internal reports from the local Maluti-A-Phofung municipality and external scrutiny from the press (Greyling 2017). Minutes of the Wilge River Forum from 2006 to 2015 (reporting on wastewater treatment works in the eastern Free State- available for download at www.reservoir.co.za) reveal the occurrence of several pollution events besetting rivers in the Phuthaditjhaba and Harrismith areas. These events were said to be caused by several factors including underperforming wastewater treatment plants (WWTPs), improper sewage sludge disposal and infrastructural failures. Recent research seems to indicate that in both Phuthaditjhaba and Harrismith, these issues have persisted (Mosolloane et al. 2019; Moloi et al. 2020). Furthermore, Moloi et al. (2020) found that WWTPs alone did not account for the levels of pollutants recorded in the Elands River, thus pointing to other anthropogenic sources most notably "uncontrolled waste disposal" and "inflow of domestic sewage" at upstream sections of the river.

According to the last available figures from the Department of Statistics South Africa, in 2011, Phuthaditjhaba, which is the urban centre of Maluti-a-Phofung municipality, boasted a population of 54 661 people translating into 17 529 households of which 90.5% had at least one flush toilet connected to the sewerage system (Stats SA 2011). With an average household size of three people, according to the same source, this meant that nearly 5000 people did not have access to proper sanitation a decade ago. The same data further reveal that only 79.6% of the town houses were connected to the municipal water supply. Indicating that the rate of people without domestic access to potable water was practically double that of people without proper sanitation. Added to the fact that one and two out of ten households did not have proper sanitation and direct access to potable water, respectively, Stats SA (2011) also reported that weekly refuse removal was only offered to 68.6% of these households. Because of the time of writing, these inferences were based on the outcome of a decade old national census, it remains unknown whether these numbers have improved in the last ten years. What is certain, based on the 2020 mid-year population estimates by the Department of Statistics South Africa, is that the national population grew from 51.7 million in 2011 to 59.6 million in 2020 (Stats SA 2020). If we go by the national trend and other social indicators in the community (and highlight the fact that these numbers concern the town of Phuthaditjhaba and not the greater QwaQwa region), it would be safe to acknowledge that the current state of affairs is certainly different and could be more precarious than reported here.

Moreover, it is important to note here that having access to municipal water directly in one's household does not guarantee that water will flow through the taps. For many years now, water outages in Phuthaditjhaba have become common occurrence, with such outages often lasting for months (Macupe 2020; Mdlalane 2020; Mtengwane 2020). The reasons for this are multiple, ranging from the simple lack of water due to changing or erratic precipitation patterns, to infrastructure failure due to poor maintenance and mismanagement. In 2020 for instance, the Fika-Patso Dam (Fig. 7.2)–established in the mid-1980s as a water reservoir for the domestic and industrial needs of Phuthaditjhaba–was filled on average to 45.8% of its 29.5 million cubic meters capacity (Department of Water and Sanitation 2021). Gross mismanagement, a significant compounding factor, caused the local municipality to be put under administration in May 2018 after a municipal financial sustainability index study reported debts amounting to 2.8 billion Rand and a total lack of financial accountability (Makhafola 2019; Setena 2020).

The decade old data from the Department of Statistics South Africa help to elucidate the persistent issues pertaining to the quality of natural water resources in the greater Phuthaditjhaba area (Greyling 2017; Vorster 2018). If we are to confer value to Phuthaditjhaba as a water catchment, we are also obligated to acknowledge that access to improper water quality and quantity by the local communities represents a limiting factor to sustainable development in the region. These water-related challenges could be the nexus between several of the Sustainable

Developmental Goals (SDGs) of the United Nations. Indeed, issues related to water quantity and quality certainly have a bearing on SDGs such as:

- No poverty—Goal 1. How to lift oneself from poverty when not enough and/or good quality water is available for subsistence farming, or small-scale irrigation farming? Mukhala and Groenewald (1998), small-scale farmers of the Free State have traditionally practiced irrigation farming on communal gardens. Koatla (2012) indicates that the majority of small-scale farmers of the Phuthaditjhaba area (53%) practice livestock farming (e.g. cattle, sheep, horses, goats, etc.) and another substantial number (44%) prefer mixed farming (farming both livestock and crops). Popular crops are pumpkin, carrots, cabbage, potatoes and maize. These are sold, used for subsistence or animal feed (Koatla 2012). Such farming requires continuous access to sources of good and abundant water. Mukhala and Groenewald (1998) expressed the hope that "savings on irrigation water through efficient farming practices will release precious water supplies for human and industrial consumption." They recognized that assisting small-scale irrigation farmers to optimally utilise the water resources at their disposal is therefore of critical importance. Unfortunately, these hopes have hardly materialised because in Phuthaditjhaba, water is scarce for all forms of use.
- Good health and well-being/Clean water and Sanitation—Goals 3 and 6. How does one rise to attain good health and well-being if the basic necessity of water is a scarcity? Oyekale (2017) reports that in 2014, the majority of children younger than 5 years in South Africa lived in houses with improved access to drinking water and sanitation, although only 29.7% of households paid for safe drinking water. The author found that water pollution significantly increased diarrhoea morbidity among 1-year-old children. In the early 2000s, research had already indicated that most of the burden of unsafe water, sanitation and hygiene (WSH) in South Africa was particularly high in children under 5 years with as much as 9.3% of total deaths in this age group attributed to unsafe WSH (Lewin et al. 2007). Health practitioners and researchers have long postulated that strategies to improve water quality, in conjunction with improvements in excreta disposal and personal hygiene can be expected to deliver substantial health gains in the population (Davison et al. 2005), especially among children in developing countries who primarily bear this health burden. In Phuthaditjhaba, even the main regional hospital, the Mofumahadi Manapo Mopeli Hospital, has not been spared by the water crisis. The press has reported instances of unflushed toilets in the outpatients department and other unsanitary conditions, with members of the community acknowledging that during periods of water shortage "we get water from water trucks but that is not enough. It's impossible to flush toilets and maintain proper hygienic conditions" (Mofokeng 2016). Universal access to safe drinking water and improved sanitation are indeed paramount sustainable development goals as stated by Oyekale (2017).
- Life below water/Life on land—Goals 14 and 15. Substandard water quality and sanitation ineluctably affect the surrounding environment, especially aquatic ecosystems. Sufficient and good quality water are the inconspicuous links between life on land and life below water. There is a paucity of studies focusing on life below water in the Phuthaditjhaba area. Motholo (2014), after characterising the macro and micro-invertebrate assemblages and assessing the water quality of selected rivers in the Phuthaditjhaba catchment area, reported that the Elands river had the worst water quality. This was mostly based on the average score per taxon (ASPT), a water quality index that uses macroinvertebrate tolerance scores to determine the quality of the aquatic environment. Unsurprisingly, the Elands river located at the lowest altitudes within the catchment area, flowing through some of the densely populated sections of the

town and receiving effluent from wastewater treatment works had an ASPT of 4.8, indicating a significantly altered and ecologically poor environment (Motholo 2014). This author also noted that in general the waters below the dams (mainly the Fika-Patso and Metsi-Matsho dams) were generally of poorer quality. Consequently, organisms such as fish, frogs and crabs mainly occurred higher in the catchment area. These findings highlight the impact life on land can ultimately have on life below water, especially in a water catchment where the quality of water channelled downslope to the receiving watershed and the health of the aquatic ecosystems within the catchment depend heavily on processes occurring on land.

Therefore, in a water catchment area such as the montane terrains around and within the town of Phuthaditjhaba, failure to provide proper sanitation, regular and thorough refuse removal, and easily accessible drinking water results in increased environmental contaminants being continually released into the local waterways. As documented by early research evidence (Motholo 2014; Mosolloane et al. 2019; Moloi et al. 2020), this could have far reaching implications for the people and ecosystems within the catchment area and further downstream. Water has been at the heart of the many issues crippling Phuthaditjhaba, until these challenges are tackled, sustainable development in Phuthaditjhaba will remain elusive. In order to ensure sustainable development in Phuthaditjhaba, a catchment management strategy is necessary. This necessity is in line with the proposed research agenda of the Afromontane Research Unit (ARU) housed on the local campus of the University of the Free State. Through its an afromontane biodiversity theme, ARU plans to support and facilitate research on several sustainability topics, including biodiversity, the green economy and catchment management, among others (Mukwada et al. 2016).

7.5 Ecosystem Services in Phuthaditjhaba

The ecosystem services in the surroundings of Phuthaditjhaba are intertwined with those of the greater Maloti-Drakensberg mountain range within which it is nested. As already mentioned, the region is primarily important for its ability to provide water to near and far away lowland regions. Together with the Northern Drakensberg and the Cape Drakensberg (also known as the Cape Midlands Escarpment), the Maloti-Drakensberg is a key strategic water source area (Zunkel 2003; Taylor et al. 2016; Nel 2009). According to Taylor et al. (2016), collectively, these areas supply 50% of the water needs of the country, albeit only representing 8% of the land surface area. On a national scale, South Africa derives about 25% of its water supply from the Maloti-Drakensberg Mountain region alone (Mukwada et al. 2018).

Because of the transboundary nature of the Maloti-Drakensberg, conservation efforts in the region known as the Maloti-Drakensberg Transfrontier Conservation and Development Area (MDTFCA) have been in place since the early 2000s, managed by the Maloti-Drakensberg Transfrontier Conservation and Development Programme (Zunkel 2010). By integrating biodiversity conservation and socio-economic growth strategies, this joint initiative between Lesotho and South Africa has sought to address natural resource management and conservation issues in the Maloti-Drakensberg (Zunkel 2003). According to Zunkel (2010), the MDTFCA might be the most strategically significant transfrontier conservation area because it is located between the economic hubs of Durban, Bloemfontein and Johannesburg. In fact, through a system of impoundments and tunnels known as the Lesotho Highlands Water Scheme, the city of Johannesburg receives close to half of its water provisions from the Maloti-Drakensberg region (Zunkel 2010).

Besides water, the Maloti-Drakensberg teems with endemic flora and fauna (Stattersfield et al. 1998; Sandwith 2003; Zunkel 2003, 2010; Davis et al. 1994; Brand et al. 2019; Bentley et al. 2019). Because of these attributes, the Drakensberg Alpine Region has been recognized as one of the world's 200 most important ecoregions (WWF 2000) and one of eight South African biodiversity "hotspots" (Cowling and Hilton-Taylor 1994). Nevertheless, these ecosystems have come under threat from several factors, chief among them climate change (Bentley et al. 2019) and unsustainable land use practices (Zunkel 2010). Land use in Phuthaditjhaba and its surroundings is driven by subsistence agriculture, livestock farming, and informal land settlements. Sandwith (2003) had already pointed to these factors along with historical conflicts over the land as causes of biodiversity degradation.

Adelabu et al. (2020) argue that the anticipated effects of climate change could be mitigated by adopting agricultural practices and technologies "*that increase the resilience of mountain livelihoods.*". Taylor (2022, this volume) advocates for urban greening through the planting and maintenance of trees throughout Phuthaditjhaba, which would also necessitate training and job creation. Clark et al. (2019) acknowledge that the management of the Maloti–Drakensberg region lacks a proper vision for its sustainable development despite considerable policy and academic appraisal. Adelabu et al. (2020) argues that achieving sustainable development in the region also calls above all for the tackling of Goals 2 and 15 of the UN-SDGs, "which emphasize zero hunger and the need for sustainable, resilient food production as well as conservation of mountain ecosystems".

7.6 Social Tensions Over Water in Phuthaditjhaba

The change in climate has been accompanied by increasing civil disputes over declining natural resources over time (Solow 2013). For example, in January 2020, the community of Phuthaditjhaba and surrounding villages gathered to express their dissatisfaction over the lack of water (SABC News 2020). The roads were barricaded with burning tyres and rock boulders (Moloko 2020). This protest lasted for over two weeks, with citizens demanding running water. The region had been experiencing water problems for over 10 years; however, it was during the last four years that the situation worsened as a result of prolonged periods of little to no rainfall. The local municipality did not fulfil its duty to provide the right of access to sufficient and reliable water supply (Mtengwane 2020). Consequently, out of frustration and desperation, the community embarked on a "shutdown" and complete closure of business and prohibition of movement by people within the Phuthaditjhaba area. The intention was to have every resident participate in the service delivery protest.

Multiple factors were attributed to the lack of water in the area, including water scarcity, prolonged drought seasons and aging infrastructure. Against the backdrop of UN Sustainable Development Goals, a lack of safe drinking water is highlighted by social conflict against the local municipality of Phuthaditjhaba. It is equally important for all stakeholders who benefit from water resources to ensure the restoration and protection of water-related ecosystems such as dams and rivers, which are quite abundant in the region. At the time of writing, issues related to the provision of potable water in the region had still not been satisfactorily addressed (Koka 2022), leaving the possibility for more significant social unrest in the future.

7.7 Conclusion

Water is an integral part of the socio-economic-environmental system. Major challenges confronting Phuthaditjhaba's water supply are gross mismanagement of resources and infrastructure by local municipal authorities and climate change. These challenges prompt water-related tensions emanating from the local communities which rely on these rural–urban water supply networks. Environmental issues related to water have also dominated reports from the local

Maluti-A-Phofung municipality, similarly pointing to the absolute lack of water as a key limiting factor to sustainable development in Phuthaditjhaba. Issues related to water quantity and quality, and climate change have been proven to have an impact on SDGs that address an absence of poverty, creating good health and well-being, providing clean water and sanitation, dealing with climate action, and protecting life below water and life on land. Substandard water quality and sanitation also affect the surrounding environment. Sufficient and good water links life on land and life below water and the lack of proper climate action is already tilting this fragile balance in Phuthaditjhaba. This chapter thus advocates for more multi-disciplinary studies in Maloti-Drakensberg Mountains and surrounding rural montane communities to understand the role of water in achieving the United Nations Sustainable Development Goals in this region.

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Bottom-up Solutions to Food Insecurity: Puseletso Maphesa's Vegetable Gardens Support QwaQwa

Hilfe für Südafrika and Jess L. Delves

One way to tackle food insecurity in Phuthaditjhaba is the cultivation of small vegetable gardens, either privately or collectively. One QwaQwa resident is teaching her community to establish their own vegetable gardens and donating surplus to those in need.

While working as a nurse, Puseletso Maphesa's patients often went hungry because the hospital could not provide enough food for them. She witnessed firsthand the problems caused by undernutrition among her patients, who often had to take medicine on empty stomachs. So Puseletso Maphesa began bringing food to the hospital from her own vegetable garden for the patients. Then in 2013 she joined a social gardening project in her community where she honed her skills.

In 2017 Puseletso Maphesa set up a practical and educational project, starting with her own vegetable garden (Fig. 7.3). The key principles of Puseletso Maphesa's project are to give generously and to pass knowledge on to others. She teaches people in the community how to establish their own vegetable gardens, how to plant and care for vegetable plants and how to collect and store seeds for the next planting period. In this way, she ensures that her community can establish long-lasting gardens and thereby increase their food security. In addition, Puseletso Maphesa teaches how to prepare and store vegetables once harvested. She advises growers on how to commercialise their produce and encourages them to donate a part of their harvest to other people in need.

Fig. 7.3 Puseletso Maphesa working in her vegetable garden. Right: Puseletso Maphesa

Currently, two young men help Puseletso Maphesa both in her garden and with her educational activities in the community. The vegetables grown in her garden are donated to day care centres, to patients in hospitals and amongst the community. She has been able to expand her activities since receiving financial support from a small non-profit organization (NPO) based in Germany, *Support QwaQwa—Hilfe für Südafrika e.V.* (www.support-qwaqwa.de). With this support, she and her community have been able to expand their gardens, distribute more seeds and provide more fresh produce to people in need. In 2021, 60 families and 100 individuals benefitted from Puseletso Maphesa's gardening project.

The project nevertheless faces several challenges. In order to receive financing via the German NPO Puseletso Maphesa must complete complex paperwork. As an elderly woman who speaks neither German nor English and has no experience with European bureaucracy, this poses a significant challenge. But finding volunteers to help with paperwork or with practical activities is difficult, since young people prefer to spend their time looking for paid work. In the gardens, crops are frequently damaged by cattle, birds, insects or other pests. Extreme weather events, particularly heavy and prolonged rainfall as well as drought, can have serious impacts on crop yields. Reliable water availability is also an issue and funds are needed to purchase water tanks to store water for the community, as well as shading nets to control sunlight and protect crops. Despite these challenges, Puseletso Maphesa is determined to expand her educational activities in order to bring knowledge, food and ultimately increased independence and security to her community.