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James, Lucien

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UNIVERSITY OF THE WITWATERSRAND

FACULTY OF SCIENCE

SCHOOL OF GEOGRAPHY, ARCHAEOLOGY AND

ENVIRONMENTAL STUDIES

PERSPECTIVES ON THE ROLE OF STAKEHOLDER ENGAGEMENT AND PARTICIPATION IN RIVER BASIN MANAGEMENT IN SOUTH AFRICA: A STUDY OF THE HENNOPS RIVER

Ph.D Thesis

Lucien James (949999)

Supervised by: Professor Mulala Danny Simatele

28/05/2024

DECLARATION

I, Lucien James, declare that this thesis is my own work. It has been submitted to the Faculty of Science of the University of the Witwatersrand, Johannesburg, for the fulfilment of the requirements to obtain the degree of Doctor of Philosophy in Geography, Archaeology and Environmental Studies. It has not been submitted to any other institution for examination prior to this submission.

Signed:



Lucien James Date: 28/05/2024

ABSTRACT

As a country that already faces hydrological and climatological challenges, South Africa's socio-economic situation further complicates River Basin Management. This is observable through the state of rivers in the Gauteng Province such as the Hennops River. Like other rivers across the country, the state of the Hennops River is alarming, being affected by multiple sources of pollution. The state of the Hennops River Basin is observably affected by Tembisa, a poor former township area that has contributed to the pollution of the upstream Kaalspruit tributary. While the community of Tembisa contributes to the Hennops' degradation, the potential of stakeholder engagement and community participation in Integrated River Basin Management is yet to be harnessed.

The aim of this study was to investigate in what ways stakeholder and community engagement, mobilisation, as well as participation can be harnessed to promote sustainable River Basin Management considering the Hennops River Basin as a case study. The objectives of this study were to (1) analyse existing policies and frameworks which promote stakeholder engagement and community participation in River Basin Management in South Africa, (2) identify challenges and opportunities that hamper and facilitate sustainable River Basin Management through stakeholder engagement and community participation in South Africa, taking the Hennops River Basin as a case study, (3) create a sustainable model through which stakeholder engagement and community participation can be harnessed towards effective River Basin Management, and (4) Contribute to the body of knowledge on the role of stakeholder engagement and community participation in River Basin Management. Through a research design involving key stakeholders and the community, new insight was gathered about their potential through engagement and participation. Data were gathered from Key Informants, interviews, focus group discussions, as well as clean-up campaigns, which included a campaign hosted by the researcher.

Findings of this study suggest that although policy supports the engagement, participation, as well as the mobilisation of stakeholders and the community, implementation thereof has been challenged. At community level, implementation is further challenged through community disinterest, a lack of support or funding for disparate initiatives, and lack of political will to address community issues. Key stakeholders, namely NGOs have taken it upon themselves to address River Basin Management. However, their initiatives are self-reliant and therefore unsustainable.

Several conceptual models to address River Basin Management in South Africa are proposed. These models address (1) the implementation of policy through the establishment of effective institutions, (2) the role of the NGO in River Basin Management, (3) the funding of small projects or initiatives, (4) an approach to wicked problems in the community, and (5) the relationship between government, stakeholders, and the community. Together, these models are argued as some of the ways the potential role of stakeholder engagement and community participation can be harnessed as part of a framework for sustainable River Basin Management in South Africa. Opportunities exist to better understand stakeholder engagement and community participation, particularly in the context of leadership and agency. The framework presented as the result of this study opens the doorway to new possibilities for the implementation of policy and new approaches to water governance.

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LIST OF ABBREVIATIONS

CBNRM	Community-Based Natural Resource Management
CBWM	Community-Based Waste Management
CMA	Catchment Management Agency
CMF	Catchment Management Forum
DWM	Developmental Water Management
DWS	Department of Water and Sanitation
EU	European Union
FGD	Focus Group Discussion
HR	Hennops River
IPCC	Intergovernmental Panel on Climate Change
IRBM	Integrated River Basin Management
IWRM	Integrated Water Resource Management
NGO	Non-Governmental Organisation
NWRS (2/3)	National Water Resource Strategy
PAR	Participatory Action Research
RDP	Reconstruction and Development Programme
SWPN	Strategic Water Partnerships Network
WFD	Water Framework Directive
WMA	Water Management
WUA	Water User Association

CHAPTER ONE
FRAMES OF REFERENCE

1.1 BACKGROUND TO THE STUDY

As the world continues to traverse through the Anthropocene, a new geological epoch characterised by human influence on an ever-changing planet, the need to better understand our environment and how we affect it has never been more crucial (Crutzen, 2006; Zalasiewicz *et al.*, 2010). Human life continues to push our planet's boundaries, having an effect on several key natural resources while also driving climate change (Rockström *et al.*, 2009; Steffen *et al.*, 2015). Even in recent research, it has been highlighted that novel entities, such as plastic pollution has overwhelmed our natural environment surpassing a safe operating space as per planetary boundaries (Persson *et al.*, 2022). Along with this discussion come considerations of the impending and continued pressures imposed on Earth's water resources (Bates *et al.*, 2008). It is predicted that global water resources will continue to be threatened by climate change and population growth (Gosling & Arnell, 2016). In the years to come, water-related challenges will only be exacerbated in those regions of the planet which are already experiencing them (Falkenmark, 1989; Oyebande, 2001; Niang *et al.*, 2014; Leal Filho *et al.*, 2022).

Africa is no stranger to water stress, water scarcity, and water conflict (Falkenmark, 1989; Oyebande, 2001). To make matters worse, it has been predicted that the COVID-19 pandemic of the 2020s will influence socio-economic factors, leading to additional water-related challenges (Boretti, 2020). To elaborate on Boretti's (2020) stance, the Covid-19 pandemic's impact on the world economy would have effected a global change towards less focus on water challenges. Further, the pandemic's impact on the world economy would only inspire the exacerbation of poverty, food insecurity, and water scarcity for those in need. Some of these predictions have been realised and now studied. For example, Desye (2021) supports the notion that Covid-19 has required leaders, stakeholders and communities to redefine their relationship with water, sanitation, and hygiene services as water has become a crucial element towards the fight against the pandemic. It has been noted that most of Africa's population rely on water resources that are unreliable or precarious, and these resources are only to become more unreliable in the future (Vörösmarty *et al.*, 2005). Recent research also suggests that climate change will continue to drive water scarcity across the continent as current adaptation strategies and plans are not effective enough to address the overall issues (Filho *et al.*, 2022). Changes in

precipitation, runoff, and evapotranspiration patterns are ultimately affecting Africa's rivers, including some of the largest and most iconic such as the Congo and Niger Rivers (Mahe *et al.*, 2013; Gan *et al.*, 2016).

Altogether, a negative projection is predicted for Africa's future water resources and river systems. At the same time, South Africa's rivers also suffer the same fate with other factors affecting them such as Acid Mine Drainage and eutrophication (Naicker *et al.*, 2003; McCarthy Terence, 2011; Van Ginkel, 2011; Matthews, 2014). As a country which is rapidly developing, South Africa's rivers encounter several issues linked to development and human activities. The first, and most severe of these problems is the ongoing pollution of rivers across the country. To name but a few of these pollution issues, South Africa's rivers are victims of sewage spills, plastic pollutants, and heavy metal contaminants (Okonkwo & Mothiba, 2005; Oberholster *et al.*, 2008; Sibanda *et al.*, 2015; Lebepe *et al.*, 2020; Weideman, Perold & Ryan, 2020; Atangana & Oberholster, 2021; Moss *et al.*, 2021). This goes without considering the impact acid mine drainage and eutrophication have had on water resources across the country as a whole (McCarthy, 2011; Naicker *et al.*, 2003; Van Ginkel, 2011). Therefore, not only do South Africa's rivers and water resources face the impending and constant threat of climate change, but also an alarming amount of pollution.

Plans to address the challenges that South Africa faces in relation to the management of its water resources are captured as part of the country's policy framework. The National Water Act (Act no. 36 of 1998), as well as the National Water Resources Strategy 3 (NWRS3) present frameworks through which pollution challenges can be addressed. However, river systems across South Africa such as the Hennops and Jukskei River Basins continue to experience evolving environmental challenges despite strategies in place to manage the country's water resources effectively. While different root causes are associated with these ongoing challenges, it is important to realise that communities and stakeholders actively engage with River Basins and associated water resources.

1.2 THEMATIC CONSIDERATIONS

Securing effective water resource management approaches in South Africa is complex given the status and future of the country's water resources. South Africa is among the most water scarce countries in the world, given its hydrological and climatic situation (Molobela & Sinha, 2011; Knight, 2019a). Through the pressures of climate change and population growth, it has

been predicted that many water scarce areas around the world will continue to face worsening water challenges (Distefano & Kelly, 2017). Furthermore, Misra (2014) substantiates that Africa is one of the most vulnerable regions to climate change and its potential repercussions on the continent's water resources. Through their predictions, the IPCC support that changing, unpredictable precipitation patterns and rising temperatures will exacerbate Africa's water scarcity and stress (Niang *et al.*, 2014). Unfortunately, these predictions affect South Africa as well. This goes beyond considering the socio-economic factors that affect the effectiveness of implementing frameworks and strategies. In this regard, socio-economic aspects affect how water is viewed, distributed, and used in South Africa in as much as environmental factors do. A key example that can be drawn from is the overburdening of South Africa's water infrastructure through continuous urban expansion (Otieno & Ochieng, 2004; du Plessis, 2017). This ultimately affects how the resource is managed under the current water policy. Therefore, an overview of the main water challenges in South Africa is necessary to highlight the context of the current study.

Although climate change has and is affecting South Africa's water resources, geographically, the country has been described as a water-scarce region (Herrfahrdt-Pähle, 2013; Naidoo *et al.*, 2016; Bischoff-Mattson *et al.*, 2020). While geographical aspects contribute to the natural distribution of water across the country, it has been suggested that socio-economic and governance issues form the core reasons for the country's perceived water scarcity (Knight, 2019a). Growing water demands and inefficient management and distribution of the resource continues to affect South Africa's water resources essentially creating the problem of water scarcity (Otieno & Ochieng, 2004; Swatuk, 2005; Funke *et al.*, 2007; du Plessis, 2017). Additionally, South Africa's water resources are further stressed through other environmental issues. While these stresses on water resources include the observed threat and impact alien invasive species have on water (Le Maitre *et al.*, 2000; Le Maitre *et al.*, 2002; van Wilgen *et al.*, 2012), a more compelling argument is presented when considering the impact of human or economic activity and pollution on the resource in South Africa.

The problem of water pollution in South Africa is so vast that no stand-alone study or review has been able to cover all the challenges the country faces. Some of the major pollution problems South Africa faces includes acid mine drainage, eutrophication as well as direct pollution through effluent, emerging contaminants, and other waste (Oberholster *et al.*, 2008; McCarthy, 2011; Van Ginkel, 2011; Matthews, 2014; Simate & Ndlovu, 2014). The sources

of pollution vary greatly across the country; however, industries, human activity and different land uses contribute to the various types of pollution as highlighted in different studies (Akcil & Koldas, 2006; Oberholster & Ashton, 2008; Oberholster *et al.*, 2008; McCarthy, 2011).

An example can be cited considering past experienced water challenges in South Africa and their relationship with socio-economic factors. The Cape Town 'day zero' event of the mid-2010's in South Africa was a severe case where the city was adversely affected by drought. During this event, water supply in the city of Cape Town was limited to a few supply points, with a looming date of when the city would completely run out of water (Rodina, 2019). While climatic factors were the root cause of this issue, several socio-economic concerns were revealed, exposing the reality of most water management strategies in South Africa (Knight, 2019a; LaVanchy *et al.*, 2021). The country's water management strategies were tested, demonstrating a lack of resilience to weather major catastrophic water crisis events (Rodina, 2019). At the same time, it has been observed through the 'day zero' event that social inequality, political struggles, and poor communication had exacerbated Cape Town's drought (Robins, 2019; Bischoff-Mattson *et al.*, 2020). This event exemplifies the depth of South Africa's water resource management challenges. However, this is not apparent in all critiques of South Africa's water law.

South Africa does not have any large natural lakes which hold its water resources. Instead, the country relies on key large dams from which water is distributed to the population. One of these large dams is the Hartbeespoort Dam which supports some of the country's greatest water demands (Rimayi *et al.*, 2018). The dam, like other water sources in South Africa, has faced and continues to encounter major pollution challenges (Van Ginkel, 2011; Matthews, 2014; Rimayi *et al.*, 2018; Amoah *et al.*, 2020). Although eutrophication or nutrient enrichment has been noted as a key polluting factor (Van Ginkel, 2011), sewage spills and pharmaceutical waste from rivers flowing into the dam also contribute to the quantity of pollutants the dam is exposed to (Rimayi *et al.*, 2018; Amoah *et al.*, 2020). Therefore, South Africa's water resources are threatened by pollution which makes its way into river systems, eventually flowing into large dams.

The Hennops River is considered an important water source flowing into the larger Crocodile River which ultimately feeds the Hartbeespoort Dam. More recently, the state of the Hennops River Basin has become alarming, being reported by the media as heavily polluted and in need of intervention (Tlhabye, 2018; Bega, 2020; Ngobeni, 2020). As suggested in some of these

media sources and now confirmed as part of this research, the Hennops River and its Basin, like other rivers across the country are affected by human activity (Oberholster & Ashton, 2008; Oberholster *et al.*, 2008). In this regard, the Hennops River and its major tributaries are surrounded by urban settlements, agricultural land, as well as industries. While the river has been reported as polluted, it must be considered that those living within the Hennops River Basin are being adversely affected by its condition. To complicate matters further, the communities themselves, industries as well as other facilities and land uses around the river have been attributed to its pollution (Oberholster *et al.*, 2008).

In view of the above, this study investigates the role of stakeholder engagement and community participation in River Basin Management in South Africa, considering the case study of the Hennops River. The focus of this study was to investigate how stakeholder engagement and community participation can be used and therefore modelled to manage natural resources effectively and sustainably. It is therefore argued that through comprehensive stakeholder and community engagement, which espouses principles of participation in the design and creation of knowledge, the current governance and management of the Hennops River Basin can be explored. This would in turn facilitate the creation of new insight, by ways of identifying contemporary challenges and opportunities for the sustainable management of the Hennops River Basin. In an environment where human activity has had adverse impacts, it is important to recognise that the most effective approach should involve humans (Oberholster *et al.*, 2008). Therefore, this study highlights the value and importance of stakeholder and community engagement, and participation as cornerstones in working towards its aim and outcomes.

1.2.1 Problem Statement

After contextualising the problem, the following problem statement summarises the thematic considerations and research gaps addressed:

Considering the challenges and opportunities in the context of South Africa's policies and frameworks, how can River Basin Management be most effectively and sustainably implemented the through stakeholder engagement and community participation, considering the case study of the Hennops River Basin and Tembisa.

1.2.2 Research Questions

Following from the above thematic considerations, a few important points can be gathered which essentially form the most crucial questions driving the current study:

i) What are some of the current policies and frameworks which promote stakeholder engagement and community participation in River Basin Management in South Africa?
ii) What challenges exist in mobilising and engaging stakeholder and community participation in River Basin Management, considering lessons learned from the case study of the Hennops River Basin?
iii) In what ways can participation and engagement be modelled to effectively mobilise and involve stakeholders and communities in River Basin Management?
iv) What are some of the wider implications of the findings of this study relating to River Basin Management in South Africa?

1.2.3 Research Aim and Objectives

The aim of this study was to investigate in what ways stakeholder and community engagement, mobilisation, as well as participation can be harnessed to promote sustainable River Basin Management considering the Hennops River Basin as a case study.

In view of the above research aim, the objectives of the study were to:

i) Analyse existing policies and frameworks which promote stakeholder engagement and community participation in River Basin Management in South Africa.
ii) Identify challenges and opportunities that hamper and facilitate sustainable River Basin Management through stakeholder engagement and community participation in South Africa, taking the Hennops River Basin as a case study.
iii) Create a sustainable model through which stakeholder engagement and community participation can be harnessed towards effective River Basin Management.
iv) Contribute to the body of knowledge on the role of stakeholder engagement and community participation in River Basin Management.

1.3 SCOPE OF THE STUDY

This study was limited to looking at River Basin Management, particularly understanding stakeholder engagement and community participation as important tools for the effective

management of River Basins, and water resource management. This study considered the Hennops River Basin as a point of departure from which the role stakeholder engagement and community participation in River Basin Management in South Africa was investigated. In this regard, this study goes beyond research on the challenges the Hennops River Basin faces, assuming a social science approach to understanding how engagement and participation can be harnessed to address the already studied challenges faced by South Africa's rivers and associated water resources. The Hennops River Basin is therefore adopted as a key case study exemplifying the reality of River Basin Management in the country, especially for rivers such as the Jukskei which is experiencing similar challenges.

This study considered different stakeholders and communities such as the community of Tembisa. Tembisa became a key area from which stakeholders and the community were engaged given their close interaction with the Kaalspruit tributary, one of the main tributaries of the Hennops River. Key stakeholders included active community-based groups who have an interest in environmental affairs. This study was limited to such key stakeholders as they presented opportunities in terms of insight and data.

This study took place over a period of two years during which data collection, analysis, and write-up were achieved. The time allotted to this study allowed for participation in different activities which included workshops, attending of clean-up campaign events, as well as engagement with different professionals for data collection purposes. The time constraints of this study influenced the nature of sampling, therefore determining the study's sample size and sampling strategies. Therefore, an effective methodology was applied to collect enough data to address the study's research questions, aim, and objectives.

1.4 ETHICAL CONSIDERATIONS

Through past experience, the importance of considering ethics in research has been solidified. Several key examples including unethical medical trials such as the Nuremberg trials of Nazi Germany led to advances considering the value of people, straying from postpositivist approaches to medical and social science (Denzin & Lincoln, 2011; Kruger *et al.*, 2014; Ndebele *et al.*, 2014). Today, ethics is a vital component of modern research, forming the foundations of any medical or social science enquiry.

Several ethical considerations were necessary as this study was embarked on. Social contexts of participants were considered. In this regard, the community engaged, that is, Tembisa, has a

profound history based on colonialism, Apartheid, and inequality. Participation of the community would include a level of vulnerability specific to Tembisa. The community would generally be sensitive towards outside interactions, for example through engagement with the researcher. Additionally, language barriers would be present since the context from which the researcher comes from, and that of the community differ greatly. Further, this community is inherently poor and therefore, would seek incentive to be part of a study.

Through the community-based organisation (CBO), the nature of the study was communicated to the community. At the same time, similar was communicated to other key stakeholders engaged. It was made clear that the study was purely academic and that no incentives were attached to participating in the study. Further, potential participants were informed that they were not obliged to participate in the study. Special consideration was given to people who may have perceived the study to be a means of employment. The basis of the study was therefore communicated with participants before the implementation of data instrumentation.

Altogether, before this study was undertaken, the proposed methodology was presented to the Human Ethics Research Committee (non-medical) of the University of the Witwatersrand, and Ethical Clearance was obtained in June 2022. See Appendix 1 for Ethical Clearance certificate.

1.5 STRUCTURE OF THE THESIS

Having outlined the background, scope, thematic and ethical considerations of this study in this chapter, an overview of the structure of the rest of this thesis is here presented. While the overall structure of this thesis follows conventional norms, several adjustments were made to capture the novelty of this study as opposed to other studies of a similar nature. For instance, this thesis includes an additional chapter which other theses would not include. Further, this thesis engages with different concepts, definitions, and theories in great depth to properly situate the study, as well as demonstrate the researchers understanding of different theoretical frameworks as well as key terminology.

As such, Chapter Two expands on theoretical frameworks, and definitions of key terminology. In this chapter, a profound understanding of the body of literature is presented to contextualise the current study. Chapter Two provides an overview of key concepts which are used throughout this thesis. As these key concepts have been used in previous studies, therefore this thesis provides working definitions and a critical analysis thereof. Following the definition of key concepts as used in the context of this study, different literature is contextualised to define

the knowledge base to which the current study contributes to as well as draws from. Finally, Chapter Two presents the various gaps in the knowledge base which the current study addresses.

Differing from other theses, this thesis includes an additional chapter which is not conventionally included in standard research report structures. Chapter Three provides a critical review of the study site by discussing a situational image of the Hennops River Basin in the context of South Africa. This chapter defines the geographical background of South Africa. Further, Chapter Three critically assesses different socio-economic and demographic characteristics of the country, arguing for the relevance of this study. As part of this chapter, historical underpinnings are examined, situating communities such as Tembisa in the developmental context of the country. This chapter is therefore considered a critical part of this thesis as River Basin Management in South Africa must be understood, not only in the context of the case study of the Hennops River Basin, but also in the context of historical and socio-economic factors which have essentially shaped the past and present of the country.

Chapter Four follows discussing methodological considerations of this study. Firstly, this chapter discusses the philosophical positionality adopted by the research and through which this research was conducted. This was a critical element of Chapter Four as it defines the lens through which data was collected and analysed. Chapter Four is also dedicated to discussing the research design of this study. In this section of the chapter, the Hennops River Basin itself is defined as the site from which data was collected. Study populations and sampling strategies are subsequently discussed. The various data instrumentation is thereafter presented, each being critically assessed for their relevance and usefulness in the context of data collection for this study. The methods of data analyses adopted in this study are then defended in terms of their effectiveness, considering the qualitative nature of data collected. As an overview and discussion of the methodological considerations of this study, this chapter also considers some of the opportunities and limitations encountered. These methodological reflections essentially have had a bearing on how this research was conducted and therefore, the empirical evidence gathered.

The results of implementing the methodology and associated methods are subsequently presented in Chapter Five. This chapter is presented as the empirical evidence gathered after implementing the various data instrumentation. Essentially, Chapter Four is a presentation of the raw data collected which relate to the various research questions of this study. This chapter

forms the core of the study, providing the information which has been used to achieve the objectives of this study, such as the creation of models and frameworks which are then discussed in the subsequent chapter.

Following from the above, the penultimate chapter of this thesis, that is Chapter Six, is the product of the implementation of the methodology of this study as well as the analysis of data collected. This chapter is the crux of the thesis, essentially discussing how each of this study's objectives were achieved. This chapter presents the various models and frameworks formulated through this study, addressing the knowledge gaps highlighted in Chapter Two. Therefore, Chapter Six discusses the different ways the current study contributes to the body of knowledge while critically assessing findings in the context of the literature base.

Although the above chapters form the bulk of this thesis, Chapter Seven not only provides a conclusion to this study, but also opens discussions around future studies. Chapter Seven captures an overall summary of the study, while also discussing key limitations and opportunities which have been uncovered. This chapter encapsulates the core information this thesis discusses, making recommendations for a way forward. Chapter Seven concludes the work engaged through this study, essentially incorporating it into the body of knowledge and suggesting avenues through which the findings can be further explored.

CHAPTER TWO
THEORETICAL CONSIDERATIONS AND LITERATURE REVIEW

2.1 INTRODUCTION

This chapter presents the literature base in which the current study is contextualised. Firstly, a definition of key concepts provides a standpoint from which the reader can better understand the terminology and theoretical underpinnings of this study. As a study focused on the role of stakeholder engagement and community participation in River Basin Management, different terminologies are associated with this area of interest. The terminologies and theoretical underpinnings have been engaged with through past studies, as presented. The different approaches to defining these terminologies must be critiqued and examined for the current research to position itself in the context of what has already been done.

Considering research that has already been conducted in similar fields, a contextualisation of different perspectives is addressed in this chapter, essentially qualifying, and defending the novelty of the current research. In this chapter, global, sub-Saharan African, and South African perspectives are explored, and a critical assessment thereof discussed. The subject matter in question has been addressed in different ways in the past, however, different gaps in the knowledge base have been identified in this chapter through which the importance of this study is therefore supported in the context of River Basin Management in South Africa.

This chapter is concluded with a summary and a presentation of the knowledge gaps that exist in literature. This section sets the stage for the next chapter which provides a situational image of the study site.

2.2 SOME PERSPECTIVES ON THEORETICAL UNDERPINNINGS

From an overview of the literature base, it was ascertained that the current study resonates with several theoretical underpinnings or key concepts. In other words, as this study engaged with the role of stakeholders and communities in River Basin Management in South Africa, prevailing theories and understandings which have emerged through past research need to be considered and aligned with, or at best critically assessed. Theoretical underpinnings or key concepts therefore include aspects of stakeholder engagement and community participation as well as perspectives on how best to define River Basin Management, and further, water

resource management and natural resource management. These theoretical underpinnings include:

2.2.1 Integrated Water Resource Management (IWRM)

IWRM has now been considered an approach to water resource management being praised and supported for its effectiveness to address some of the most critical water-related challenges (Herrfahrdt-Pähle, 2013; Grigg, 2016). Supporting notions of sustainable development, IWRM has been considered as a solution to addressing water demands while considering environmental and social factors (Thomas & Durham, 2003). The concept of IWRM extends to encompass a large number of considerations and has ultimately been positioned as a completely new paradigm through which water resources can be managed (Meran *et al.*, 2021). Furthermore, IWRM supports an interdisciplinary approach, involving elements of physical science, engineering, sustainability science, and social science (Grigg, 2016). However, the history and evolution of this theoretical framework is rich, spanning across different periods of different water challenges. As its history indicates, the concept of IWRM did not always encompass the principles it does today.

Rahaman and Varis (2005) present an overview of the history and evolution of IWRM. They highlight that different conferences, forums, and summits have refined and conceptualised the term to involve key principles in its approach to water resource management. While Rahaman and Varis (2005) present that the concept has evolved since its first uses as early as the late 1970s to the early 1980s, Mukhtarov (2008) is of the opinion that early water resource management approaches labelled as IWRM did not all represent the contemporary concept. In Mukhtarov's (2008) review of the history of IWRM, they suggests that many early conceptual frameworks lacked key principles which are arguably very important for the management of water resources. For example, it has been argued that earlier iterations of IWRM sought to engage water resource management for water conservation purposes only (Mukhtarov, 2008). This is further supported when considering the early conceptualising of IWRM by some such as Mitchell (1990). Mitchell (1990) is of the opinion that integrated water management should consider the interrelationship between environmental factors, demonstrating IWRM's early applications in different parts of the world. At the same time, Mitchell (1990) is among the first to stand for the importance of social actors, stakeholders, and participatory approaches. This has been supported by more recent arguments towards the necessity of integrating stakeholders into decision-making processes (Thomas & Durham, 2003). Since, IWRM has evolved into a

concept which embodies social science as part of its multidisciplinary approach to water management, particularly river basin and catchment management.

Stakeholder and community engagement and participation has now become a cornerstone of IWRM principles around the world, as well as the concept as a whole. For example, Delozier and Burbach (2021) support that stakeholder engagement is a critical for addressing long-term water resource planning. Furthermore, Ward (2013) is of the opinion that IWRM opens up water governance to other social actors including NGOs, water users, as well as other stakeholders. Altogether, the whole concept of IWRM has been defined as a participatory approach to water resource management, with some such as Badham *et al.* (2019) arguing that stakeholder and community participation is what defines the IWRM principles, making them stand out when compared to other water resource management planning.

In South Africa, IWRM is a key part of the country's water policy (Funke *et al.*, 2007; van Koppen & Schreiner, 2014). Since as early as 1998, IWRM has been viewed as an approach to address past water challenges related to equality. However, water governance in South Africa, particularly at a local level is questionable, given case studies such as the Hennops River basin, where it is observable that water governance and the involvement of social actors is not apparent. In this regard, the current study draws from the key principles of IWRM around the need for participatory approaches and stakeholder engagement in water resource management. Following Mitchell's (1990) viewpoint, a social element is required for effective water resource management,. In the case of the Hennops River basin, the river basin co-exists with social actors who interact with it directly. Therefore, IWRM becomes an important concept when considering the current and future approaches to the management of the Hennops River basin, as well as similar river basins across South Africa.

2.2.2 Community-Based Natural Resources Management (CBNRM)

CBNRM is a key concept which is embedded into IWRM. It is a concept described as a solution to resource management through the participation of stakeholders and communities (Armitage, 2005; Measham & Lumbasi, 2013). Under the concept of CBNRM, the opinions, viewpoints, and knowledge systems of communities play an important role in how a natural resource is managed (Armitage, 2005). Addison *et al.* (2019) are of the opinion that through CBNRM, the governance of natural resources is altered to include a multi-level approach. Baddianaah & Baaweh (2021) are of the opinion that CBNRM supports the decentralisation of natural

resource management, to allow communities the ability to manage their own common resources. Through indigenous knowledge systems, communities can adapt their resource management according to challenges they face. This allows for resource management to be sustainably managed despite local as well as global challenges (Brosius *et al.*, 1998; Reid, 2016). CBNRM becomes an important concept to consider in this study as it further expresses the need to involve communities in water resource management. As communities interact with the Hennops River Basin, their potential in governance and management of water resources becomes an important aspect to consider.

2.2.3 Participatory Action Research (PAR)

PAR is a concept which supports the need for stakeholder and community engagement in a research context. The concept of Action Research - a precursor of PAR, is often considered a novel approach to research because of its objective. Ottosson (2003) is of the opinion that action research does not only set out to identify challenges and opportunities, but also acts to address challenges while also taking advantage of opportunities for the improvement of integrated approaches. Ottosson (2003:91) further supports that the objective of action research is not to "describe, understand or explain social reality" but to enhance the methods which address a lived reality. Drawing from the objective of action research, Ottosson (2003) define PAR as a social science tool, rather than a statistical tool, with the researcher working alongside participants. While Chambers (1994) argues for the importance of participants to meditate on their current experiences, lives, and situation, and act towards making changes, Ottosson (2003) is of a different opinion. According to Ottosson (2003), PAR defines the role of the researcher as not to look from afar and assess the realities lived by participants, but rather for the researcher to live the realities themselves. Therefore, PAR challenges conventional views on how research is approached especially with regards to the relationship between researcher and participants and their respective roles. As in its earlier forms, the concept of PAR was set around raising awareness in communities about issues which affect them, and then encourage them to take action (Chambers, 1994). As the concept developed, its role in research has now been described as a method through which participants collect and analyse data, drawing from their own experiences and perceptions, resulting in them taking action (Baum *et al.*, 2006).

2.2.4 Integrated River Basin Management (IRBM)

The concept of IRBM has been defined as a reformed approach to river basin management, where improved planning and action is involved in sustaining the ecological integrity of a river basin (Watson, 2004). The concept focuses on the dynamics of river basins management and the structures which are put in place to facilitate thereof (Watson, 2004; Rijke *et al.*, 2012; Nielsen *et al.*, 2013). IRBM is often used together with IWRM and involves different levels of authority and key stakeholders and decision-makers. In this regard, IRBM supports the role of stakeholder engagement and community participation in river basin management (Carr, 2015). These movements towards a participatory river basin management plan seek to decentralise decision-making, mobilising stakeholders to implement their own decisions related to river basin management (Dinar *et al.*, 2007; Kemper *et al.*, 2007). In this regard, Kemper *et al.* (2007) are of the notion that IRBM supports the appropriation of decision-making power to different stakeholders with the aim of relieving the burden of government. In essence, these movements within IRBM draw from the precepts of CBNRM, promoting empowerment and a consensual approach to river basin management (Kemper *et al.*, 2007). As other studies have demonstrated, IRBM involves the participation of different players in society, and each catchment or river basin involves a unique approach to governance and management of water resources (Rijke *et al.*, 2012; Nielsen *et al.*, 2013; Richards & Syallow, 2018; Eduful *et al.*, 2020). The term IRBM relates back to the current study as a concept embodying an effective approach to River Basin Management incorporating the various roles of social actors.

2.2.5 Stakeholder Engagement

Careful consideration has brought to light the need to address the concept of stakeholder engagement itself. As a concept used throughout this thesis, there is a need to provide an overview of the concept and explore the difference between stakeholder theories.

a) Stakeholder engagement: An overview of the concept

Altogether, the concept of stakeholder engagement finds its roots in early attempts to harness stakeholder relations for shareholder value enhancement. The concept has been used extensively in research and management strategies (Kujala *et al.*, 2022). Reviewing the concept, its history, and present link to research, Kujala *et al.* (2022) delve into the depth of the concept as it emerged in the early 2000s. Having reviewed 90 academic articles dealing with the concept, Kujala *et al.* (2022) capture the basis of the concept having been used to

better understand the relationship between different role-players in society and business. Some of these role-players include different organisations, local communities, as well as other groups. Freeman (1984) takes this idea further, demonstrating that the concept embodies understandings of the relationships between stakeholders, where a central focus (or firm) is present (Figure 2.1). As presented by Freeman (1984), stakeholders essentially affect and can be affected by a central component, notably in Figure 2.1, the Firm or business. This conceptualisation of the idea of stakeholder engagement was effectively adopted as inspiration for the models formulated in the current study.

However, over the years, this concept has become ambiguous with various understandings attached to it. Stakeholder engagement is a concept that research has mostly studied to see how it helps implement strategies and policies with stakeholder input in practice (Carr, 2015; Shackleton *et al.*, 2019; Kujala *et al.*, 2022). It is from this point that stakeholder engagement on a practical level differs as different applications draw from different forms of stakeholder theory.

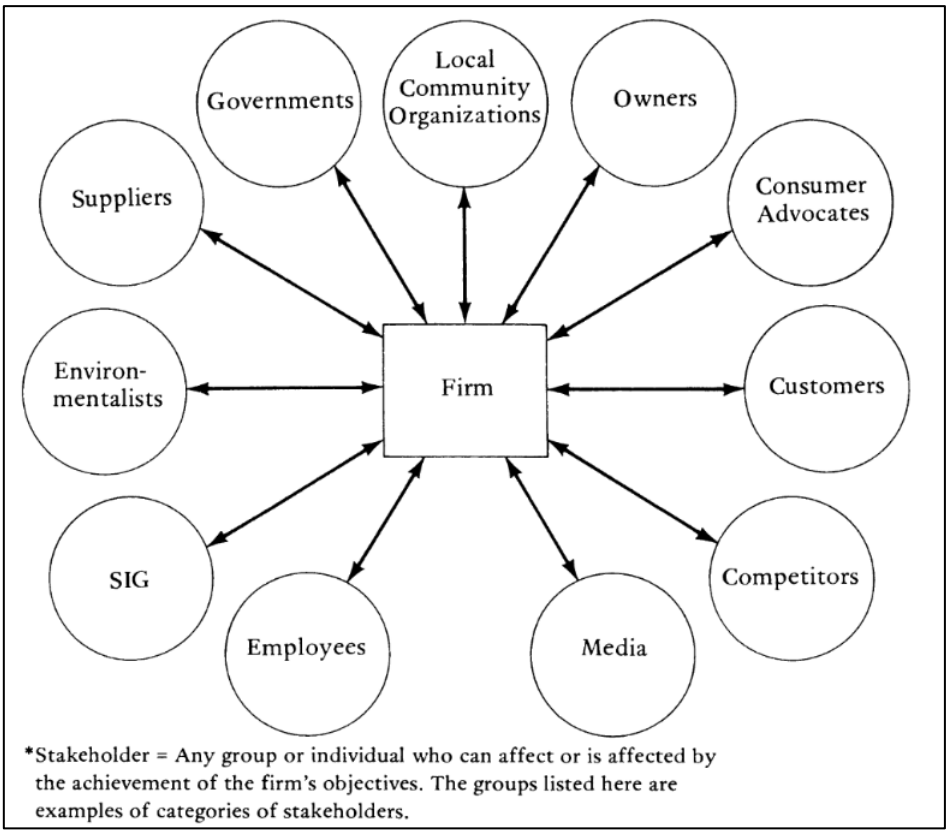


Figure 2.1. Freeman's (1984) model of Stakeholder Relations (Titled: Stakeholder* View of Firm)

Source: Freeman (1984: 25)

b) Stakeholder theory

From as early as the 1990's, stakeholder engagement has been theorised (Donaldson & Preston, 1995). Stakeholder theory has subsequently emerged through which stakeholder engagement has been studied from different angles. As the three main forms of stakeholder theory, descriptive or empirical, instrumental, and normative are discussed in this section. Further, divergent theory, as a subsequently, and less studied theory is also placed in context of this theoretical underpinning.

Descriptive or empirical stakeholder theory is essentially the starting point of conceptualising the potential of stakeholder engagement. In this sense, Donaldson and Preston (1995) describe the theory as being the need to understand or define the different stakeholders in question. It is therefore relatable to the idea of "empirically" assessing stakeholders for the purpose of understanding their potential or role in research, society, or business. However, the theory itself is ambiguous as suggested by Egels-Zandén & Sandberg (2010). In their appraisal of Donaldson and Preston's (1995) rationalising of the theory, Egels-Zandén & Sandberg (2010) define the theory as being more of an evaluation of stakeholder behaviour in some instances in research. There are therefore discrepancies between definitions of the theory, however, descriptive stakeholder theory is placed in context when juxtaposed with instrumental stakeholder theory.

Instrumental stakeholder theory takes descriptive or empirical stakeholder theory further, considering the connections and links between stakeholders (Donaldson and Preston, 1995). Once again, Egels-Zandén & Sandberg (2010) critique early understandings of instrumental stakeholder theory suggesting that in studying the connections between a central focus and stakeholders, research goes beyond a simple definition of the theory. There are several considerations that must be made when theorising the connections between stakeholders including understanding of the nature of these connections and their implication for practical and managerial approaches to stakeholder engagement. This essentially feeds into the final of the three main forms of stakeholder theory, that is normative stakeholder theory.

Considering that stakeholder theory has been founded on the relationship between stakeholders and business, normative stakeholder theory finds its place in the understanding of the central focal point or objective of stakeholder engagement (Donaldson and Preston, 1995). In this regard, normative stakeholder theory engages with the principles that govern stakeholder engagement, the ethical considerations thereof, and how best to ensure stakeholder interests

are balanced. As initial theorising of stakeholder engagement would encapsulate it, normative stakeholder theory seeks to establish or consider best practice in order to ensure that the practical application of stakeholder engagement maximises its effectiveness (Freeman, 1984; Donaldson & Preston, 1995).

The three elaborated stakeholder theories are but a basic set which have persisted through time, and have remained some of the main ways stakeholder theory is understood and conceptualised (Freeman, 1984; Kujala *et al.*, 2022). As a less studied theory, divergent stakeholder theory is founded on the idea that stakeholder theory should consider the agency and the interests of stakeholders themselves (Freeman, 1999). However, divergent stakeholder theory goes further, considering how different stakeholder viewpoints and roles can conflict (Freeman *et al.*, 2020). In this regard, divergent stakeholder theory inspires the contemplation of stakeholder management, frameworks that have been conceptualised for stakeholder management, and how stakeholder engagement can be best harnessed.

c) Stakeholder management and modelling stakeholder engagement

As stakeholders are not all the same, there exists the potential for conflicts to emerge. Therefore, past research has also considered the importance of stakeholder management. Stakeholder management is a crucial aspect of stakeholder engagement, as it involves the identification, analysis, and prioritisation of stakeholders and their interests (Bourne, 2016). Stakeholder management also entails the development and implementation of strategies to communicate and collaborate with stakeholders effectively, and to monitor and evaluate the outcomes of stakeholder engagement (Bourne, 2016; Freeman *et al.*, 2020). Stakeholder management can be seen as a process that aims to balance the needs and expectations of different stakeholder groups, and to create value for both the organisation and the stakeholders (Freeman, 1984; Donaldson & Preston, 1995).

Various models and frameworks have been proposed to guide stakeholder management in different contexts. For example, Mitchell *et al.* (1997) developed a typology of stakeholders based on their power, legitimacy, and urgency, and suggested different strategies for managing each type of stakeholder. Similarly, Savage *et al.* (1991, 2010) classified stakeholders into four categories based on their potential for cooperation or threat and recommended different approaches for reducing potential harm or enhancing potential benefit from each category. Another example is the stakeholder circle, which is a tool for visualising and ranking

stakeholders according to their proximity, power, urgency, and legitimacy, and for developing engagement plans for each stakeholder (Bourne, 2016).

Stakeholder management can have various benefits for both the organisation and the stakeholders involved. For the organisation, stakeholder management can enhance its reputation, legitimacy, and social license to operate, as well as improve its performance, innovation, and competitiveness (Freeman *et al.*, 2020; Kujala *et al.*, 2022). For the stakeholders, stakeholder management can increase their satisfaction, trust, and commitment, as well as enable them to voice their concerns, influence decisions, and access resources and opportunities (Freeman *et al.*, 2020; Kujala *et al.*, 2022). Moreover, stakeholder management can foster mutual learning, dialogue, and collaboration among different stakeholder groups, and contribute to the achievement of shared goals and values (Freeman *et al.*, 2020; Kujala *et al.*, 2022).

d) Stakeholder engagement, leadership, and water governance

Understanding stakeholder engagement goes beyond understanding the theories embedded within the concept, or how effective modelling and management can be achieved through it. As this thesis captures it, a key consideration made was governance for River Basin Management. Stakeholders considered during this study included the community as well as leadership, and entities that are associated with leadership. For this reason, engagement with different theories of studied around water governance and leadership was considered and used to inform the conceptual models of this study.

The idea of leadership has to critiqued before the role of stakeholders and the community can be applied to it. In this regard, leadership is a concept that continues to grow in its ambiguity, with more and more new meaning given to it (Alvesson & Spicer, 2011). In a world that supports a regime founded on the role of those with, governance itself becomes skewed and more associated with “leaders” instead of people. Unfortunately, the role of the everyday person has been relegated to that of more a bystander, while “leaders” make decisions and shape the world. Or, at least, this is how leadership is currently perceived.

Alvesson & Spicer (2011) present a different stance to leadership. It is of their opinion that leadership must be considered in its ambiguity, with no true meaning associated with it. Hence, the role of leadership and governance is not universal but rather defined by specific traits, and considerations. Further, because of its ambiguity, leadership and governance are shaped by the

situation in question. Often, leaders are perceived "heroes" where others simply follow or are governed. In the face of stakeholder engagement and its associated theories, this view of the leader must be critiqued. This is especially true when governance is so often associated with "heroic" leadership, as captured by Alvesson & Spicer (2011). Therefore, together with the understanding that leadership needs to be understood in the context of different dynamics, the role and potential of stakeholders must be considered.

It is here that the agency of stakeholders in leadership must be addressed or brought forward. In assessing the role of stakeholders, their agency to inform governance is important when conceptualising a framework for sustainable River Basin Management. Not only does a consideration of stakeholder agency consider roles and responsibilities, but enhancing stakeholder leadership allows for a framework to be sustained by opportunities that exist in this space. As Hobson & Seabrooke (2007) argue, so often is the agency of everyday actors and actions not considered as key role-players in the shaping of world politics and economics.

Agential power theory in relation to water governance has been explored in the context of South Africa. Such studies are critical in understanding some of the shortfalls related to policy in practice. Förster *et al.* (2017) consider the implications of IWRM in the context of water governance in South Africa, and explore the implementation of institutions. In this case study, a Water User Association, and its potential were studied in the context of the Crocodile (West) – Marico River System in the North West province. Through their evaluation of the role of different stakeholders including, government departments, farmers, land users, and local communities, the agential power of each was established. For Förster *et al.* (2017), agential power is defined by the capacity and resources of different stakeholders. As a conclusion, Förster *et al.* (2017) demonstrate that more work is necessary if policy is to be implemented for effective water governance and River Basin Management in South Africa.

The case study of Förster *et al.* (2017) inspires the reflection on the different roles stakeholders may take in relation to water governance and River Basin Management. As such, Meissner & Jacobs (2016) contemplate conceptual models that highlight the link between government, society and science. Through the Government-Society-Science Model presented by Meissner & Jacobs (2016), the agency of key stakeholders is placed in the context of water governance. This is then further theorised considering decision-making and the role of stakeholders such as the community. These models and understandings were important for the formulation and support of the models that the current study presents, emphasising the need to understand

stakeholders, their capacity, and their ability to play key roles in leadership and River Basin Management.

2.3 CONTEXTUALISING THE LITERATURE ON STAKEHOLDER ENGAGEMENT AND COMMUNITY PARTICIPATION IN RIVER BASIN MANAGEMENT: GLOBAL PERSPECTIVES

2.3.1 The Water Framework Directive of the European Union

New approaches to water and river basin management have been of interest for a long time across the world. While IWRM was formulated leading up to the early 2000s (Mukhtarov, 2008), a key response to the global movement towards better water resource management is found in the Water Framework Directive (WFD) of the European Union (EU). The Water Framework Directive (WFD) in the EU represents one of the world's largest, longest standing, river basin management directives or policy frameworks (Hering *et al.*, 2010). The WFD was inspired by the US Clean Water Act of 1977 and was implemented in 2000 in the EU for the main purpose of addressing the integrity of aquatic ecosystems (Hering *et al.*, 2010). The WFD was the result of a global movement towards addressing environmental management which drew inspiration from different Earth Summits, notably the 2002 Johannesburg Summit (Hering *et al.* 2010). The result of this movement was a policy strategy that advocates for:

(1) the continuous assessment of the biological and chemical status of river systems,

(2) the establishment of monitoring systems considering changes to the status of river systems while identifying those which are ecologically challenged and,

(3) the implementation of River Basin Management Plans.

Although aquatic ecosystems and biota are a focus of the WFD, the approach to river basin management the framework takes is what can be drawn from for the current study. As it has been noted, under the WFD, EU Member States are required to involve stakeholders and communities in decisions around river basin management, ultimately promoting the ecological well-being of water resources (De Stefano, 2010). Furthermore, the WFD was formed on the foundations of stakeholder engagement itself, without which, the program cannot succeed (De Stefano, 2010). Therefore, exploring its successes and shortcomings is necessary to illustrate how water resource management is being addressed elsewhere in the world.

As a policy framework developed over 12 years, the WFD was adopted by the EU in 2000 (Kallis & Butler, 2001; Kaika, 2003; Mostert, 2003; De Stefano, 2010; Voulvoulis *et al.*, 2017). The framework encompasses a comprehensive approach to water and river basin management, being slated as the EU's most substantiate piece of environmental policy (Voulvoulis *et al.*, 2017). Established as a holistic approach to water resource management, the framework promotes the sustainable use of water, addresses water pollution, as well as responds to events such as floods and droughts (Mostert, 2003). The overall objective of the WFD is to maintain the EU's water resources and ensure its "good status" (Kallis & Butler, 2001; Mostert, 2003). At the core of this point is the notion that through the WFD, the EU's water resources are to be protected from pollution and overexploitation, supporting extensive water quality monitoring plans (Kallis & Butler, 2001; Mostert, 2003; Allan *et al.*, 2006; Collins *et al.*, 2012; Voulvoulis *et al.*, 2017). Addressing an otherwise fragmented array of policies around water resource management, the WFD is described as the solution to addressing water quality, eventually leading to the conservation of aquatic ecosystems (De Stefano, 2010; Voulvoulis *et al.*, 2017).

A key element of the WFD is its move towards the decentralisation of water governance and public participation. Mostert (2003) explains that the WFD encourages EU Member States to actively involve water users and stakeholders in water resource management. De Stefano (2010) also supports this argument stating that the WFD was formed on the foundations of stakeholder engagement itself, without which, the directive cannot succeed. Apart from addressing uncertainty (Newig, Pahl-Wostl & Sigel, 2005), the role of public participation in the WFD has been supported an effective approach to dealing with challenges normally encountered in traditional water governance systems (Kaika, 2003). Furthermore, public participation was considered a solution to Europe's then-emerging water challenges related to urban expansion, increased economic activity and therefore growing water demands (Kaika, 2003). By involving more actors in water governance, the WFD addresses water use concerns, river basin management plans as well as different interests the public have that government and authorities may not be aware of (Kaika, 2003; Kallis & Butler, 2001; Newig *et al.*, 2005). In this regard, active public participation plays an important role in formulating River basin managing and monitoring plans. Altogether, the WFD approaches river basin management in ways to address both ecological or environmental concerns, while allowing for the security of socio-economic wellbeing (Hering *et al.*, 2010).

A very important way that the WFD redefines the role of stakeholders and public participation is through decision-making. There are several benefits of public participation in decision-making which have been highlighted by Mostert (2003). Active involvement of the public in decision-making allows for more creative decisions to be made. These decisions reflect the opinions and views of those making the decisions, unlike in the case of a traditional framework (Wright & Jacobsen, 2011). Through a multi-level approach, public participation in decision-making allows for social actors to evaluate decisions, supply additional information towards formulating decisions, and finally, encourages consultation between different stakeholders (De Stefano, 2010). While the progress and success of the implementation of this element as part of the WFD has been argued as not sufficiently studied, the principles of the WFD around public participation in decision-making align with the values of IWRM (De Stefano, 2010).

2.3.2 The Danish Water Councils: A practical example of water resource management through stakeholder engagement

A key example of how the WFD has reformed water resource management in the EU is the case study of Denmark as an EU Member State, and the country's implementation of local participatory institutions as well as an associated river basin management plan. In 2013, long after the establishment of the WFD, the Danish government, initiated a new approach to river basin management through the formation of water councils for different catchment areas in the country (Wright & Jacobsen, 2011; Graversgaard *et al.*, 2017). These water councils were formed to manage a catchment which the members of the council had interest in. Formally referred to as the Danish Water Councils, members included a balance between river protectors (activists, NGOs, and environmentalists), and those with an economic interest in the water resources of the catchment (fisheries, industries, agriculturalists, and other organisations). Councils were also encouraged to incorporate their own knowledge systems in the management of their river basin of interest. Active involvement of participants in water resource management in Denmark has been beneficial, with some suggesting that Denmark addresses the WFD's objectives effectively (Wright & Jacobsen, 2011; Graversgaard *et al.*, 2017). However, some criticism has been made on the challenges similar strategies have, as well as the effectiveness of the WFD altogether.

Several challenges have been noted related to the involvement of the public in river basin management. This also relates to concerns around the implementation of the WFD (Voulvoulis *et al.*, 2017). The WFD encompasses a large amount of expectations, many of which are argued

best addressed through public participation (Mostert, 2003). In fact, some suggest that the strategy itself is too expansive and advanced, with too many goals associated with it (Voulvoulis *et al.,* 2017). For example, public participation through the WFD supports that stakeholders and communities need to be active in creating river basin management plans (De Stefano, 2010; Mostert, 2003; Wright & Jacobsen, 2011). These plans must also account for monitoring the status of catchments and river basins (Kallis & Butler, 2001; Mostert, 2003; Wright & Jacobsen, 2011). It has been established therefore that some participatory initiatives, including some initiated in Denmark were unable to address the expectations of the WFD due to participants' limited capacities and expertise (De Stefano, 2010; Wright & Jacobsen, 2011). Therefore, while the WFD and studies of the Danish Water Councils support public participation as a potential solution to river basin management, implementation thereof is a complex matter.

While the Danish Water Councils case study is an example of initiatives embodying IWRM and IRBM, this is but one case study of the implementation of public participation as part of the WFD. The main reasons for the lack of implementation has been related to the framework's policy in general, which has been described as not sufficient in supporting stakeholder engagement (De Stefano, 2010). It has been further suggested that the WFD does not sufficiently address learning and knowledge practices, lacking rigid management goals and resources to address river basin management altogether (Dawson *et al.,* 2018). It is therefore considered that continued engagement with policy and practice is required to improve approaches to IRBM. At the same time, the Danish Water Council case study is a key example which illustrates that integrating CBNRM and PAR in IRBM is possible.

2.3.3 Comparing the global example to local realities

Several themes can be drawn from the example of the WFD considering the current study's area of interest. Further, a comparison of the lived realities in the EU versus those in South Africa is necessary before a contemplation of the potential such a framework may have in the context of the current study. Firstly, European communities differ greatly from those in South Africa. For example, the socio-economic *status quo* of Danish communities is incomparable to that of Tembisa. As a community which suffers from legacy challenges related to inequality, racism, and colonialism, Tembisa, like other communities in South Africa are not equipped with the same resources that a community in a developed country may be. This already limits the extent to which such a structured framework can be shaped to fit South African realities.

While a lot can be learned from the experiences with the implementation of the WFD, opportunities and challenges within communities such as Tembisa need to be identified through which a tailored framework can be adapted.

Environmental conditions must also be considered. As two completely different continents, Africa, and Europe contrast greatly in terms of their respective geographic, climatic, and deeper socio-economic backdrops. As the WFD may have been developed to maintain the "good status" of water resources in the EU, South Africa, as a water scarce country already suffers with dwindling water resources, most of which are already victim to overexploitation and pollution. Therefore, the challenges to address go beyond maintaining water resources, but also ameliorating them and securing them for future generations. This needs to account for the geography of South Africa in a continent which is only to experience more challenges when it comes to water resource management in the future.

2.4 CONTEXTUALISING THE LITERATURE ON STAKEHOLDER ENGAGEMENT AND COMMUNITY PARTICIPATION IN RIVER BASIN MANAGEMENT: A SUB-SAHARAN AFRICAN PERSPECTIVE

Like the rest of the continent, Sub-Saharan Africa faces water resource challenges, some of which are specific to this part of the continent (Vörösmarty *et al.*, 2005; Knight, 2019a; Boretti, 2020). However, given the nature of the continent's environmental and socio-economic status, the challenges the continent faces are not limited to water resources, but extends to encompass natural resources in general. Hence, the literature base drawn from includes key sub-Saharan African examples of stakeholder engagement and community participation in managing natural resources. These examples present ways through which the current study can be contextualised. Further, the various case studies at a regional scale contextualise global challenges and opportunities. In this regard, similar challenges and opportunities are identified within sub-Saharan Africa.

2.4.1 CAMPFIRE, Zimbabwe: Important lessons about government-stakeholder relationships

While reviewing the literature base, a key case study emerged from which lessons around CBNRM were drawn. The Communal Areas Management Program for Indigenous Resources (CAMPFIRE) case study of Zimbabwe highlights an example which was theoretically sound but was poorly implemented because of power imbalances. CAMPFIRE was established in the

1980s to promote CBNRM in Zimbabwe's rural districts. CAMPFIRE was aimed to promote conservation and development in marginal rural areas where wildlife management represented an opportunity for revenue production but where game populations were threatened (Taylor, 2009; Gibbes & Keys, 2010; Measham & Lumbasi, 2013). At the heart of this strategy was the need to engage communities and encourage the implementation of indigenous knowledge systems to promote sustainable wildlife management. CAMPFIRE was considered relevant as communities were inherently participating in interactions with wildlife, albeit not involved with further decision-making.

CAMPFIRE is an example of where too much authority over a participatory framework leads to its downfall (Gibbes & Keys, 2010; Measham & Lumbasi, 2013). Although through its history, CAMPFIRE has been beneficial, both for the environment and economically, the framework has been criticised for not involving community members in decision-making and allowing other stakeholders like community and government leaders to take full control of associated projects (Taylor, 2009). Additionally, community members reported gaining little to no economic benefit from projects in recent years (Shereni & Saarinen, 2020). Therefore, although the framework and associated projects were meant to do good for the environment and communities, a lack of proper structure and communication between stakeholders, leaders and community members have led to the framework not performing as well as it was hoped.

2.4.2 The Densu River Basin, Ghana: Community agency and active participation

CAMPFIRE becomes important in demonstrating some of the shortcomings involved with implementing a stakeholder engagement and community participation framework in Africa, however, some examples exist exemplifying the opportunities thereof. The case study of Ghana's Densu River Basin and the country's efforts towards reforming water resource management through this initiative is here considered a cornerstone contextualising the current study. Ghana is one of the countries in Africa which has made attempts at including IWRM approaches in its policy and water management frameworks (Owusu *et al.*, 2016). According to Laube (2007), Ghana went through a water resource management reform in 1996. This reform saw a change in policy towards support of incorporating IWRM into water governance. As part of this shift in policy, a private agency, the Water Resources Commission of Ghana, was given full governing power of Ghana's water resources as an attempt to decentralise governance (Laube, 2007; Owusu *et al.*, 2016). While this reform and the actions that followed are criticised by some (Agyenim & Gupta, 2012; Eduful *et al.*, 2020), Amani *et al.* (2015)

praise the value of the incorporation of IWRM has brought to water resource management. The value of public participation and stakeholder engagement in water resource management is of particular interest.

In the early 2000s, the Water Resources Commission of Ghana sought to amend water resource management by focusing management efforts at river basin level, rather than at regional or national level. As suggested by Amani *et al.* (2015), the Densu River basin was adopted as a pilot site through which several principles of IWRM were applied. As a densely populated area similar to the Hennops River Basin, the Densu River Basin had been experiencing a gradual degradation in water quality mainly from anthropogenic activities over the years (Anokye & Gupta, 2012; Amani *et al.*, 2015). Amani *et al.* (2015) highlight that some of the challenges the river faced related to solid waste dumping which originated from a nearby township.

The Water Resources Commission encouraged and supported the formation of a council to address the issues within the Densu River Basin (Anokye & Gupta, 2012). This council was very similar to the Danish Water Councils formed under the WFD. The Densu Basin Board (DBB) was formed in 2003 as a decentralised management approach for the management of the river basin with the objective to protect water resources (Amani *et al.*, 2015; Anokye & Gupta, 2012; Eduful *et al.*, 2020). The DBB was composed of different stakeholders from government agencies, local community members from different NGOs, municipality, and traditional authorities. Very similar to the WFD, the initiatives involve stakeholders in the management of the Densu River Basin focusing around decision-making and the monitoring of water quality (Allan *et al.*, 2006; Collins *et al.*, 2012). Stakeholder engagement in this regard functioned as an established system through which decisions were made and actions took place (Anokye & Gupta, 2012; Amani *et al.*, 2015). Therefore, management of water resources in the basin and responsibilities as well as decision-making capacity had been distributed among stakeholders.

Public awareness campaigns, capacity building initiatives as well as monitoring programs were some of the results of involving stakeholders and communities in managing the Densu River Basin (Amani *et al.*, 2015). At the heart of these different initiatives, communities were provided education and awareness on the value of IWRM in water resource management (Amani *et al.*, 2015). In the case of the Densu River Basin, the focus of stakeholder and community participation has been to address pollution and monitoring thereof. This also corresponds with the efforts made through the WFD of the EU, which includes a focus on

pollution and water quality monitoring (Allan *et al.*, 2006; De Stefano, 2010; Wright & Jacobsen, 2011; Collins *et al.*, 2012). Furthermore, the initiatives made in the Densu River Basin through the DBB have empowered communities. Community members contribute in various ways to the upkeep of infrastructure, understanding that it is only themselves who reap the benefits (Anokye & Gupta, 2012; Amani, Dessouassi & Paintsil, 2015; Owusu *et al.*, 2016).

However, not all share the positive sentiments of Amani *et al.* (2015) around the introduction and adoption of IWRM principles and decentralisation in water resource management. Some arguments have been made suggesting that Ghana, as a developing country, has not been able to fully adapt to the changes brought about by the shift in policy in the early 2000s (Laube, 2007; Agyenim & Gupta, 2012; Anokye & Gupta, 2012). In the case of the Densu River Basin, Anokye & Gupta (2012) demonstrate that while efforts have been successful, some areas of water delivery are not sufficiently dealt with. At the same time, a more stronger argument exists, critiquing the role the Water Resource Commission and privatisation of water governance in Ghana (Laube, 2007). Altogether, the application of IWRM in the context of Ghana is argued to be more complex than otherwise envisioned given that IWRM encompasses different elements of water resource management to address (Agyenim & Gupta, 2012). A similar argument is also presented in the context of global initiatives such as the WFD of the EU (Voulvoulis *et al.*, 2017). The complexity and criticisms made in this regard, have led to the argument that, unlike in the context of the WFD and the EU, IWRM cannot simply be applied to developing countries such as Ghana, as economic, cultural, and social dynamics need to be considered (Agyenim & Gupta, 2012). This resonates with the critique of the WFD previously discussed in the context of South Africa.

As the most studied example of the application of IWRM and IRBM in sub-Saharan Africa, Ghana's experience, particularly related to the Densu River Basin, is a key case study worth exploring the value of the theoretical underpinnings of the current study. Considering the global perspective of the WFD of the EU, the application of IWRM in an African context is more complex, albeit does show promise for the potential of stakeholder engagement and community participation in sustainable water resource management (Agyenim & Gupta, 2012). The case study of the Densu River Basin demonstrates that while advantages exist in applying IWRM, CBNRM and IRBM for better water resource management, some challenges are encountered which can lead to exacerbating other challenges such as economic wellbeing and equality.

2.4.3 Scaling down to the local level: Lessons learnt in relation to the Hennops River Basin

Similar themes, as with global perspectives, emerge for the literature when considering the role of stakeholder engagement and community participation in a Sub-Saharan African context. The above examined literature base contextualises aspects of stakeholder engagement and community participation highlighting challenges faced such as formulating an integrated yet flexible framework for all parties to be involved and benefit, as well as the need to properly evaluate the reality of the community and environment upon which this framework is applied. Considering the current study, it becomes clearer after engaging the existing body of knowledge that no one framework can be applied to multiple scenarios. Instead, an in-depth evaluation of current policies, structures, and opportunities therein must precede the formulation of a stakeholder engagement and community participation framework, hence the need of the current study in the context of the Hennops River Basin and subsequently, South Africa.

2.5 CONTEXTUALISING THE LITERATURE ON STAKEHOLDER ENGAGEMENT AND COMMUNITY PARTICIPATION IN RIVER BASIN MANAGEMENT: A SOUTH AFRICAN PERSPECTIVE

Different initiatives and experiences in South Africa exemplify the extent to which the country has implemented stakeholder engagement and community participation into the management of natural resources (Waalewijn *et al.*, 2005; Meer & Schnurr, 2013; Shackleton *et al.*, 2019; Adom & Simatele, 2022). For the most part, separate local case studies provide more insight than broader, national examples. This section considers case studies in KwaZulu-Natal, particularly that of the Somkhanda Game Reserve and the role of the Gumbi community in CBNRM as well as the Ngome Game Reserve and the Zondi community (Musavengane & Simatele, 2016). This is further expanded into the space of river basin management when discussing the case study of the Inkomati River Basin and the agency of its Irrigation Board. Finally, the literature base is then harnessed to contextualise the current study considering recent research in Tembisa aimed to assess the current state of community participation. Case studies of this nature resonate with understandings assessed in the body of literature. At the same time, these case studies play a vital role in contextualising the current study as they represent local experiences addressing previous gaps highlighted in terms of geographical and socio-economic situations.

Firstly, stakeholder engagement and community participation in a South African context has been best studied considering CBNRM as highlighted above.

2.5.1 Ngome and Somkhanda Game Reserves, KwaZulu-Natal: Comparing CAMPFIRE to South African examples

As in the CAMPFIRE case study of Zimbabwe, similar initiatives have been engaged in South Africa for the management of wildlife and game reserves which involved engaging stakeholders and communities in the management of natural resources such as wildlife and game management in KwaZulu-Natal (Musavengane & Simatele, 2016). Through their study, Musavengane & Simatele (2016) argue for the need for social funds in the context of supporting CBNRM initiatives among communities in KwaZulu-Natal, contrasting two different experiences. After engagement with two communities, Gumbi and Zondi, their role and experiences in local natural resource management initiatives were assessed. For example, Musavengane & Simatele (2016) state that a lack of consultation and imbalanced power relations led to the demise of the Ngome Game Reserve initiative. However, through the balancing of power dynamics, and effective fundamental social and political shifts, a completely different experience was noted through the Somkhanda Game Reserve initiative. It is key to recognise that both these initiatives take place in the same province, with both being governed by similar if not the same local laws and governing bodies or structures. The above case studies demonstrate that indigenous knowledge systems are not always effective enough to address contemporary challenges relating to natural resource management. Instead, a balance in power relationships and an understanding of the needs of stakeholders and communities must be incorporated into CBNRM strategies.

These case studies demonstrate key arguments towards the need for enhancing stakeholder engagement and community participation. Further, they set the stage for discussion around applicable scenarios captured through past research related to river basin management. A review of the literature base suggests that the extent to which CBNRM has been implemented in the country extends only as far as the management of land resources with limited experiences related to the potential of stakeholder engagement and community participation in water resource management. However, it was necessary to assess relevant case studies, demonstrating the novelty of the current study in its context.

While several examples of CBNRM exist on a Southern African scale which include CAMPFIRE and the above-mentioned case studies (Dyer *et al.*, 2014; Musavengane & Simatele, 2016), not many studies consider one specific case in depth save for that of Meer & Schnurr (2013). Considering the Ndumo Game Reserve, also in KwaZulu-Natal, Meer & Schnurr (2013) advocate for the role of the community in contrast to preconceived notions around what meaningful participation and engagement entail. Meer & Schnurr (2013) review a framework of stakeholder engagement and community participation which failed to achieve what it intended to do. Further, its implementation led to catastrophic results including inciting violence and societal disfunction. In the case study in question, CBNRM initiatives were implemented for the restitution and management of land of the Ndumo Game Reserve. Initially, the CBNRM framework was adopted to address colonial inequalities in relation to land appropriation. However, due to the framework lacking key engagements with communities, the framework was misinformed and based on principles which did not reflect the views and sentiments of the interested communities. This argument becomes key as it highlights a critical consideration of the current study, that is, past inequalities and subsequent repercussions these have had on community development.

2.5.2 Stakeholder engagement in River Basin Management: The Komati River Basin as key case study

In the context of South Africa, the above further affirms the need to consider current policies and structures in place which facilitate stakeholder engagement and community participation. This is particularly key in the context of River Basin Management in South Africa of which a need for institutional transformation has been argued (Waalewijn *et al.*, 2005). In this regard, an analysis of a case study relating to River Basin Management in the context of South Africa allows for the current study to be better contextualised. The Komati River Basin is an important example showcasing the potential of IRBM in South Afrrica.

The Komati River Basin case study itself is a consequence of historical factors which, like in other geopolitical areas of the country had repercussions on how social actors interacted with the river basin. As presented by Waalewijn *et al.* (2005), the case study of the Komati River Basin can be considered a revolution in terms of water resource management as it stands apart from current policy and institutional frameworks governing river basin management. The case study exemplifies the agency of stakeholders and communities, demonstrating that, where an interest exists, action can take place addressing challenges. Because of the nature of the

agricultural activities within the Komati River Basin, like other river basins in South Africa, farmers commissioned their own Irrigation Board. This was achieved outside of a recognised institutional framework or the implementation of a specific policy. As a result of continued interest in the wellbeing of the Komati River Basin, the Irrigation Board essentially became the managing institution ensuring the River Basin's wellbeing. At present, the Komati River Basin remains the responsibility of the landowners and farmers who maintain its water resources. As a result, the success recounted in terms of this case study has aided in pushing arguments towards the transformation of policy to encourage similar across South Africa (Waalewijn *et al.*, 2005).

2.5.3 An appreciation of perceptions: homing into Tembisa and the Hennops River Basin

Perhaps one of the most critical studies contextualising the current study is that of Mashazi *et al.* (2019). As a perception study focused around water resource management, the community of Tembisa, and the Kaalspruit tributary, Mashazi *et al.* (2019) provides an overview of sentiments towards River Basin Management and the current challenges the Kaalspruit faces. As a recent study of community and stakeholder perceptions around the Kaalspruit tributary, Tembisa is brought to light, with the value of the community further highlighted. Efforts were taken to collect quantitative data related to perceptions of challenges the area faces essentially capturing the community's current sentiments and attitudes. As results of this study, Mashazi *et al.* (2019) consider the value of future research to address community awareness and participation through action and initiatives. The results of this study solidify observable trends and patterns in the area suggesting that the community is fully aware of the challenges but are estranged from actions to promote its rehabilitation. The study was a comprehensive overview of perceptions and viewpoints of stakeholders and communities which are built upon and addressed through the current study's model of PAR. In this regard, the current study draws from the work already done, implementing a participatory methodology addressing what Mashazi *et al.* (2019) have identified as a gap in the existing body of knowledge. Further, the current study drew from the perception study of Mashazi *et al.* (2019) to position itself in the context of the Hennops River Basin as a whole, and further, context of stakeholder engagement and community participation in South Africa.

2.5.4 A need to consider the Hennops River Basin and the management thereof

Although South African examples of the incorporation of stakeholder engagement and community participation into natural resource management exist, all these address varied contexts. Further, the overall outcomes of the different case studies have been driven by various factors whether historical or consequential. Considering the Hennops River Basin and therefore contextualising the current study, several theoretical considerations emerge. Firstly, the current study addressed stakeholder engagement and community participation in a context that has never been considered, that is, an ever-expanding urban hub within South Africa's economic heart, that is Gauteng. Further, the realities experienced and overall socio-economic context within the Hennops River Basin contrast dramatically with that of a river basin such as the Komati. The same experiences would be impossible to apply to the Hennops River Basin, therefore qualifying the need to study communities such as Tembisa, to better understand their interest in the Hennops River Basin, and therefore understand their potential to address its management. Thus, a unique model is required in terms of stakeholder engagement and community participation, drawing inspiration from various case studies across the country, and building upon them.

2.6 IDENTIFYING THE GAPS IN THE KNOWLEDGE BASE

Chapter 2 reviews the literature on stakeholder engagement and community participation in IRBM, focusing on different theoretical perspectives and case studies from around the world. As a starting point, different theoretical underpinnings are presented and discussed, identifying common approaches to the subject matter. For instance, it was important to understand stakeholder as a concept. Further, studies have been undertaken which consider stakeholder engagement, modelling effective water governance. Such studies have identified gaps, for example, the disparity between policy and practice. This chapter also contextualises the discourse of Water Resource Management and River Basin Management, citing key examples of frameworks and policies based on the theoretical underpinnings discussed. While frameworks such as the EU's WFD or examples such as the Densu River Basin exists, this study conceptualises these in the context of situations like the Hennops River Basin and Tembisa. to the South African context.

The chapter identifies four main gaps in the knowledge base that motivate the current study. Firstly, there is a lack of a comprehensive and context-specific model or framework for IRBM

in South Africa, which can incorporate the diverse and complex realities of the country's river basins and communities. Secondly, the applicability of existing models or frameworks for IRBM developed in other regions to the context of South Africa is limited. Following from this assertion Tembisa itself is unique as a case study as is discussed in the next chapter. Therefore, this study identified the need to explore how stakeholder engagement and community participation can be effectively implemented and sustained in IRBM, especially in urban settings and among poor and marginalized communities, such as Tembisa in the Hennops River Basin. Finally, this study assessed the potential of stakeholder engagement and community participation to address the multiple and interrelated challenges facing the Hennops River Basin. These include challenges such as pollution, degradation, water scarcity, poverty, and inequality.

CHAPTER THREE
A SITUATIONAL IMAGE OF THE STUDY SITE- THE HENNOPS RIVER

3.1 INTRODUCTION

The following chapter discusses and positions the study site, that is the Hennops River Basin, in the context of South Africa. Addressing River Basin Management in South Africa, such a situational image is necessary to understand how the case study of the Hennops River Basin relates to national contexts, and the different factors that make South Africa a unique country. The Hennops River Basin and the dynamics within have been shaped throughout history, and through the different events which have led to the country's evolution. This chapter considers various socio-economic and environmental factors of the country. Further, an understanding of the historical development of the country is discussed, particularly considering the influence of Apartheid. Finally, this chapter considers post-Apartheid South Africa and developments towards addressing legacy challenges.

Following a review of literature and appraisal of theoretical considerations, key themes emerge. These themes suggest that, even though South Africa is not estranged from theoretical underpinnings such as CBNRM and IRBM, contexts differ greatly, leading to complexity in how River Basin Management can be conceptualised. For this reason, this chapter provides a situational image of the study site, contextualising the Hennops River Basin in relation to South Africa's historical, socio-economic, and overall geographic conditions. Differing from other studies' descriptions of a study site, this thesis firstly considers the country holistically, as this study addresses River Basin Management across the country.

3.2 GEOGRAPHIC AND SOCIO-ECONOMIC BACKGROUND OF SOUTH AFRICA

3.2.1 The Geography of South Africa

a) The South African Landscape

Like every other politically defined landmass, South Africa's overall geographic position is unique. The country itself and its associated geography makes it a critical point within the African continent. The geography of South Africa has allowed for the country to become

valuable in terms of natural capital, contributing to the upliftment and development of the African continent holistically. In this regard, natural resources are abundant in South Africa, particularly as it pertains to mining (Harrison & Zack, 2012). Forming the southern tip of Africa, South Africa is the southern-most country of the Eurasian-African region. The landmass finds itself between both the Atlantic and Indian Oceans. The political boundaries of the country landlock the kingdom of Lesotho, while sharing borders with Namibia, Botswana, Zimbabwe, Mozambique, and the kingdom of eSwatini. South Africa is a landmass spanning an area of 1,22 million km^2.

South Africa's landscape differs drastically from region to region, or province to province. Different geomorphic processes have resulted in a mosaic of landforms and land features which makes South Africa's geographic nature spatially varied and complex (Knight, 2019b). The country is divided into different regions which correspond to various geographic considerations such as land features and natural boundaries such as rivers, but also to the socio-economic status of a specific region. South Africa's landscape is characterised by different biomes and natural features, some of which are unique to the country such as the Fynbos (Mucina & Rutherford, 2006). In contrast to the richer biomes of the country, South Africa also features desert landscapes. This reflects South Africa's varying and complex climatic and hydrological conditions which govern its natural water resources.

b) Climate of South Africa

South Africa experiences contrasting climatic conditions across its landscape. For example, the mainland and its east coast experiences summer rainfall, and drier winters. In contrast, South Africa's West coast is affected by anti-cyclones originating in the South, leading to regions such as the Western Cape and Eastern Cape experiencing wetter winters. Varying conditions are experienced across South Africa's nine provinces which ultimately affects the country's total rainfall and evo-transpiration rates (Dennis & Dennis, 2012; Botai *et al.*, 2018). South Africa's average annual rainfall of approximately 500mm is much lower than the world's average of 860mm (Dennis & Dennis, 2012). Although arguments have been made towards the insignificance of these rainfall statistics (Knight, 2019a), it is undeniable that recent studies suggest that South Africa's rainfall is entirely variable and unpredictable. Through studies of rainfall variability, it has been brought forward that varying rainfall patterns have contributed to recent extreme drought events (Botai *et al.*, 2018; MacFadyen *et al.*, 2018; Burls *et al.*,

2019). The nature of South Africa's climatic conditions has in turn affected South Africa's natural water resources which are mostly concentrated in river systems.

c) Water Resources in South Africa

South Africa's River systems are very important as they provide the country with all its water resources. In this regard, South Africa has no natural large water bodies such as lakes. South Africa has several major rivers including the Orange, Molopo, Vaal, Inkomati, and Limpopo, many of which form part of transboundary catchment areas. Altogether, the DWS provides the names of 7710 rivers, streams, and estuaries found within the country. Water drains from South Africa's mainland, being captured in dams, of which there are 4 395 across the country according to the NWRS2 (Department of Water and Sanitation, 2013). South Africa's inland water resources are amalgamated into nine Water Management Areas (WMAs). These WMAs include different catchment areas and associated river systems. WMAs represent large portions of the country, some of which span across multiple provinces, but also include transboundary river systems. WMAs were established for better management of South Africa's water resources (Department of Water and Sanitation, 2013). Contextualising the study site in terms of WMAs, the Hennops River Basin is part of the Limpopo WMA as captured in Figure 3.1. As highlighted in Figure 3.1, the Hennops River Basin makes up a small part of the entire Limpopo WMA yet is linked to transboundary water resources.

South Africa's River systems are not limited to the country's borders. All its neighbouring countries share catchment areas with South Africa. A notable country with which South Africa shares water resources is Lesotho. The Lesotho Highlands Water Project is an important example of how not all South Africa's water resources are confined to the country's borders. The Lesotho Highlands Water Project is but one example of transboundary water collaborations (Mirumachi & van Wyk, 2010). At the same time, such collaborations have been criticised because of challenges associated with maintaining transparency and equality (Mwangi, 2007; Mirumachi & van Wyk, 2010).

d) The challenge: Water resource management

As discussed, the geography of South Africa makes the country unique in several ways, culminating in its distribution and availability of natural resources, particularly water resources. Being limited, the conservation and sustainable use of water is a critical part of the country's situational image. It can therefore be understood that due to the nature of the geography of the country, approaches to river basin management, and subsequently water resource management

needs to account for differing environmental conditions. This is further complexified through the socio-economic situation of the country which ultimately governs the strategies and approaches adopted for the country's natural resource management, as well as its overall development.

3.2.2 The Socio-economic Background of South Africa

As of 2022, South Africa supports a population of 60,6 million people (Stats SA, 2022a). The population has grown by almost 20% over the last decade. South Africa's population is generally young, with most of the population aging between 20 and 39. Presently, the median age of the country is 28 and has been steadily increasing over the last few decades. In terms of sex ratio, the population consists of more females than males. This has remained consistent over the past few decades. As a characteristic of this population, South Africa has a mix of urban and rural settlement, with much of the country moving towards urbanisation. In 2006, it was estimated that the rural population of South Africa accounted for almost 44% (Kok & Collinson, 2006). This has since decreased to 32% as per data from the World Bank (2021). There has therefore been arguments suggesting that urban expansion is a key aspect part of South Africa's development (Venter *et al.*, 2021).

South Africa currently has one of the highest unemployment rates across southern African countries, accounting for 33,5% of the population (Stats SA, 2022b). Of this number, 60% are youth aged 15 to 24. Of the youth that are employed, most have found work in the formal sector. More interestingly, statistics suggest that South Africa's young women are more likely to remain uneducated or unemployed (Stats SA, 2022a).

The above are characteristics that lend to communities in South Africa keeping their poor status. As such, some of the development goals of the country, as discussed in the National Development Plan 2030 (South African Government, 2012) have been focused on ways to facilitate job creation, address unemployment, and eradicate poverty. Policy has therefore focused on ameliorating socio-economic situations particularly among previously disadvantaged communities. However, legacy challenges related to inequality have had a bearing on the country. This is observable when considering the community of Tembisa, as discussed in the context of the country's developmental history.

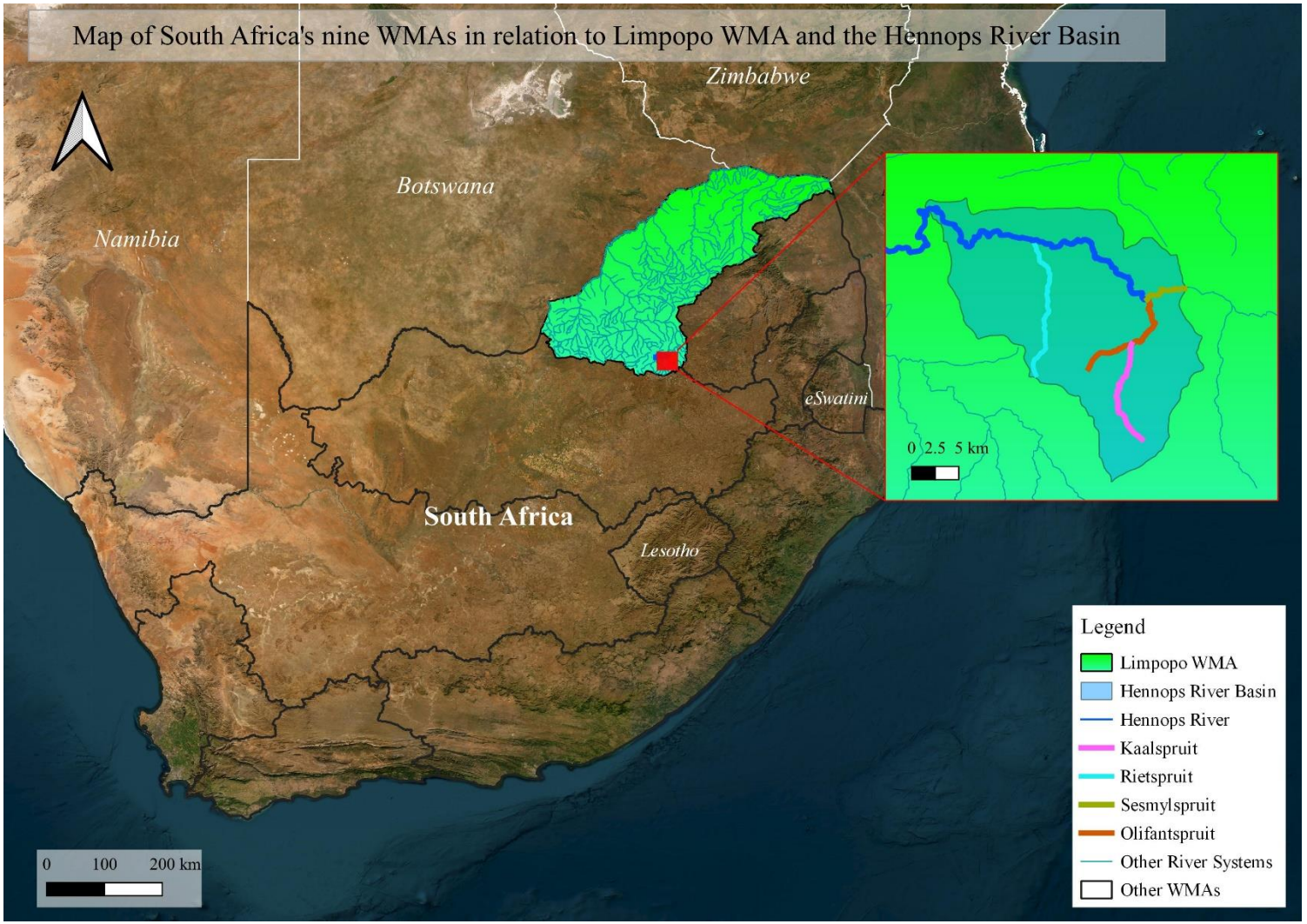


Figure 3.1. Hennops River Basin in the context of the Limpopo WMA and South Africa.

Source: Created on QGIS using data gathered from Department of Water and Sanitation (2013)

3.3 HISTORICAL DEVELOPMENT OF SOUTH AFRICA

3.3.1 A Brief History of South Africa

South Africa has a vast history, and this is often related to the country's colonial and precolonial events. While this chapter does not explore the true complexity of the history and prehistory of the country, a brief outline of South Africa's developmental past is important to situate the current study which focuses on the reality faced in Tembisa. Especially in relation to South Africa's recent past, specific events have played an important role, leading to the development of key urban areas such as the province of Gauteng. It is also important to note that even before South Africa's colonial history, the country was part of complex interactions and hosted different settlement events, some of which have been studied as the most complex in Africa.

It is widely accepted that South Africa's archaeological history has been the most active in the last 2000 years. These argument support the country becoming a central point of interaction, trade, and migration activities long before its colonisation by the Dutch and British (Smith *et al.*, 1991; Huffman, 2000, 2007, 2009). Since even before its colonisation, South Africa has a complex history of interaction between different groups including hunter-gatherers and pastoralists (Smith *et al.*, 1991; Sadr, 2015).

Foreign interest in South Africa expands when the country becomes a port of call for ships traveling between Europe and India (Thompson, 2001). The Portuguese, French, English and Dutch are among the first to take interest in South Africa. After several voyages and interactions with local groups, Cape Town becomes the first European settlement to be developed in the country in the 17th century (Thompson, 2001). From the time of its establishment, Cape Town plays an important role in the colonial history of South Africa, leading to further European exploration of the country.

The development of South Africa takes a historical shift in the early 1900s with the discovery of the country's mineral wealth (Harrison & Zack, 2012). Because of the discovery of its mineral wealth, a race towards the colonisation and development of regions of South Africa takes place. As Harrison & Zack (2012) express, the discovery of gold led to the development of South Africa's economic hub, Johannesburg, and surrounding urban areas which continued to develop over the course of the 20th century. The development of cities and urban areas including Johannesburg and Pretoria eventually constitute what is known as the present-day Gauteng province. This area is of particular interest being the province within which the study

site is located, but also because Gauteng is related to much of the development of South Africa altogether.

3.3.2 Inequality and the Rise of Apartheid

The early development of South Africa was, first and foremost, racialised and founded on colonial principles. Among these was the notion to allow exploited wealth to benefit colonial powers and members of the racial group thereof. In this regard, as the country developed, policies and frameworks were put in place to curtail the economic progression of people of colour, while securing the wellbeing of upcoming colonial businesses and companies. Together, this developmental plan was enacted through the policy framework known as Apartheid.

Apartheid brought profound changes to South Africa's development. Characterised by segregation laws, Apartheid divided South Africa's population according to preconceived racial standards, confining different people to different geographic and socio-economic realities (Thompson, 2001; Seekings, 2008; Seekings & Nattrass, 2008). Through laws such as the Group Areas Act of 1950, the movement of people of colour, including those identified as Black, Indian/Asian, and Mixed or Coloured, was limited (Jürgens *et al.*, 2013). As elaborated by Seekings (2008), this did not hinder or limit urban development, instead, racialisation had become part of South African culture and still dictates the lives of South African's today.

Like other areas of South Africa, the recent past which included the Apartheid regime, influenced the demographics and social characteristics of Gauteng. Research has corroborated this notion demonstrating that Gauteng still experiences a settlement divide despite more than 20 years after Apartheid's abolishment (Wray, 2014). It has been established that racial segregation continues to challenge South Africa, with many South Africans confined in their choices in terms of mobility and settlement (Christopher, 2001). This has also been related to larger discussions on how urban spaces are perceived according to racial ideas (Seekings, 2008).

Beginning in the 1950s, racial segregation was used as part of urban planning across South Africa, leading to the displacement of populations to areas outside of the city centres (Seekings & Nattrass, 2008; Jürgens *et al.*, 2013; Tewolde, 2021). This was as part of movements towards reserving land for preferred populations and their economic and social needs. A legislative framework was created supporting Apartheid's overall urban plan and led to forced displacing

and confinement of millions of people. Although taking effect between the 1950s and 1980s, this approach to urban development was put in place almost 50 years prior, and was intensified as South Africa's economy grew (Tewolde, 2021). The result of Apartheid's urban plan were townships – urban areas characterised by cheap housing, and infrastructure, accommodating large populations of people of colour.

3.3.3 Townships: The Legacy of Apartheid

Townships are normally situated at the outskirts of major urban centres. Tembisa is one of the largest townships in South Africa, at the outskirts of both Pretoria and Johannesburg. A main characteristic of these areas is their demographic make-up, including mostly youth of colour or specific racial group. As a result of Apartheid, townships are urban spaces offering residents the bare minimum in terms of services and amenities (Jürgens *et al.*, 2013; Philip, 2014). While these spaces lack services that other urban areas receive, the cheap lifestyle that townships offer appeal to a population that continues to grapple with unemployment and a growing population.

As previously highlighted, South Africa's population of unemployed individuals continues to grow. As supported by du Toit *et al.* (2018), townships hold a large part of South Africa's unemployed population. Philip (2014) explains that this phenomenon is based on the viewpoint that life in townships is cheaper than anywhere else. As services are less or non-existent in these areas as a repercussion of Apartheid urban planning, residents pay for less services. Townships also present opportunities for migrant workers to cheap alternatives to living. For those that can find employment, townships offer people from rural areas an opportunity to live closer to city centres where work is available. As a result, the legacy of townships continues to exist supporting poor populations across the country in an already-defined space lacking proper service delivery. While the government has made attempts to ameliorate situations, these efforts involved decreasing the population from townships through external opportunities such as RDP (Reconstruction and Development Programme) housing (Jürgens *et al.*, 2013; Philip, 2014). As previously discussed, these initiatives have not been as successful, as townships still offer more convenience despite the lack of services.

Considering the above, the lack of services has prompted agency of township communities who have now established their own avenues and services. For example, illegal electricity connections, and waste management networks. Further, township communities also avoid services altogether leading to illegal dumping. This has led to the emergence of environmental

challenges such as that experienced in Tembisa and the Hennops River Basin. At the same time, local initiatives have also brought about opportunities in enabling the community to address challenges they face. For example, local community groups have been established in Tembisa with different areas of interest such as the arts, horticulture, and environmental activities. These community groups were of interest to the current study and has therefore been discussed in subsequent sections.

3.4 POST-APARTHEID SOUTH AFRICA: DEVELOPMENTS TO DATE

From 1994, South Africa saw a change in power dynamics, bringing an end to Apartheid. With the end of Apartheid came reforms in policy, shaping environmental management, water resource management, and redefining the potential role of stakeholders and communities (Williams, 2006; van Koppen & Schreiner, 2014). Legacy challenges such as townships still exist challenging current models for an equal country (Jürgens *et al.*, 2013; Philip, 2014), however, opportunities exist to allow for a more profound engagement of public participation. It is important to highlight current situations before assessing the potential role of stakeholders and communities in river basin management.

As previously discussed, townships have been observed as a challenge, not an opportunity, with a persistence in separating them from other spatial and socio-economic factors (Philip, 2014). Townships such as Tembisa continue to expand, with populations now overburdening its limited infrastructure. Service delivery challenges continue to plague this community and worsen environmental conditions. This is observable along the Kaalspruit tributary which hosts high levels of solid waste from illegal dumping. This has eventually led to the deterioration of environmental conditions of the Hennops River further downstream.

Because of its recent state, the Hennops River itself has become a point of interest in media (Tlhabye, 2018; Bega, 2020; Ngobeni, 2020). In this regard, media reports and news articles act as the primary source of information on the current state of the Hennops River. Media has pointed out that the river is in no good condition. Solid waste as well as effluent discharge continue to affect the health of the river (Bega, 2020, 2021).

is a photograph extracted from an internet article reporting on the state of the river (Bega, 2020). Taken from an unknown location along the Hennops River, a range of different solid waste items can be observed hindering the natural water flow of the river. From the photograph alone, it can be ascertained that the water is not clear and therefore, not a good reflection of the

state of water resources in the area. Also covered in media communications is the point that NGO's and stakeholders are actively looking for solutions to the problem at hand (Ngobeni, 2020). Some clean-up initiatives have been implemented, involving different stakeholders and community input. Further, the Hennops River Basin also has a relationship with settlements, industries, and infrastructure around and along it.

It becomes important then to observe the potential stakeholders and communities have in addressing such situations, hence the rationale behind the current study. While challenges exist, NGOs and key stakeholders continue to participate in the hopes of making a difference. Further, South Africa's current policies allow for this engagement through guidelines such as the National Water Resource Strategy (NWRS2) which espouses the principles of IWRM. As corroborated by some, South Africa's reform of its water policy in recent years allows for new opportunities to emerge (Swatuk, 2005; van Koppen & Schreiner, 2014; Movik *et al.*, 2016). The value of this potential is therefore argued through this study, considering the experiences drawn from engaging with the Hennops River Basin.



Figure 3.2. Photograph taken of solid waste pollution in the Hennops River.

Source: Bega (2020)

3.5 DESCRIPTION OF THE STUDY SITE

The Hennops River Basin is the primary site of the current study. As illustrated in the map, Figure 3.3, the Hennops River as well as its main tributaries were considered the main site as the entire catchment area is diverse yet interacts with different communities and landuses. Several developed areas, urban settlements, and industries fall within the catchment area. These include the key urban spaces, Tembisa, Centurion, Olifantsfontein, and Ivory Park. The overall area of the Hennops River Basin and associated catchment area is estimated to be around 550km^2. The Hennops River itself is approximately 55kms long. As observed, the highest elevated area of the catchment is located a few kilometres south of Tembisa, with an elevation of approximately 1687m above sea level.

The Hennops River itself drains into the Crocodile River in the West and has four main tributaries. These tributaries include the Rietspruit which runs through Centurion, the Olifantspruit which runs through Olifantsfontein, the Kaalspruit which runs through Tembisa and Ivory Park, and the Sesmylspruit which runs from the Rietvlei Dam. For the most part, the river is fed by these four tributaries, eventually flowing through Centurion as well as other urban, agricultural, and industrial areas. It is also observed that wetlands and natural vegetation surround the banks of most of the river, except in areas where the river flows through developed areas. The Rietspruit and Kaalspruit are surrounded by developed area.

Tembisa, also described as a township, surrounds most of the Kaalspruit with several of its sub-tributaries branching out into the area itself. Tembisa is the second largest township in Gauteng, after Soweto, with a population of 463 109 people and a population density of 10 820 people/km^2 (Stats SA, 2011a). A large portion of the community reports being unemployed with only a small percentage of Tembisa's residents identifying as belonging to a "middle class" economic background (Charman, 2017). As information suggests, 22.2 % of Tembisa's residents report having no income (Stats SA, 2011a). This township mainly consists of formal housing and 84.7 % of the community has access to toilets connected to sewage systems. Only 36.1 % of residences have access to piped water inside their dwelling. Therefore, the infrastructure of Tembisa differs greatly from surrounding towns and cities. Compared to the poor socio-economic background of Tembisa, Centurion is observed as a high-income urban area, with a population of 236 580 people and a population density of 599 people/km^2 (Stats SA, 2011b). Most households in Centurion earn between R 153 801 and R 1 228 800 per year. Almost the entire population has access to piped water and proper sanitation.

Tembisa's community is far removed from decision-making and therefore finds itself in an opportune position to make an impact on the Hennops River Basin in terms of its management. As the point from which large amounts of pollution originates, it is therefore suggested that there are several advantages to focusing the implementation of data instrumentation on this area and the associated population. The resulting proposed frameworks would address a key challenge, while empowering a community that remains disempowered. Further, Tembisa is exemplary of poor urban communities in South Africa. This study sought to learn from experiences having engaged with populations living in the heart of this community.Figure 3.4 was the product of desktop research through which key urban areas and associated constituents of the community along the Kaalspruit were identified. Delineated in Figure 3.4 is the extent of Tembisa itself and key areas identified within. Key areas included eSiphetweni, Mpho, Tafeni, Thiteng, Vusimuzi Informal Settlement, and Winnie Mandela Zone 2.

3.6 CONCLUDING REMARKS

South Africa is a unique country, geographically, and historically. Different factors have shaped it into what we perceive today as a developing country with several challenges and opportunities for growth. At the heart of this is its socio-economic positioning which has ultimately had a bearing on its urban development and town planning. Apartheid brought with it urban planning frameworks which have left indelible marks on South Africa. This has been in the form of townships, which to this day, continue to support poor communities. These poor communities remain poorly provided with basic services. In response, initiatives have emerged within these communities to address social needs.

Some of these initiatives have led to the improvement of conditions within townships. This therefore presents opportunities in terms of stakeholder engagement and community participation, particularly to address deteriorating environmental conditions. This study has positioned itself at a key vantage point to not only engage with key challenges the township of Tembisa faces, but also examine in what ways the community can be actively involved in ameliorating current realities. This is especially considerable in a country that has in its recent past, reformed its policy around its approach to river basin management. As discussed in the next chapter, the community of Tembisa, as well as key local organisations have played important roles in this study, essentially enabling the modelling of a framework to address River Basin Management across the country.

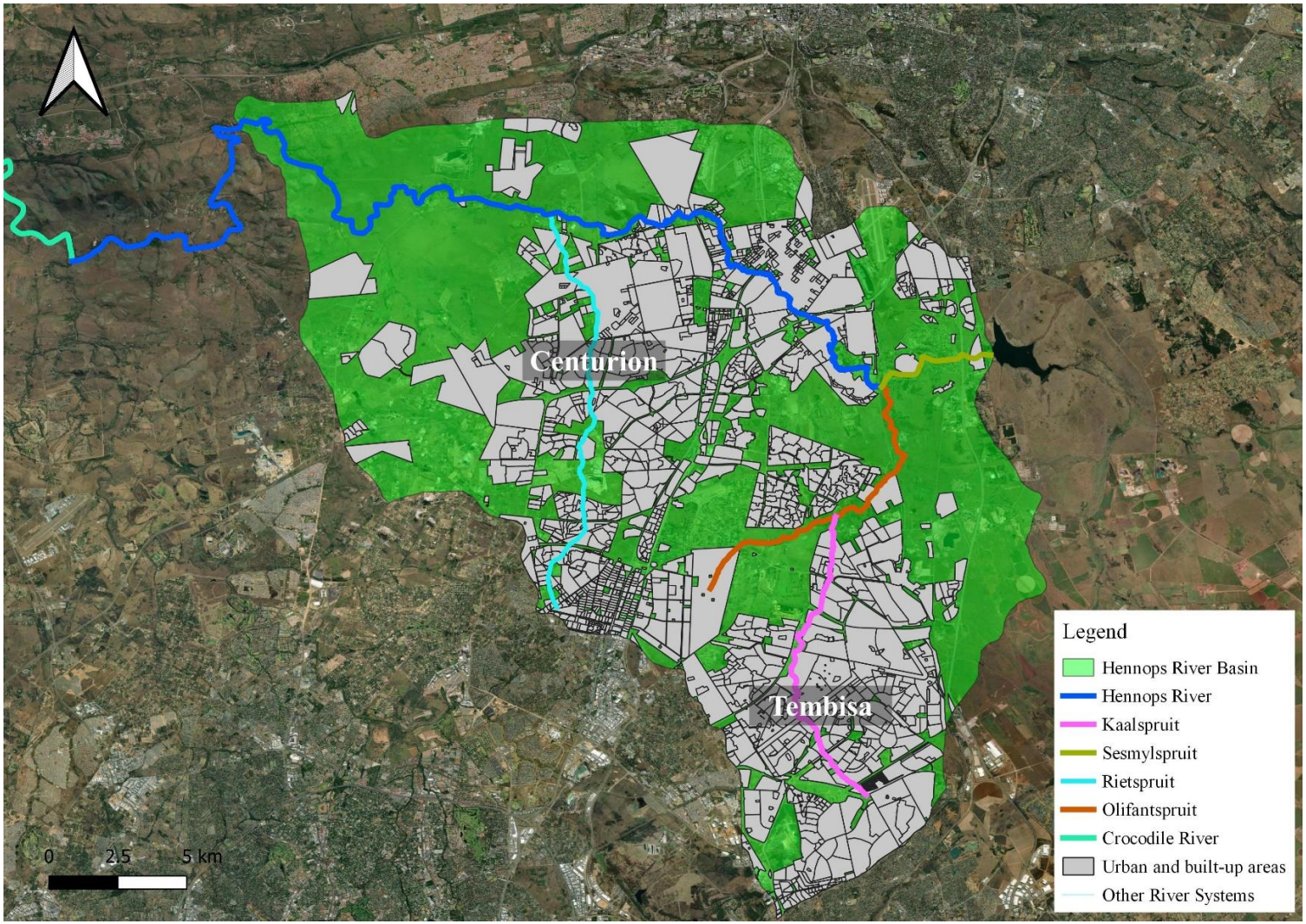


Figure 3.3. Map of the Hennops River Catchment Area and associated drainage basin.

Source: Researcher's own map created on QGIS (2024)

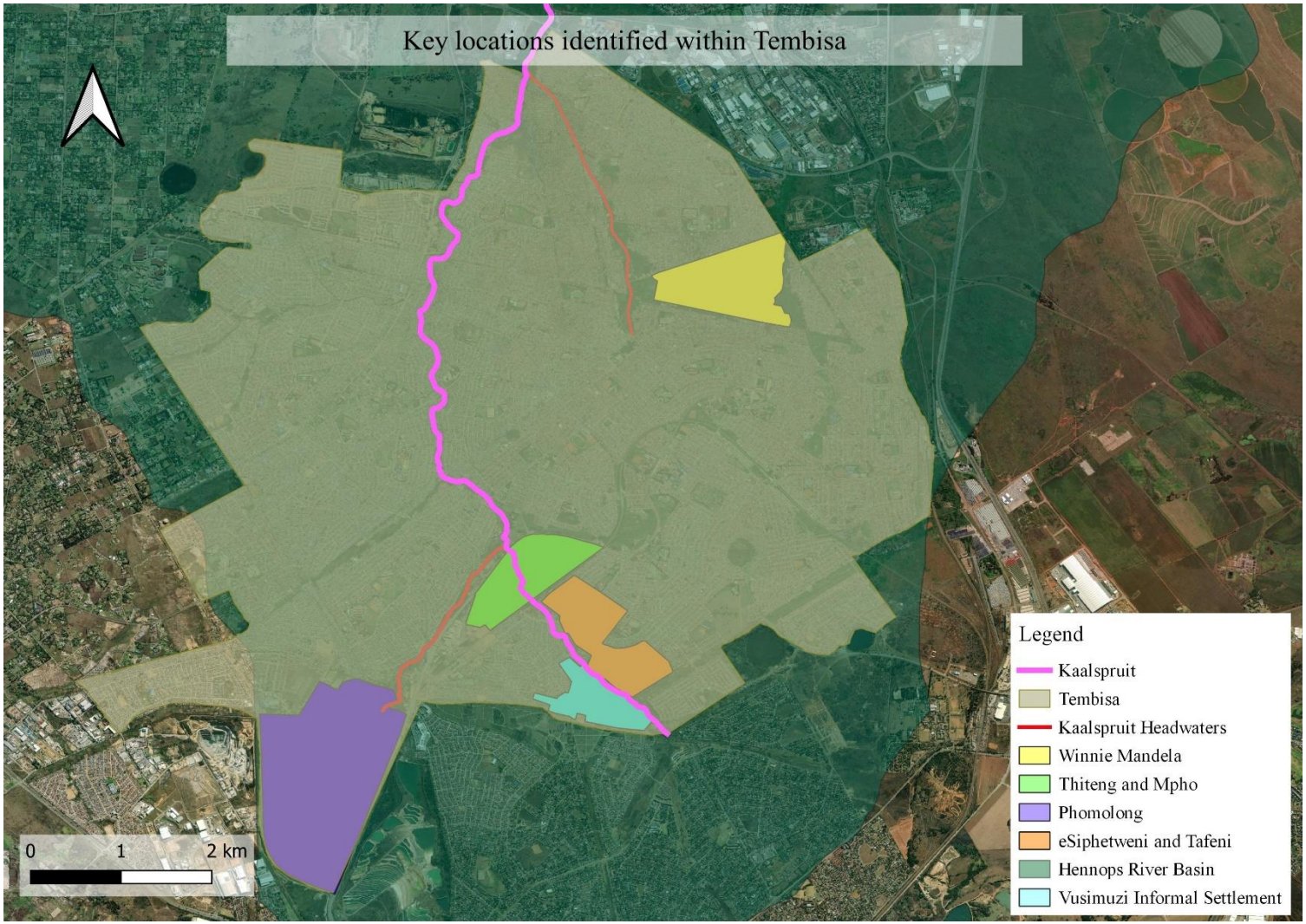


Figure 3.4. Areas of Interest within Tembisa, along the Kaalspruit and its headwaters.

Source: Researcher's own map created on QGIS (2024)

CHAPTER FOUR
METHODOLOGICAL CONSIDERATIONS

4.1 INTRODUCTION

In this chapter, the research design and its methodological aspects and considerations are discussed. A methodology is the way a researcher approaches a research project (Leedy & Ormrod, 2005). It is the overall strategy and design that guides the selection of methods to answer a research problem (Crotty, 1998). Methodology is different from the methods, which are the tools and steps that are used within the larger research plan or design (Crotty, 1998; Leedy & Ormrod, 2005). Therefore, this chapter aims to present the chosen strategy and research design that the researcher used to address the knowledge gaps that were identified before. Moreover, the methods that are part of this strategy and research design are presented. As such, an enquiry based on the relationship between theory and observation drove the planned methodology.

4.2 PHILOSOPHICAL POSITIONALITY

Scientific research can be conducted through different lenses or positions which are assumed by the researcher and ultimately play out through how data is collected and analysed. This posits that prior assumptions must be considered before research can be embarked on. These assumptions are made considering the object of research, and their relationship with other objects, scenarios, and theories. Considering this, the lens or position is described as a study's philosophical positionality. Philosophical positionality can be described as the paradigm which informs the research methodology. There are several philosophical positionalities which qualitative research methodologies can be formed around, and these include, among others, constructivism, positivism and interpretivism to mention but a few (Tracy, 2019). Other scholars observe that philosophical positionalities are at the foundation of a research methodology and can influence the nature and quality of information gathered (Maxwell, 2012; Creswell & Poth, 2016; Tracy, 2019). In view of the above observations the approach for the current study is strongly founded and influenced by the philosophy of critical realism, and premised on the principles articulated by Sayer (2000) as presented below.

A distinction between realism and critical realism is therefore necessary. According to Maxwell (2012), realism has two key tenets. *Firstly*, a realist perspective suggests that a real world exists

detached from theories and our perceptions of it. This key tenet is further affirmed by the *second*, which suggests that the human experience of reality is our own and is in no way a true reflection of reality but rather a construction of what we perceive. Importantly, it is understood that our perceptions of reality are shaped by our prior experience and the reality we interact with or live in (Maxwell, 2012). We thus, understand the world around us based on our own formed experiences of the world.

Sayer (2000) distinguishes critical realism from realism arguing a more in-depth approach to the position, particularly considering the dynamics and subsequent co-production of knowledge in social science. According to Sayer (2000) critical realism in social science must go beyond attempts for the researcher to understand what is real, or otherwise, the object of research. Social actors do not exist removed from (1) their actuality or current realities, and (2) their potential to act or change, which may not be observable. Sayer (2000) establishes here that there are limitations to consider when applying a methodology to social science scenarios. At the same time, opportunities exist which a realist much consider, ultimately adding a new dimension to empirical observations which goes beyond what can be observed.

It is worth noting here that realism focuses on the experience of the individual rather than what a researcher would perceive (Leedy & Ormrod, 2005). Through a more critical review of the research approaches founded in realism, it has been defined that realist scientific methods are interested in an object, just as any other method. However, the processes, causalities, circumstances and events which take place around the object of study are the sources from which a realist scientific method abstracts information (Sayer, 2000). Further, realists are also tasked with understanding the potential of social actors, through which their actions and causal relationships can be modelled. The current study formulates frameworks and models for sustainable River Basin Management in South Africa. It draws understandings and observation from the community of Tembisa and interested stakeholders. Drawing from the critical realist arguments of Sayer (2000), Figure 4.1 captures key considerations of this study made prior to the formulation of its research design.

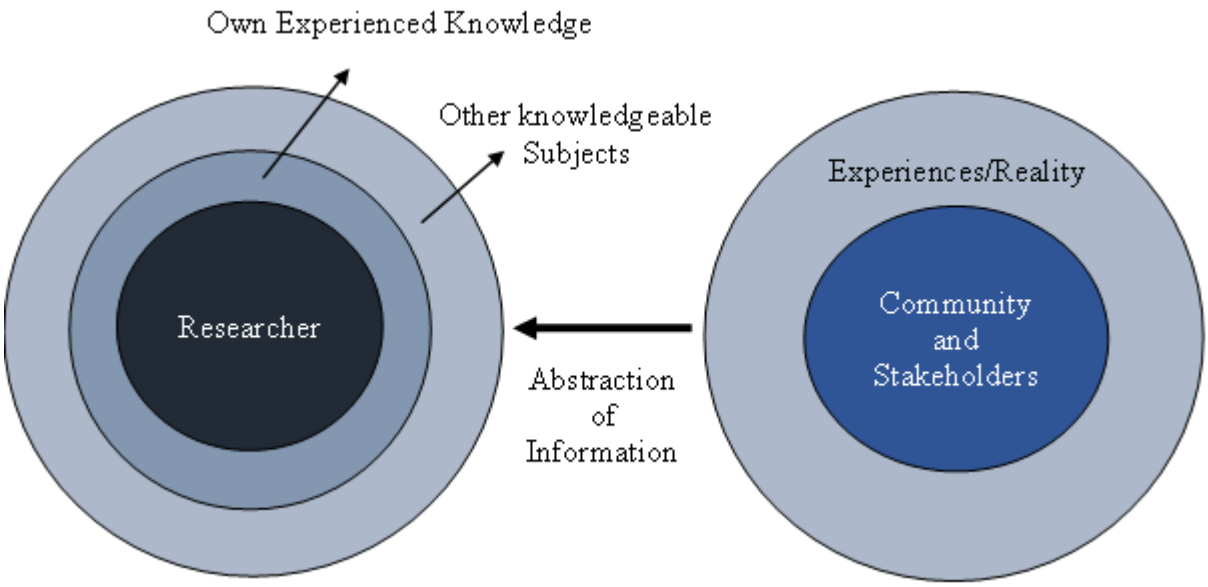


Figure 4.1. Model of Critical Realist Considerations of the study.

Source: After Sayer (2000)

As per the arguments of Sayer (2000) and using Figure 4.1 as an illustration thereof in the context of the current study, it must be considered that a transitive reality exists about the intransitive features of society, that is the community and stakeholders. The researcher is similarly subject to their own experiences and those of others around them. For the abstraction of knowledge, it is therefore necessary to consider these realities and experiences. These may be empirical, but at the same time, these may be conceptual and otherwise intrinsic to the nature of the object of study as well as their realities and experiences. For the researcher, these transitive realities, or in other words, their own experiences and knowledge of other subjects around them would have a bearing on how data is collected and analysed. It becomes important for the researcher to make sense of what they are exposed to, considering wider implications and influences. Interpretation of reality and potential scenarios becomes key to how research under this positionality is undertaken. Therefore, the models and frameworks formulated through this study also reflect the reality of the researcher who is ultimately positioned at an outside perspective, drawing from observations, assumptions, and theorising. As illustrated in Figure 4.1, the relationship between researcher and the object of research is not without buffers of experience on either side, which in themselves hold valuable information.

Sayer (2000) further supports that critical realism also allows for the conceptualisation of different realities which may be projected from observations and theories. In this regard,

objects that is in the case of the current study, stakeholders, and communities, must be understood in terms of their agency and potential to affect their reality as well. Hence, the models and frameworks drawn from are founded on critical realism and critical thinking, considering policies, institutions, current realities, and the potential of stakeholders and communities to contribute in meaningful ways through engagement and participation.

Altogether, several considerations regarding how data could be biased by the researcher were considered. Critical realism is defined here to have been the most effective approach to this study as it aligns well with the concept of Participation Action Research. This positionality not only challenges how knowledge is abstracted from research participants, but also challenges their perceptions in the context of their surrounding environment. It further allows for the conceptualising of different realities while considering the current reality. The methodology of this study considered this positionality and has used it to "construe" its findings, that is in the sense of interpretation and understanding, rather than "construct" them, that is observe and draw conclusions. How critical realism has therefore been applied to this study is articulated in its research design which is subsequently discussed.

4.3 RESEARCH DESIGN

Drawing from the key tenets and considerations related to this study's philosophical positionality, a plan of action, or otherwise, a roadmap towards answering this study's key questions and ultimately achieving its aim and objectives were formulated. This plan of action or roadmap is described as this study's research design. Several steps are involved with the formulation of a research design as supported by Bhattacherjee (2012). Bhattacherjee (2012) states that the first step in establishing a research design is operationalisation. As part of this step, key concepts are defined in the context of the study and then inform relevant data collection and analyses methods. In the context of the current study, this was achieved in Chapter Two through the definition of key concepts and theoretical underpinnings. To further discuss these theoretical underpinnings in relation to research design, this study engaged with PAR. PAR supported the need to engage with communities and stakeholders through different activities, through which data was collected.

Bhattacherjee (2012) further supports that the next step in formulating a research design is to select a research method which addresses the operationalisation of the study. Research methods can be either qualitative or quantitative and should be selected accordingly to address the

research questions. Given the nature of the current study which aimed to draw information from participatory data instrumentation, qualitative methods were selected. Qualitative methods were then applied to the study population, which was defined by the study site itself, that is, the Hennops River Basin.

4.3.1 Study Population and Sampling

Considering that the study focused on gathering qualitative data from the community of Tembisa and its key stakeholders, a sampling strategy was deployed to gather data effectively, while still representing the study population. As previously discussed, Tembisa supports a population of almost 500 000 people (Stats SA, 2011a). Further, the study population in question includes stakeholders who are outside of the community itself. Therefore, it would have been impossible to consult with every member of the community during the two years allotted to this study. Therefore, a sampling strategy was formulated through which an ideal, and statistically sound sample was identified. Sampling considered the entire area of Tembisa as the study population; however, the implementation of this study's methodology and subsequent sampling were focused in key areas identified through their spatial relationship with the Kaalspruit and its headwaters. Various sampling strategies were then implemented to engage stakeholders and communities of interest.

Two sampling strategies were deployed through which key informants were identified and the community of Tembisa best represented. This included Snowball or Chain Sampling as well as Purposive Sampling. The two sampling strategies were used in conjunction with one another. To identify key stakeholders and informants who would aid in the sampling of the community, Snowball or chain sampling was implemented. Snowball sampling has been described as a strategy which allows for the identification of a study sample through the implementation of data instrumentation as well as over the course of the study (Schreier, 2018). The concept of snowball or chain sampling is founded on the premise of identifying participants who would then be engaged to direct the researcher to other potential participants, essentially resulting in the building of a sample. As Tracy (2019) defines it, snowball sampling allows for access to "hidden populations" and "difficult-to-access" groups.

In practice, snowball sampling was initiated by first identifying past activities within the Hennops River Basin through online searches, social media platforms, media coverage, as well as past research, and the stakeholders engaging in these. As a point of departure, the actions of

NGO group Hennops Revival were at the forefront of examples of current activities in the river basin. Hennops Revival were subsequently contacted. The researcher was then directed to several NGO groups working specifically in Tembisa, from which EnviroCare Tembisa was further engaged. Together, EnviroCare Tembisa and Hennops Revival then facilitated communication with communities and other stakeholders, further expanding the sample.

The eventual sample would have been too expansive and not all entirely relevant to engage in its totality. Therefore, purposive sampling was applied through which participants representative of the population were selected. Purposive sampling is widely supported, particularly in social science contexts such as the current study (Leedy & Ormrod, 2005; Maxwell, 2012; Schreier, 2018; Tracy, 2019). Tracy (2019) explains the value of purposive sampling, especially when engaging with individuals and groups to gather qualitative data which are needed to address specific questions. In this regard, purposive sampling is defined as a method which is employed to select participants as they have a relationship to a study's research questions, aim and objectives. Purposive was continually applied in the current study as the sample gathered through snowball sampling grew. For example, multiple businesses and organisations were identified through snowball sampling. Of these, some were deemed irrelevant and therefore excluded from the sample when implementing the study's data instrumentation. This resulted in the defining and confining of the study sample to effectively represent stakeholders and the community of Tembisa.

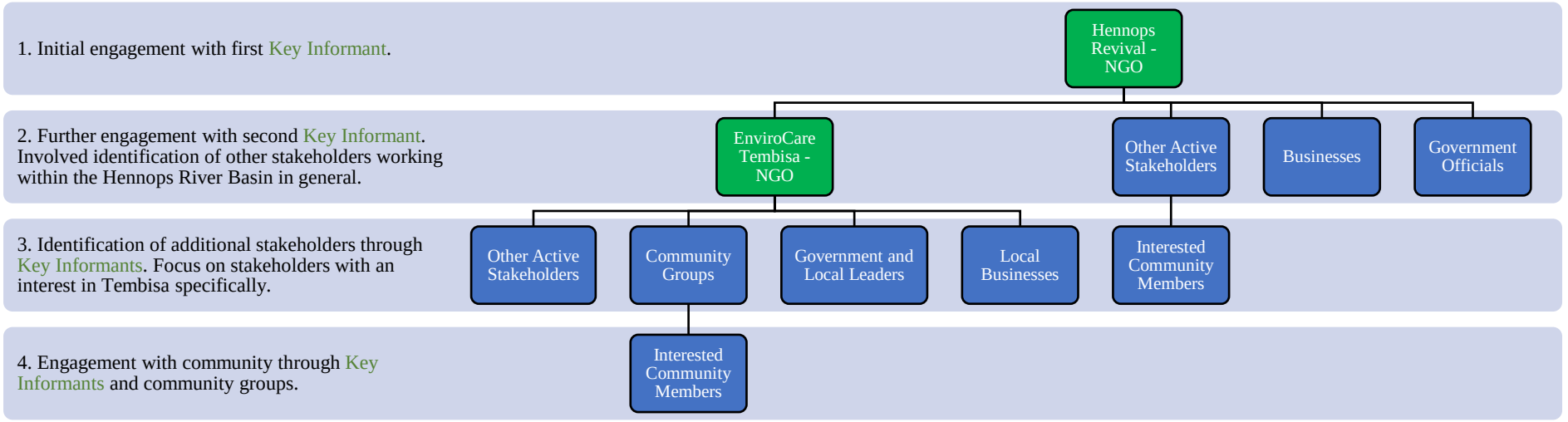


Figure 4.2. Resulting sample identified through the application of sampling strategies. Key Informants highlighted in Green.

Source: Researcher's own diagram (2024)

Figure 4.2 illustrates the sampling strategy and its results in terms of defining a representative sample. As a point of departure, Key Informants played a key role in connecting the researcher to other potential participants. Hennops Revival, being the first Key Informant engaged was able to connect the researcher to active stakeholders, businesses, and government officials who have an interest in the Hennops River Basin. One example was EnviroCare Tembisa. Through EnviroCare Tembisa, more participants were engaged and encountered such as local businesses, local leaders, and various community groups and forums. Finally, through these community entities, the community of Tembisa could be sampled and interested community members were identified. The resulting sample included initial stakeholders which eventually became the key informants of this study.

4.3.2 Data Instrumentation

A range of data instrumentation was deployed to gather data from the identified study sample. As supported by Tracy (2019), different instrumentation exists to aid the researcher in their efforts to gather qualitative data for the purpose of addressing set research questions. The nature of this instrumentation should allow for flexibility of the study. As the sampling strategy of this study was implemented, and the study sample was identified, various tools such as semi-structured interviews, focus group discussions, and engagement activities were deployed with and through Key Informants. This section discusses the various data instrumentation selected and deployed.

a) Literature Appraisal

As a key step before the deployment of various data instrumentation on the identified sample, a literature appraisal was conducted. A literature appraisal or rapid appraisal was implemented for the gathering of background information. A rapid appraisal has been considered valuable as it allows for the gathering of information from literature sources in a determined timeframe (Crowther *et al.*, 2010; Ganann *et al.*, 2010). A literature appraisal aided in establishing what some of the current policies and frameworks in place are, which have a bearing on the lives and activities of the community of Tembisa. This was achieved prior to engagement with Key Informants, stakeholders, and the community.

Different academic journals, research papers, books, and statutes were considered as part of this literature appraisal. An online search was conducted through which relevant research papers and academic journals were identified which addressed IWRM, IRBM, and Public

Participation in the context of the Hennops River Basin, and River Basin Management in South Africa. Several pieces of legislature were then reviewed, identifying key themes which correspond to institutionalised frameworks towards IWRM and CBNRM in River Basin Management. Legislation included the National Environmental Management Act (107 of 1998), the National Water Act (36 of 1998), as well as National Water Resources Strategy 2 and 3 (NWRS2 and NWRS3).

The appraisal of literature allowed for the establishment of the context of the current study. It allowed for the identification of key areas of research which could be further explored through the deployment of the other data instrumentation of this study. A Literature appraisal also allowed for the situating of River Basin Management in the context of current policies and frameworks of which evidence of implementation was to be verified through the deployment of ground-truthing as another data collection tool.

b) The Case Study

As a crucial part of its methodology, this study involved case study research. Collins (2018) articulates the concept of the case study as a data instrument in a clear fashion. In this regard, Collins (2018) states that the case study is the consideration of a single unit, in this case, the Hennops River Basin. Case studies such as this allows the researcher to explore different challenges and opportunities, while observing relationships and connections. Collins (2018) further affirms that case study research holds a special place as a data instrument, as different case studies yield different data.

Following Collins (2018) case study method, the following steps were involved while studying the Hennops River Basin. Firstly, an understanding of the present situation was established through ground-truthing, site visits, and guided tours. Background information was also gathered through a literature appraisal, as previously highlighted. The methodology adopted does not test any hypotheses as Collins (2018) considers. However, the methodology uses the case study as a basis of application for other data instrumentation. As will be discussed, the case study offered unique opportunities for engagement and data collection through the different stakeholders involved.

c) Key Informants

It is important to acknowledge the vital role Key Informants have played in this study. As a preliminary step in the sampling process, Key Informants were identified, through whom data

collection was conducted among other stakeholders and the community. As supported by Leedy & Ormrod (2005), key informants can be described as participants who provide insight to address research questions. Furthermore, Leedy & Ormrod (2005) are of the opinion that key informants facilitate contact with other potential participants. Key informants played a vital role in this current study and its PAR methodology. The key informants of this study guided the researcher to different stakeholders, community members, and other organisations. Part of their participation also included organising different engagement activities such as clean-up campaigns. The researcher also followed the activities of key informants themselves to gather information about their influence and role in water resource management and the management of the Hennops River Basin.

Key Informants engaged in this study were from two NGO groups who are actively involved in different interventions and engagement activities. Through their own initiatives and agency, Hennops Revival and EnviroCare Tembisa continue to engage interested stakeholders and community members in addressing some of the challenges the Hennops River Basin faces. A brief profile of each Key Informant is presented below.

Hennops Revival – Hennops Revival is an NGO primarily working in the Centurion area addressing the pollution of the Hennops River. Hennops Revival engages in clean-up campaigns several times a month, working to encourage the participation of the Centurion community in managing the Hennops River. Hennops Revival includes a small team; however, the NGO also has an employed staff. The initiatives of Hennops Revival are supported by a large community which includes several businesses, government representatives, and other NGOs such as EnviroCare Tembisa. Hennops Revival facilitated initial engagement with stakeholders. It was through this initial engagement that EnviroCare Tembisa was identified.

Although Hennops Revival did not facilitate engagements in Tembisa, the researcher participated in activities organised by Hennops Revival in the Centurion area to gain an idea of the influence and potential of the NGO. At the same time, one of the activities engaged in with Hennops Revival included a clean-up campaign in the Tembisa area. This was a key experience which allowed for a comparison between the influence of Hennops Revival versus EnviroCare Tembisa.

EnviroCare Tembisa – EnviroCare Tembisa works in the Tembisa area as an environmental activist group addressing several challenges the area faces. Most notably, EnviroCare Tembisa

engages in dialogues with local leaders as well as municipal representatives to address waste and water resource management challenges. As part of their efforts EnviroCare Tembisa engages in community workshops, clean-up campaigns, awareness workshops, training workshops, among other activities to help empower the community to address Tembisa's environmental challenges. The NGO is very small consisting of a core team of less than 10 people.

Engagement with this Key Informant allowed the researcher to access information about Tembisa's environmental situation as well as how the environmental challenges of the community affect the Kaalspruit tributary, and therefore the Hennops River Basin. Many of the engagement activities highlighted in this chapter were facilitated and supported by EnviroCare Tembisa. Ground-truthing and fieldwork in the Tembisa area was likewise facilitated by EnviroCare Tembisa who guided the researcher to the key sites visited as previously discussed. Dialogue with local leaders and community members of Tembisa was also facilitated by EnviroCare Tembisa. Several interview opportunities were made possible through events initiated by EnviroCare Tembisa, but at the same time, the Key Informant also guided the researcher to stakeholders of interest. The Key Informant played a critical role in the data collection of this study and their participation is exemplary of the application of PAR in the current study.

d) Ground-truthing

The concept of ground-truthing is best described as a method which involves field observations to validate or triangulate remotely sensed findings (Carp, 2008). The method has been increasingly used in social science research. The value of ground-truthing has been demonstrated in the past regarding studies involving communities (Caspi & Friebur, 2016). At this point in the research design, much of the activities of this study had been desktop-based, for example, establishment of a sampling strategy and literature appraisal. Findings had to therefore be triangulated and verified through engagement with the various social actors and locations in question.

Several ground-truthing exercises were conducted in the form of field trips over a period of eight months. These were facilitated by Key Informants who introduced the researcher to some of the most challenged sites along the Kaalspruit tributary and other locations within the area. Key sites visited are listed in Table 4.1 and include five locations. Included in Table 4.1 is a description of the site as well as an overview of some of the perceived challenges the site faces.

For the most part, these sites include crossings of the Kaalspruit tributary or key locations near its headwaters. These areas are heavily polluted and face several challenges including growing urban areas and informal settlements. Through ground-truthing, a situational analysis was conducted on the study site, including the verification of information that was collected remotely. Ground-truthing guided the researcher to further sampling and the implementation of engagement activities.

e) Interviews

As Key Informants introduced the researcher to Tembisa, the researcher was also introduced to new participants who snowballed into the study's sample. Discussions with these participants were undertaken in the form of semi-structured interviews. Interviews were considered an important tool for gathering information from individuals representing different organisations, businesses, and governmental offices. Interviews are described as a method which can be employed when direct observation does not yield sufficient data (Merriam & Tisdell, 2015). Interviews can range from being highly structured to unstructured. The interviews of the current study were conducted in a semi-structured manner. Semi-structured interviews are described as one of the most effective interview types, resembling a "friendly chat" (Leedy & Ormrod, 2005).

An interview guide was drafted which included key questions to be asked during the conducting of semi-structured interviews. See Appendix 2 for the interview guide used for engagement. It is important to note that the interview guide was not followed in the same way as an interview protocol, where a rigid structure and timeframe were followed. Interviews were conducted in the most natural circumstances they could be, allowing participants to engage with the researcher freely. Further, in some instances, interviews were conducted in isiZulu or Sesotho. In these cases, Key Informants facilitated these engagements and interpreted conversations for the researcher as the interview was conducted.

Twelve main questions were included in the interview guide. These questions were mostly situated to engage the participant, introduce them to the study, and learn more about their roles and responsibilities in relation to the Hennops River Basin. While Appendix 2 lists different questions, it is important to reiterate the semi-structured format of the interviews and discussions. Further, it was noted that open-ended nature of questions, participants spent more time providing detailed responses. For example, question 8 yielded lengthy responses mostly addressing multiple viewpoints on challenges. Stakeholders, for example, listed more than one

challenge in their response. For this reason, several codes and themes could be drawn from a single response.

Table 4.1. Key locations visited during ground-truthing exercises.

Site	Description	Perceivable challenges	Co-ordinates
eSiphetweni-Vusimuzi bridge	Poorly constructed/ informal bridge crossing the Kaalspruit tributary joining a formal residential area and an informal settlement.	• Heavily polluted part of the Kaalspruit. • Area affected by poverty. • Associated with one of the biggest informal settlements in Tembisa.	26°1'59.39"S 28°12'54.12"E
Thiteng bridge	Road bridge crossing an open wetland area along the Kaalspruit. Area experiences high volumes of traffic and activity.	• Heavily polluted wetland area. • Associated with large-scale dumping.	26°1'20.21"S 28°12'15.24"E
Tafeni bridge	Pedestrian bridge crossing a section of the Kaalspruit. Characterised by an open wetland area.	• High levels of litter • Accumulation point of waste along the Kaalspruit.	26°1'43.98"S 28°12'34.62"E
Phomolong slough	A slough along a large residential area and informal settlement. Area is situated at one of the highest points within the Kaalspruit's catchment.	• Characterised by illegal dumping directly outside households. • Observed discharge of effluent into slough joining Kaalspruit headwaters.	Start: 26°2'9.74"S 28°10'53.50"E End: 26°2'10.74"S 28°11'16.04"E
Thami Mnyele Heritage Park	A large open area along a stream part of the headwaters of the Kaalspruit tributary.	• Area Experiences high levels of erosion. • Also affected by sand mining activities	26°0'58.23"S 28°12'54.41"E

Source: Research data (2022)

Interviews allowed for each participant, that is, organisation, business, government office, and community group to be screened and assessed, allowing for further conceptualisation. A background understanding of the different key stakeholders and community members therefore informed the nature of subsequently implemented data instrumentation. Interviews therefore allowed for the creation of stakeholder profiles, which subsequently allowed for further engagement through Focus Group Discussions in the form of meetings and workshops.

f) Focus Group Discussions (FGDs)

After understanding the study sample and the representation thereof, a series of focus group discussions were engaged in. These took the form of meetings with community members and stakeholder workshops. The formation of focus groups and subsequent conducting of focus group discussions is a highly acclaimed method used for qualitative data collection (Merriam & Tisdell, 2015; Tracy, 2019). Focus group discussions is valued and is supported as a method through which a large amount of data can be rapidly generated (Hennink, 2014). Focus group discussions consist of the formation of a group of identified individuals who are then asked to participate in a group sharing activity. Focus group discussions are valuable since different views are shared within a group setting, allowing other participants to elaborate, corroborate with, and or share additional information (Hennink, 2014). Focus group discussions also allow for others in the group to understand collective viewpoints which then can be used to initiate mobilisation or the formation of action plans. The creation of focus groups is also a more efficient way to gather viewpoints which reflect the sentiments of collective populations. Furthermore, focus groups allow participants to brainstorm different solutions to problems they highlight.

Following an establishment of community and stakeholder profiles, different meetings were planned for the engagement of representatives with similar interests. Focus group discussions centred around three main groups, that is, (1) the community of Tembisa, (2) key stakeholders with an interest in, or actively engaging with the Hennops River Basin's wellbeing, and (3) small-scale stakeholders working in and around Tembisa. A community meeting was organised, engaging some of the community members introduced to through interviews and ground-truthing, as well as other interested community members. Key stakeholders themselves were engaged through stakeholder workshops. Table 4.2 Provides a breakdown of the different meetings held as Focus group discussions, who the focus group of these events were, and how many individuals were involved.

Table 4.2. Different FGDs, groups of interest, and no. of participants.

Event	Group of Interest	No. of Participants
Community Meeting	Community of Tembisa	>50
Stakeholder workshop (round table discussion)	Key Informants	10
Broader stakeholder workshop	Key informants, businesses, and other stakeholders.	>50

Source: Research data (2022)

The community meeting was open to all interested community members and was led by the key informant of EnviroCare Tembisa. Community members were offered the opportunity to share their own experiences and sentiments around waste management, water resource management, and the general management of their urban spaces in relation to the Kaalspruit tributary. Figure 4.3 is a photograph taken during the community meeting. Essentially, this focus group discussion aimed at understanding the role of the community in River Basin Management and to encourage attendees to reflect on this. The meeting was attended by more than 50 community members from different areas in Tembisa. The meeting's program was brief, being held as a single day activity from 10:00 to 13:00. The program included talks from various community groups and the researcher who facilitated discussions. As part of the workshop, preparations around clean-up campaigns were made with community members. For example, community members aided the researcher in identifying key locations of interest.

Two main engagements with stakeholders took place as part of focus group discussions. These engagements took the form of stakeholder workshops. The first workshop was attended by the Key informants, representatives from other NGO groups, religious representatives, and several key community members of Tembisa. This stakeholder meeting allowed for the identification of key stakeholders who supported and initiated subsequent engagement activities. Further, this meeting provided initial information for the researcher to better understand the context of the Hennops River Basin through an exploration of current challenges and their perceived root causes. Figure 4.4 and Figure 4.5 are photographs taken during this stakeholder meeting.



Figure 4.3. Photograph taken of community meeting held at municipal hall, Tembisa. Researcher is pictured talking to participants.

Source: Field photographs taken by EnviroCare Tembisa (2022)

The second of the stakeholder workshops was initiated and facilitated by Hennops Revival which was attended by the researcher. Hennops Revival engages a broad network of stakeholders from different areas, including other organisations working towards the management of other river basins such as the Olifants River Basin. Therefore, the researcher's engagement with this focus group allowed for the studying of river basin management beyond the Hennops River Basin. This workshop was of a larger scale, including more than 50 different representatives, from industry, activist groups, government, and the community. While these representatives may have had different profiles, all had a common interest in the Hennops River Basin's management as supporters of current activities towards improving the river basin's current conditions.



Figure 4.4. Photograph taken during first stakeholder meeting. Prof. M.D. Simatele facilitating discussions.

Source: Field photographs taken by researcher (2022)



Figure 4.5. Group photograph taken during first stakeholder meeting.

Source: Field photographs taken by researcher (2022)

g) Clean-up Campaigns

All engagement activities culminated with the hosting of a clean-up campaign, which was inspired by some of the work already being undertaken. Further, engaging in clean-up campaigns offered the researcher the opportunity to critically assess it as a tool through which stakeholders and participants can actively engage in River Basin Management. Clean-up campaigns were viewed as the height of participatory action and a key element of the PAR component of this study. As such, clean-up campaigns offered opportunities to understand the dynamics and powers which play a role in community and stakeholder action. Of interest, the different relationships between stakeholders and community members were studied through which models and frameworks could be formulated. Altogether, three separate clean-up campaigns were engaged. These clean-up campaigns took place at different locations, two of which corresponded with sites identified during ground-truthing activities.

To get a better understanding of what clean-up campaigns entail within the Hennops River basin, the researcher attended a clean-up campaign organised by the Key Informant Hennops Revival along the Hennops River itself. This clean-up campaign acted as an initial source of information gathered from stakeholders. Local government, municipal, as well as different private sector representatives were engaged with during this clean-up campaign through interviews. Individuals and groups engaged with shared their opinions on their contribution to such clean-up campaigns, as well as their interest in being part of a larger river basin management strategy. From the information gathered through this clean-up campaign the researcher was able to apply some of the lessons learned to engagements focused in Tembisa, and around the Kaalspruit tributary. Figure 4.6 is a photograph taken of a group belonging to a key stakeholder involved in clean-up activities on the day.

Considered the most important part of this study's methodology was the implementation of findings through the organisation of a clean-up campaign of the researcher's own design. Following engagement with key stakeholders through the clean-up campaign of Hennops Revival along the Hennops River, a clean-up campaign in Tembisa was initiated. This clean-up campaign was initiated by the researcher together with EnviroCare Tembisa and the University of the Witwatersrand. The campaign took place in eSiphetweni-Vusimuzi, a key location identified during ground-truthing activities and through engagement with the community of Tembisa. This clean-up campaign was attended and supported by several businesses and organisations. Further, it was endorsed by the university as one of its centenary

celebration activities. The campaign was advertised through different platforms including social media, websites, and through physical flyers and poster (Appendix 3). To inform communities, advertising was disseminated by EnviroCare Tembisa. The resulting event was attended by over 150 participants, both from the community and representatives of key stakeholders. Table 4.3 follows, listing key stakeholders who attended this clean-up campaign and their role on the day. See Appendix 4 for extended photograph gallery of this clean-up campaign.



Figure 4.6. Photograph taken at Hennops River clean-up campaign.

Source: Field photographs taken by researcher (2022)

A third clean-up campaign was then attended, which was hosted by Hennops Revival, at the Thiteng bridge, another key location identified during ground-truthing activities. This campaign was held only two days after the one hosted by the researcher, university, and EnviroCare Tembisa. Because these two campaigns were planned at similar times, parallel observations could be made, comparing the various results of these clean-up campaigns. The Thiteng clean-up campaign was spearheaded by Hennops Revival and their partners, who

included several of the same stakeholders listed in Table 4.3, but also large corporations such as Coca-Cola. This event was also facilitated by EnviroCare Tembisa, representing community-based operations working together with Hennops Revival. Figure 4.7 and Figure 4.8 are photographs taken during the campaign.

Table 4.3. List of different stakeholders who participated in eSiphetweni clean-up campaign.

Stakeholder/ organisation	**Type of Stakeholder**	**Role during event**
Dept. of Water and Sanitation	Government	Attended
Wits University	Endorsement	Collaboration
EnviroCare Tembisa	Key Informant/NGO	Collaboration
ERWAT	Private sector	Attended/Awareness
Water Research Commission	Endorsement	Collaboration
Greenpeace Africa	Private sector	Attended/Awareness
South African Police Services	Community representation	Collaboration
Ward councillors	Government	Attended
4Room	Community representation	Collaboration
Community Policing Forum	Community representation	Attended
SDA Church	Community representation	Background support
Hennops Revival	Key Informant	Background support
Meals on Wheels	Private sector	Background support
City of Ekhuruleni Municipality	Government	Background support

Source: Research data (2022)



Figure 4.7. Photograph taken of different stakeholder stalls at clean-up campaign in Thiteng, Tembisa.

Source: Field photographs taken by researcher (2022)



Figure 4.8. Photograph taken of the Coca-Cola stage set up during clean-up campaign in Thiteng, Tembisa.

Source: Field photographs taken by researcher (2022)

Clean-up campaigns allowed for the collection of observational data, through which opportunities and challenges that hamper and facilitate participation could be identified. Following interviews, focus group discussions, clean-up campaigns allowed for the identification of participatory patterns and dynamics among stakeholders and communities. The results of these clean-up were also monitored over a period of three months to evaluate their impact of the community, as well as the environment.

4.3.3 Data Analysis

Collected data represents a raw product of research which needs to be decoded to yield understandable information. For this reason, there are several ways a study can approach analysing collected data. Furthermore, the selected data analysis methods present with them their own biases just as much as data collection methods do. This section is therefore dedicated to arguing towards the value of the current study's data analysis process.

The collected data of this study were qualitative in nature. Therefore, data analysis had to include methods which have been demonstrated effective in past studies. At the same time, the data analysis methods of this study had to address the collected data, given this project's novel approach to modelling and framing River Basin Management through PAR. The data analysis methods used for this study are considered among the most effective in qualitative research. Additionally, the data analysis process employed in this study constitutes multiple steps at the end of which yield understandable information. Altogether, the data analysis process employed in this study results in the creation of models which represent the data in the best possible ways.

Figure 4.9 illustrates the data analysis process followed. The different constituents of this process is subsequently be discussed, arguing for their effectiveness to address the current study's collected data. Content analysis and thematic analysis were means through which the qualitative data gathered were processed. These steps were imperative as qualitative data alone needs to be categorised and associated to the points of enquiry needed to be explored in this study. Diagrams, flow charts, and graphs were created to represent the different findings following grouping and comparison of the processed information. An assessment of these visual representations and analysed data were then used to develop models and a framework towards River Basin Management in South Africa.



Figure 4.9. Data analysis process.

Source: Researcher's own diagram (2023)

a) Content Analysis

Content analysis is a method often employed to highlight key features and characteristics within a qualitative dataset (Leedy & Ormrod, 2005). Following the implementation of data instrumentation, data were captured either through voice recordings or note-taking. The content of these data was then analysed.

Content analysis involved transcribing, and in some cases, interpreting the information recorded through voice recording or note-taking for the articulations of participants to be represented in a clear, meaningful way. This involved a deep analysis of meaning within collected data. For example, interview data had to be analysed and unclear responses discarded or assessed more carefully for the content they include. This step was vital in the data analysis process as the resulting transcriptions of analysed data were then further analysed through thematic analysis. The researcher kept a record of written notes during events and the implementation of data collection tools. More than 600 individual responses were collected from over 250 participants. A total of 337 individual responses were extracted from these raw data. This formed the basis of the content this study draws from. These responses took the form of voice recordings and written notes in a field journal the researcher kept. Each response was then stored in a database and analysed through the process illustrated in Figure 4.10.

Figure 4.10 provides an illlustrated understanding of how content analysis was applied to an example of collected raw data. As illustrated, content analysis was necessary before different codes and themes could be abstracted from the transcribed data. As part of this process, raw data were transcribed through which transcripts of engagements were created. These transcripts were then screened for relevant information, and the rest discarded. The result of this process produced a concise response to the point of interest. Responses were then added to the study's database and associated with specific topics under which they were further analysed through Thematic Analysis.

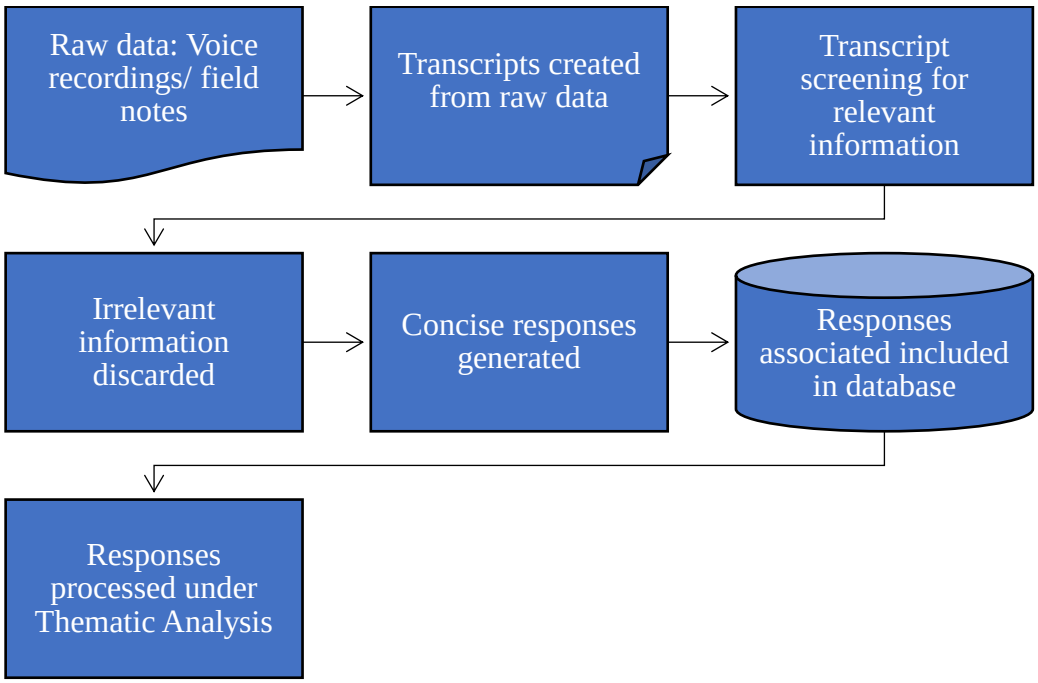


Figure 4.10. Illustration of Content Analysis process followed.

Source: Researcher's own diagram (2023)

b) Thematic Analysis

Several steps form part of a thematic analysis of data, which includes compiling, disassembly according to specific criteria, and then reassembly to generate observable trends (Castleberry & Nolen, 2018). Thematic analysis involves a complex process through which data must be analysed. This study considers the primary steps of thematic analysis and adapts it to its own context. Braun & Clarke (2021) supports a 4-step (excluding reporting) process for effective thematic analysis. This process has been adapted for the current study, including content analysis as part of the process. The resulting process is therefore presented as Figure 4.11.



Figure 4.11. Adapted Thematic Analysis process.

Source: Researcher's own diagram (2023)

As highlighted in Figure 4.11, a key difference between Braun & Clarke's (2021) thematic analysis process and the one adopted for this study is the inclusion of content analysis before familiarising oneself with the data. This step is included since before the researcher could

become familiar with the data, initial interpretations and assessments were necessary to eliminate potential misunderstandings or conflictions. After content analysis, the collected data was therefore pre-processed allowing for easier familiarisation and subsequent coding.

Familiarisation of the data is necessary to best understand the raw data through immersion. Since the data to be familiarised with has already been processed through content analysis, this step involved reading through transcriptions of data. Familiarisation was therefore facilitated through prior content analysis which generated representations of data that would be easier to understand.

Familiarisation was then followed by the coding of the data. This involves analysing data for key words or expressions which can be related to concepts or ideas of interest in the researcher's points of inquiry (Braun & Clarke, 2021). Coding involved the identification of key words and expressions in the dataset which would best represent the viewpoints and responses of participants. Resulting codes were then used to develop themes.

The development or generation of themes is a key step in thematic analysis. This step involves assessing codes for overlaps and similarity. As Braun & Clarke (2021) support, the creation of themes is essentially the clustering and collapsing of codes to associate them to broader topics worth discussing. In this context of the Hennops River basin, several areas of inquiry were of interest during data collection and therefore, generated themes resonated with these questions. Generated themes related to (1) the state of the Hennops River basin, (2) perceptions of the root causes of the observed problems and (3) the potential of stakeholders and initiatives as part of a river basin management framework. Some additional themes were also explored.

The final step in the process is the reviewing of themes. As Braun & Clarke (2021) state, the reviewing of themes is essentially a step to ensure that themes best represent the data from which they are drawn from. This step involved revisiting transcripts as well as notes and voice recordings. Essentially, this step demonstrates that the thematic analysis process was reiterative and was not a linear process as otherwise perceivable. Thematic analysis included several reviews of the data, created codes, and resulting themes, before conclusive analysed information was produced.

The different steps described were applied to the 337 individual responses extracted from the raw data collected. A table of different quotations and records was formulated. This table included associated codes for the different quotes or responses, which were then associated

with themes. These codes and themes were used to address the different research questions of this study.

c) Grouping and comparison

Before the data could be used to generate models and formulate frameworks, it was necessary to associate the data with the different groups as collectives. In other words, the different codes and themes abstracted from the database of responses had to be assessed to draw generalisations around opinions and sentiments of stakeholders and the community. To achieve the resulting codes and themes were captured in Microsoft Excel. Comparisons were visually represented as graphs to compare different codes.

d) Conceptual Models

As final resulting elements which were created following thematic analysis, grouping and comparison, conceptual models were drawn to best illustrate some of the key findings. These models were created in the form of flow diagrams highlighting perceived relationships between different themes. Further, these models were created to contextualise different findings, essentially drawing correlations between them. Holistically, the structure of these models were inspired by the precepts of stakeholder theory (Freeman, 1984; Donaldson & Preston, 1995). Models form a key feature generated from the findings of this study. From the several models generated, arguments around stakeholder engagement and community participation are presented making use of the findings of this study. Further, the models also inform the overall framework for sustainable River Basin Management in South Africa presented in this study, ultimately reviewing, and revising the generated models.

Models are the result of analysing the collected data. These conceptual models define the reality of participation as perceived in this study through the application of data instrumentation. The models are therefore compared with policy and institutional frameworks in place to best understand how policy is being implemented. Further, models also aided in understanding the relationship between different stakeholders, government, and the community.

4.4 METHODOLOGICAL REFLECTIONS

Chapter Three of this paper describes the methodology of the study, which is based on critical realism and engages with stakeholders and communities to collect data for modeling a sustainable River Basin Management framework for South Africa. This chapter highlighted the research design, data collection, and data analysis methods.

The study benefited from the funding of the Water Research Commission and the National Research Foundation, as well as the support of various stakeholders and the University of the Witwatersrand. Key Informants, especially Hennops Revival and EnviroCare Tembisa, were crucial for the sampling and data collection, such as ground-truthing, focus group discussions, and clean-up campaigns. The researcher also received guidance from their supervisor and senior academics throughout the study.

The study faced some limitations, such as the researcher's personal goal of finishing the study in two years, which required strict timelines and extra work. The researcher also started a full-time job in industry, which reduced their time for writing. The COVID-19 pandemic also affected the participation of stakeholders and communities, especially at the beginning of the study, requiring compliance with COVID-19 rules.

CHAPTER FIVE
RESULTS

5.1 INTRODUCTION

This chapter presents the empirical evidence this study makes use of to substantiate its arguments. This evidence is the result of data collection and analysis as discussed in Chapter Four. This chapter is divided into three main sections hereafter. These sections correspond with three of this study's research questions, arguing for the validity of this study's arguments based on key findings. These sections therefore discusses (1) current policies and frameworks which promote stakeholder engagement and community participation in River Basin Management in South Africa, (2) challenges in mobilising and engaging stakeholder and community participation in River Basin Management, considering lessons learned from the case study of the Hennops River Basin and, (3) the ways that participation and engagement can be modelled to effectively mobilise and involve stakeholders and communities in River Basin Management.

Different evidence is drawn from in this chapter which are the results of a literature appraisal, ground-truthing, focus group discussions, interviews, and clean-up campaigns. This chapter drew from observations, thematic analyses, as well as statistical analyses of the data collected. The data presented in this chapter represent findings which were established over the last two years of this study having engaged with literature, key stakeholders, and the community of Tembisa. Most of the data presented here is qualitative, representing the opinions of key stakeholders and the community. However, further analyses were conducted on the raw data, essentially allowing for specific statistical findings to be generated. Throughout this chapter, the names of participants have been omitted. The findings presented in this chapter represent the current state of River Basin Management in South Africa, drawing from experiences within the Hennops River Basin.

5.2 STAKEHOLDER ENGAGEMENT AND COMMUNITY PARTICIPATION IN RIVER BASIN MANAGEMENT IN SOUTH AFRICA: CURRENT POLICIES AND FRAMEWORKS

This section draws from the data collected through the appraisal of literature, as well as interviews and focus group discussions to corroborate and triangulate what policy addresses. This section firstly considers IWRM in the context of South Africa, essentially assessing the

key concept in relation to decision-making and participation. Having considered the overall stance of policy, an analysis of institutions, vertical and horizontal structures is presented. In this regard, the presence and absence of relevant structures is considered, with an overview of roles and responsibilities in relation to key stakeholders.

IWRM is a core component of South Africa's water policy (Funke *et al.*, 2007; van Koppen & Schreiner, 2014). The policy outlines several key tenets that reflect the vision and intention of the leaders and legislators for effective management of water resources. These key tenets are discussed here as the foundations of South Africa's water policy, and how they relate to River Basin Management. The different principles are explained here, followed by a contextualisation of their implications for the role of stakeholders and communities in water resource management according to current policies and frameworks.

South Africa's water policy is based on its development goal, which is to reduce poverty and redress historical inequality, as stated in the NWRS2 (Department of Water and Sanitation, 2013). Therefore, South Africa's policy framework aims to address the needs of the poor, while still adhering to international standards. The first of the key principles of South Africa's water policy is the need to incorporate IWRM in water resource management strategies. The NWRS2 does this through the principle of Developmental Water Management (DWM). DWM is defined as the need to achieve equity, sustainability, and efficiency through water resource management in South Africa, considering its status as a developing country. Together, the principle embodies the need for sustainable management of water resources, which underpins the other principles.

The second principle presented in the NWRS2 addresses IWRM directly, considering South Africa’s policy alignment with international standards. This principle was inspired by the Rio+20 Water Security Workshop, through which several threats to sustainable water resource management, their underlying causes, and potential interventions were discussed. These are captured in Figure 5.1 and becomes a vital point of consideration of this study.

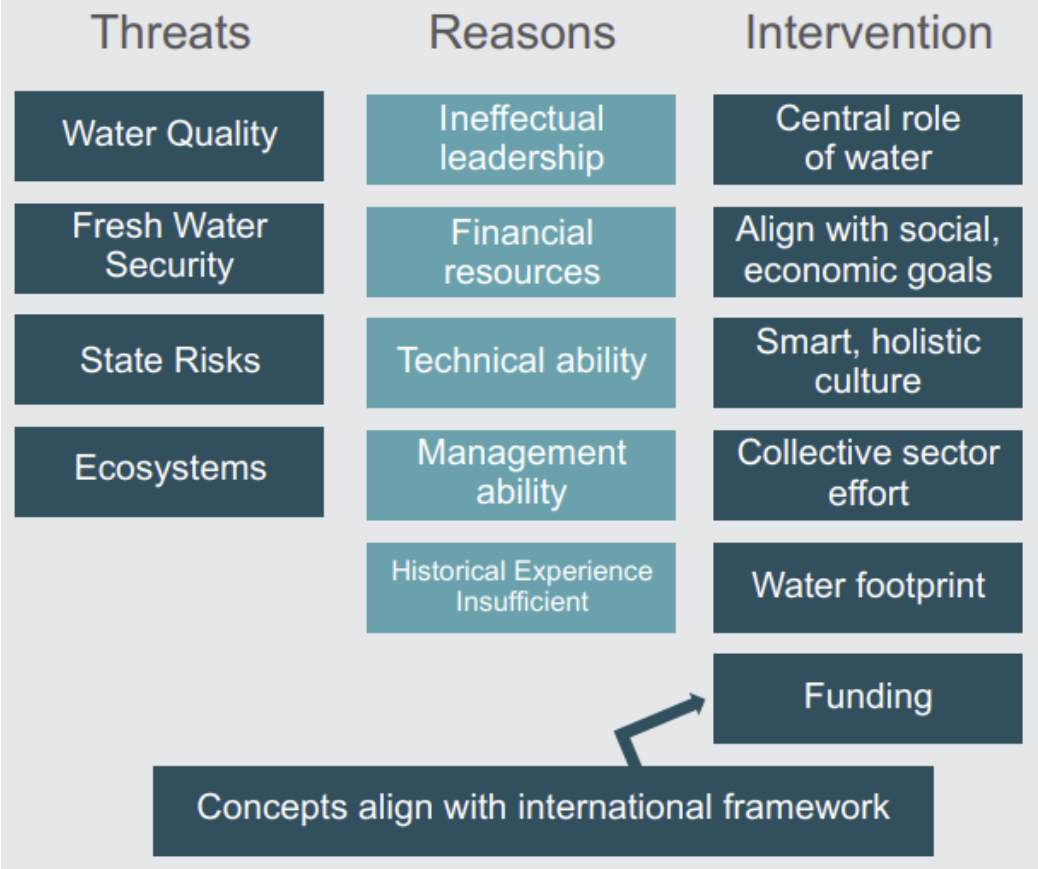


Figure 5.1. Key considerations of South Africa's water policy as inspired by the Rio+20 Water Security Workshop.

Source: National Water Resources Strategy (2013)

As captured by the NWRS2 and in Figure 5.1, two threats to sustainable water resource management resonate directly with experiences of the Hennops River Basin. These include Water Quality, and Fresh Water Security. Following these considerations, the NWRS2 also articulates some of the reasons why certain threats exist, essentially arguing for the alignment of South Africa's water policy to international standards and the need to address these reasons. Among these, as captured in Figure 5.1, is ineffectual leadership, as well as financial resources. As will be discussed, these reasons are key when considering the case of the Hennops River Basin. Finally, the argument towards this principle also includes potential interventions, with funding and collective sector effort being considered here as critical in the context of the Hennops River Basin.

It follows that the next principle relates to governance itself, essentially framed as good governance for the sustainable management of water resources. A key part of this principle will

be discussed in the next section relating to institutional roles. However, for the most part, this principle encapsulates the need for an effective institutional framework, adopting adaptive management, and promoting a business approach model of water resource management, considering potential risks. Therefore, South Africa's water policy advocates for an effective and sustainable model for water resource management, which essentially translates into similar for River Basin Management. At the heart of this principle is the role of government which is meant to address the concern of ineffective leadership which has been identified as a threat to effective water resource management.

Good governance as articulated by the NWRS2 makes provision for the need to engage the private sector. This is captured as the fourth principle upheld by South Africa's water policy. It is here where a key entity, that is the stakeholder, is identified. As discussed in this principle, the private sector is seen as an opportunity for partnership through which, water resource management can be aided. Institutions have been conceptualised to address this principle, through which stakeholders of the private sector are able to be seen as partners of government for effective water resource management. This institutional framework engaging the private sector is further discussed in the next section.

Finally, South Africa's water policy also considers the role of the community and other key stakeholders. This is embodied in the final principle arguing for the importance of participation as part of water resource management. Like the other principles highlighted above, South Africa's water policy makes provision for stakeholder and community participation through institutions. This principle upholds the need to veer away from a top-down approach to water resource management, essentially arguing for the need for decision-making to come from the public. Altogether, South Africa's water policy is a sound approach to water resource management, effectively motivating for the need of stakeholder engagement and participation. It does this through different institutions which subsequently became a point of enquiry of the current study.

5.3 CHALLENGES AND OPPORTUNITIES IN MOBILISING AND ENGAGING STAKEHOLDER AND COMMUNITY PARTICIPATION IN RIVER BASIN MANAGEMENT: LESSONS LEARNT FROM THE HENNOPS RIVER BASIN

Studying the Hennops River Basin allowed for the identification of challenges which need to be addressed through a potential River Basin Management framework for South Africa. The challenges discussed here were identified through engagement with stakeholders and communities. Following through from the last section, these challenges hinder initiatives to address the current state of the Hennops River Basin. This ultimately limits the mobilisation of stakeholders, and most importantly, the community. In this section, three of the main challenges were presented, that is, (1) funding and resources, (2) awareness and community interest, and (3) political will. This section then considers findings related to opportunities in terms of current roles and responsibilities of stakeholders.

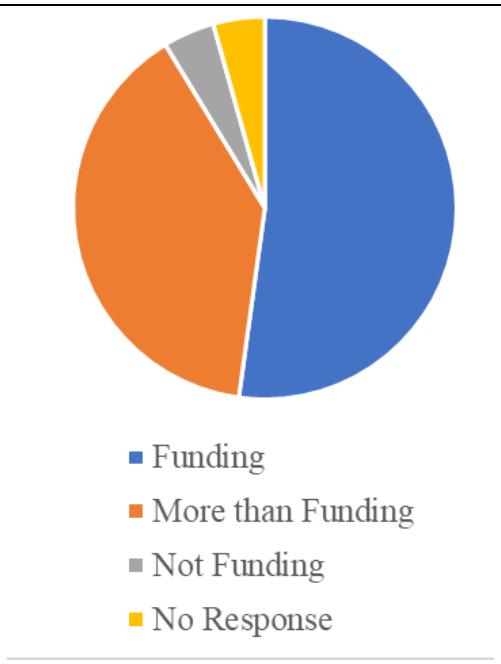
5.3.1 Funding, Support, and Resources

A theme that has been encountered numerous times during this study is the lack of funding, support, and resources. Stakeholders believed that the current state of the Hennops River Basin as well as its continued deterioration without intervention was related to a lack of support to address key challenges. Embedded in this assertion are two areas where support has been observed as lacking. These include a lack of support for the management of the Hennops River Basin, and more importantly, a lack of support attributed to participatory initiatives such as clean-up campaigns. Table 5.1 presents the opinions of stakeholders in relation to the lack of funding, support, and resources attributed to the mobilisation of stakeholders and communities.

Majority of stakeholders (52,17%) suggested that funding was the main challenge hindering the mobilisation of stakeholders and communities through participation. It is also important to note that 39,13% of participants believed that funding was a challenge, however, they also believe that funding is not the only challenge. Therefore, lack of funding as a challenge was effectively supported by 91,3% of all stakeholders engaged. It is important to note that the community was not engaged in relation to funding as it was contemplated that stakeholders would be in a better position to provide information on this topic given their involvement around this area of interest. This challenge was further explored through the codes extracted

from the data collected to understand how stakeholders interpret the role of funding in River Basin Management. These codes and example responses are presented in Table 5.2.

Table 5.1. Stakeholder sentiments towards lack of funding as a challenge hindering mobilisation.

Type of Response	No. of Responses	%	Visual Representation
A lack of funding and support hinders mobilisation	12	52,17	
Mobilisation is dependent on more than funding and support	9	39,13	
Funding is not the problem hindering mobilisation	1	4,35	
No Response	1	4,35	
Total	23	100	

Source: Research data (2022)

Exploring Table 5.2, stakeholders shared different opinions in terms of funding and how it may relate to the overall management of the Hennops River Basin. Some of these opinions related to the lack of funds to maintain infrastructure and manage pollution through the provision of services. Some have also attributed this lack of funds to government. This lack of funds and support has also been related to the overall inability to implement plans of action. This ultimately relates to key codes identified in the data, that is, the lack of funding for mobilisation, and the lack of funding for community engagement.

Table 5.2. List of codes and example responses in relation to lack of funding as a challenge hindering mobilisation.

Theme	Codes	Example of Response
Lack of Funding, Support, and Resources	Lack of funds for RBM Government funding	"The government needs to provide more funds if the problem is to be solved" – Key informants
	Lack of funding hindering progress and implementation	"A plan is there, but money needs to be put into it" – FGD with stakeholders
	Lack of funds for management Lack of funds for maintenance	"Things don't work because there's no money to keep maintaining the infrastructure" - FGD with stakeholders
	Lack of funds for mobilisation	"It is difficult to keep up the work we do through clean-ups because it gets expensive" – Key informants
	Lack of funds for community engagement	"You need to offer the community an opportunity, otherwise they will not be interested" - Key informants

Source: Research data (2022)

These codes were further explored by means of engagement through clean-up campaigns. In this regard, empirical evidence was gathered in relation to the efforts and costs that go into running a successful clean-up campaign. Firstly, the Key Informants were engaged with to gather information about their own efforts and related costs. At present, the activities of these two NGO groups are self-funded. An extract from interaction with Key Informants encapsulates the current state of the management of funds for their initiatives:

> *"It is expensive […], just the day to day running of the crew I have costs me so much more than people think – and of course being an npo [sic], people automatically assume one does everything for free – and I have, and do – plenty."* (Pers. Comm. A)

Corroborating this, a different Key Informant engaged with the researcher affirming the need to establish sources of funding for the mobilisation of stakeholders and the community:

> *"It is important that we meet to discuss […] eg [sic] links to potential partners, […] and funding."* (Pers. Comm. B)

Altogether, the above highlights the nature of the challenge at hand in relation to a lack of funding for continued and the sustainable mobilisation of stakeholders and communities. Key Informants, who have assumed the role of facilitating engagement and participation, are challenged as their activities are not funded. For some, forming partnerships is not as easy and has therefore left a gap of opportunity through which key stakeholders can be engaged to participate in the management of the river basin. To further engage with this theme, some observations regarding the researcher's own clean-up campaign are worth drawing from.

After engaging with Key Informants and their challenges related to support and funding of participatory activities, the researcher's own clean-up campaign offered several opportunities. These relate to data triangulation and verification of the concerns of Key Informants. By hosting a clean-up campaign of their own, the researcher was able to gain an appreciation for what goes into the planning and preparing of a successful clean-up campaign. Further, it is important to consider that while the researcher hosted one such campaign, the Key Informants each host several throughout the year, often more than one per month. Several considerations need to be made when hosting a clean-up campaign. Table 5.3 lists some of the basic considerations which go into planning a clean-up campaign, most of which require funds to accomplish.

As listed in Table 5.3, to host a clean-up campaign, several basic considerations need to be achieved through either self-funding or through sponsorship. In the case of the researcher's clean-up campaign, these items were all self-funded making the endeavour unsustainable as an ongoing initiative. Therefore, without considering some of the more complex items needed to mobilise stakeholders and communities, a source of funding or sponsorship would facilitate initiatives. However, in the case of the Hennops River Basin, partnerships are yet to be

established, and funding remains a critical element hindering the ongoing engagement and participation of stakeholders and the community.

Table 5.3. A list of the basic items or considerations needed when planning a clean-up campaign. Red=Needs Funding, Orange=May be possible without funding or through sponsorship.

Item	Description	Funding/ Sponsorship?
Advertising and branding	To ensure that participants are aware of the upcoming event	
Equipment	Personal Protective Equipment for participants.	
Refreshments	To ensure participants are well nourished and their health is not affected by the nature of the work involved.	
Shelter/ Protection from sun	Provision of a space where participants can cool off	
Temporary sanitation	Portable toilets are needed at certain locations.	
PA System/ Speakers and a microphone or megaphone	To ensure that all participants are aware of proceedings throughout the day and to communicate rules	
Rules and indemnity	To ensure that all participating in activities are fully aware of potential dangers	

Source: Research data (2022)

5.3.2 Community Awareness and Interest

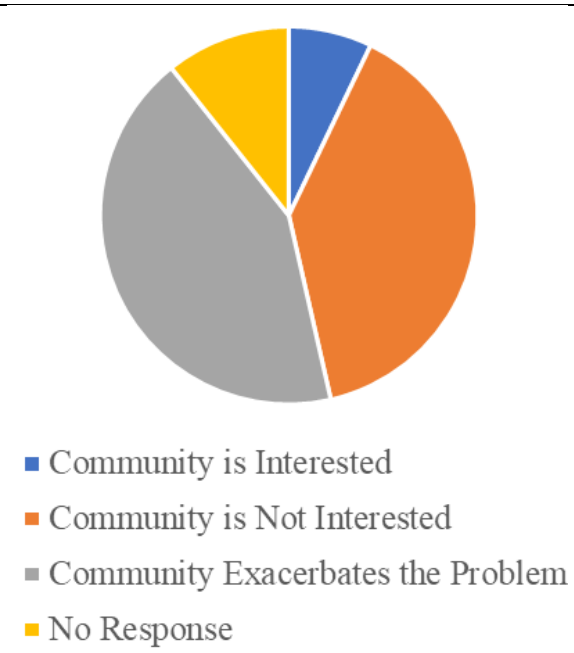
While funding can be considered a challenge mostly related to the activities of key stakeholders, it was evident that other challenges prevent the community from participating in activities meant to mobilise them. As a challenge hindering the mobilisation of the community of Tembisa itself, a lack of awareness, or rather a lack of interest was identified. Following from the discussion of the lack of funding, it was highlighted that not all stakeholders believed that mobilisation was hindered by lack of support and funding alone. Among these stakeholders were some who believed that mobilisation was also linked to the interest of those being mobilised. For this reason, further assessment of this point was conducted.

Firstly, stakeholders themselves were asked about their understanding of the community's interest in participating in River Basin Management. This was aimed at assessing how stakeholders view and interact with the community. Four key responses were obtained through engagement with key stakeholders about the interest of the community in the management of the Hennops River Basin. These responses and the number of stakeholders who resonate with them are presented in Table 5.4. As observable in Table 5.4, a mix of different responses emerged from engagement with stakeholders about community interest. Further, stakeholders were not only of the opinion that communities are interested or not interested. Instead, some stakeholders suggested that communities were to blame for the River Basin Management challenges altogether.

Stakeholders perceive the community interest or awareness to be a challenge to mobilisation towards River Basin Management. This accounted for 82,14% of stakeholders engaged. However, this percentage includes two different viewpoints. Firstly, some stakeholders (39,29%) perceive the challenge to be related to a lack of interest from the community. At the same time, majority of stakeholders (42,86%), perceived the challenge as related to the community itself and their activities which affect the river basin. In this regard, stakeholders considered the community as a key player in the challenges the Hennops River Basin faces, both hindering mobilisation but also contributing to the worsening of conditions through their ongoing activities such as illegal dumping. An extract from discussions with a stakeholder captures these sentiments, emphasising the disconnect between stakeholders and communities:

> *"The community is not aware of the problem they are creating. They just keep dumping and polluting the river and no-one does anything about it."* (Pers. Comm. C)

Table 5.4. Stakeholder sentiments towards community awareness and interest in River Basin Management.

Type of Response	No. of Responses	%	Visual Representation
Community is interested	2	7,14	
Community is not interested	11	39,29	
Community exacerbates the problem	12	42,86	
No Response	3	10,71	
Total	28	100	

Source: Research data (2022)

Having established that the relationship between the community and stakeholders is problematic, the community itself was engaged to ascertain their views on River Basin Management, their role, and their relationship with key stakeholders. Several codes were extracted from engagement with the community which adds to the discussion around the role of the community. This is presented in Table 5.5. A different understanding is derived from engagement in this regard that demonstrates the disconnect between the community and key stakeholders.

Table 5.5. List of codes and example responses gathered through engagement with community on their role in River Basin Management.

Theme	Codes	Example of Response
Role of the Community in River Basin Management	Awareness of problem	"We see the problem everyday" – FGD with Community
	Feelings of helplessness Fear of community unrest	"What can we do about this? We can't stop people from doing what they want" – FGD with Community
	Disinterest in participation Responsibility attributed to government	"This is not our responsibility. It is government that needs to sort this out" – FGD with Community
	Need for incentives	"What will you give us if we help to clean this river?" – FGD with Community
	Interest in participation Feelings of anger	"We are never involved in these things, even if we want to help. It upsets us a lot" – FGD with Community

Source: Research data (2022)

As presented in Table 5.5, a mix of different codes were associated with the community's role in River Basin Management. To start, the community is aware of the problem. After ground-truthing activities, it is hard to imagine otherwise as the pollution problem affects a large part of the community. Although the community is aware of the problem, feelings of helplessness are present, suggesting that the community is not aware of how they can participate. At the same time, the community is afraid to address the problem themselves in case their actions have negative social impacts on their own lives. In contrast, some sentiments in the community suggest that some members are not interested in River Basin Management altogether. In this

sense, some community members feel that River Basin Management should be the responsibility of government. This essentially highlights a lack of awareness in the community of their potential.

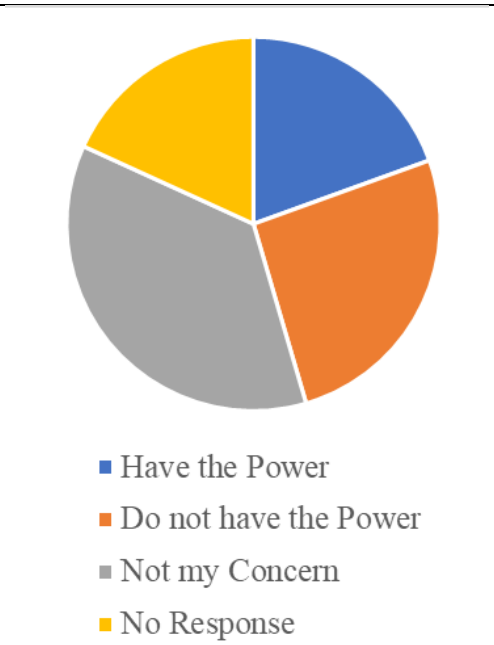
This lack of awareness is also characterised by two different sentiments. Firstly, while there is an interest in participation, some community members feel angry for not being involved in some of the work Key Informants do in the community. To complexify this, community members also seek incentives should they be mobilised for activities such as clean-up campaigns. This essentially suggests disjointed sentiments within the community which ultimately conflict. Some of these codes were therefore assessed further considering some of the data which emerged during engagement. It was critical to establish how the community positions itself in relation to River Basin Management and their capacity.

While the community was encouraged to contemplate their awareness of the pollution challenge, further engagement necessitated the reflection on their role in either addressing the problem or contributing to it. During focus group discussions, the community of Tembisa was engaged, and observations made about their understanding of their own role and potential in participatory efforts. Table 5.6 presents some of the responses of the community, and how many participants resonate with these. As a general sentiment, most community members believe that they do not have any power to address River Basin Management. Considering only those who believe they do not have the power; this accounts for 25,97% of the sample. However, a further 36,36% of participants believed that the wellbeing of the Kaalspruit is none of their concern. Altogether, this accounts for 62,33% of participants who feel that they are estranged from River Basin Management. This does not account for the 18,18% who did not respond. Altogether, a very small proportion of participants are aware of their potential to contribute to River Basin Management, with the majority, either oblivious or ignorant of their capacity.

Key observations were made during clean-up campaigns, which contextualise the above understandings. During all clean-up campaigns, the participatory role of communities was limited. Although codes and responses suggest that some community members were eager to participate in clean-up campaigns, observations suggest that participants were mainly key stakeholders and not the community. Instead, the community was often observed as bystanders, confused and afraid to engage in the activities. These observations were also corroborated with stakeholders who participated in clean-up campaigns who remarked on the lack of support

garnered from the community. While this contrasts with the idea that some community members would like to participate and consider that they have the power to do so, it corroborates with the notion that some feel they do not have the power. Further, it resonates with the views of those who feel that the Hennops River Basin's wellbeing is none of their concern.

Table 5.6. Community sentiments towards their own capability to address River Basin Management.

Type of Response	No. of Responses	%	Visual Representation
I have the power to address the river's problem	15	19,48	
I do not have any power to solve the river's problem	20	25,97	
The river is not my concern	28	36,36	
No Response	14	18,18	
Total	77	100	

Source: Research data (2022)

In relation to the above considerations of how the community views their own capacity, two contributors were identified, drawing from codes previously identified. Firstly, because the community is poor and has been a victim of socio-political challenges in the past, communities

do not find value in contributing to the wellbeing of the already degraded and deteriorating state of Tembisa. Instead, their concern rests within their own households. If they were to be approached for their contribution through mobilisation and participation, members of the community would expect to receive an incentive for their time. Secondly, it is understood that some members are afraid to engage as they believe this goes against what government intends as most engagement activities in these areas are hosted by NGOs. Therefore, a deeper fear of authorities and social exclusion exists, ultimately limiting or deterring community interest.

5.3.3 Political Will

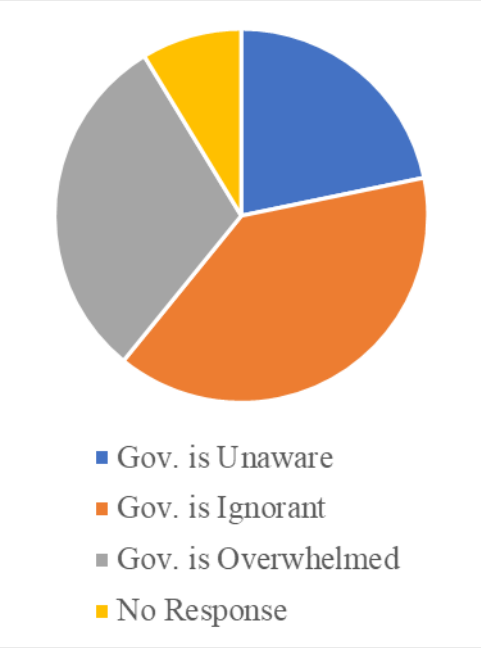
In as much as NGOs continue to mobilise and engage stakeholders and communities, it was necessary to reflect on the role of government. It was ascertained that community members fear government. This has ultimately had a bearing on their participatory role. Government itself was therefore contemplated in the context of the Hennops River Basin, Tembisa, and River Basin Management. Earlier in this chapter, government was highlighted when considering the different policies which are meant to steer River Basin Management. In essence, governmental institutions should be overseeing activities within the river basin, while inspiring the public to make decisions and act upon them. However, the reality of the Hennops River Basin demonstrates otherwise, with stakeholders and communities providing their input on how they perceive government.

Firstly, key stakeholders were engaged and asked to share their experience in relation to government. Included in this sample were government representatives themselves. As observable in Table 5.7, stakeholders share several sentiments around the role of government in the management of the Hennops River Basin. Accounting for 39,13% of participants, stakeholders share the view that government is ignorant of the reality the river basin faces. At the same time, some stakeholders (21,74%) feel that government is unaware of the challenges the river basin faces, suggesting that areas such as the Kaalspruit is not interacted with by government. While the two points are fairly contrasting, several stakeholders (30,43%), including some government officials, believe that government is overwhelmed. This point exemplifies the idea that government institutions is unable to cope with the amount of responsibility attributed to them.

To triangulate these findings, several codes were identified while engaging with the community. These are presented in Table 5.8, suggesting that some opinions are shared by

stakeholders and community members alike. As evident through several identified examples, the community has a strong opinion of the government. However, most associated codes suggest corroboration with the view that government is either aware or unaware of the challenges, but do not act. Therefore, government is either ignorant of the challenges or are too overwhelmed to deal with them. Because of their inability to address challenges the river faces, government has not been active in the mobilisation of the community, therefore creating a disconnect between themselves and the community. This adds to the notion that political will is a challenge currently hindering River Basin Management, with the role of government remaining undefined in relation to the mobilisation of stakeholders and communities.

Table 5.7. Stakeholder sentiments towards role of government in River Basin Management.

Type of Response	No. of Responses	%	Visual Representation
Government is unaware of the challenges	5	21,74	
Government is ignorant of the challenges	9	39,13	
Government is overwhelmed	7	30,43	
No Response	2	8,70	
Total	23	100	

Source: Research data (2022)

The challenge of political will also manifests itself in other ways, such as the lack of service delivery observed within the community of Tembisa. This challenge has exacerbated the problem altogether. Coupled with government's inability to mobilise stakeholders and communities, the impact of the lack of political will within the Hennops River Basin is

considered a main contributor to the challenges that hinder a participatory approach to addressing River Basin Management. Therefore, the role of government needs to be considered when formulating a model through which stakeholders and communities can be actively engaged through participation.

Table 5.8. List of codes and example responses gathered through engagement with community on the role of government in River Basin Management.

Theme	Codes	Example of Response
Role of Government in River Basin Management	Ignorance of government Government unaware	"Government does nothing for us" – FGD with Community
	Ignorance of government Government aware	"[Government] knows about the problems, but do nothing about them" – FGD with stakeholders
	Ignorance of government	"Government doesn't care" – FGD with stakeholders
	Government aware Government overwhelmed (?)	"We have complained [to government], but this leads nowhere" – Key Informants
	Government overwhelmed	"Government needs help to sort these issues out" – Key Informants

Source: Research Data (2022)

5.3.4 Institutions and Current Roles and Responsibilities

Through the literature appraisal, several key institutions were identified in policy which have different roles and responsibilities allowing for effective and sustainable water resource management. These key institutions are listed in Table 5.9 together with their targeted group of interest, as well as roles and responsibilities. Further, following interviews and focus group

discussions, the status of these institutions was also confirmed. This is also presented in Table 5.9.

Table 5.9. Different institutions promulgated by South Africa's water policy in relation to the Hennops River Basin. Status: Green = Established, Red = Non-existent.

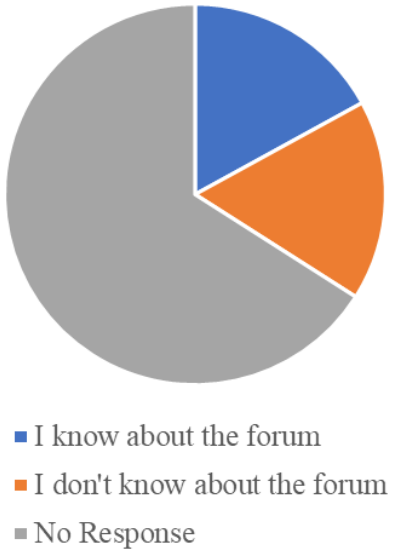
Institution	Group of Interest	Roles and responsibilities	Status
Catchment Management Agency	Government	An institution established to address the management of a WMA. It is recommended that the institution be established by the public following consultation.	
Strategic Water Partnerships Network (SWPN)	Private Sector	A partnership of private sector representatives and government. This institution is meant to act as the bridge between government and interested private sector stakeholders.	
Hennops River Forum	Community	An institution facilitating public participation in water resource management. The forum is meant to represent the decisions of the community and key stakeholders.	
Water User's Associations	Water Users and Key Stakeholders	An institution put in place to manage water resources, facilitating water governance on the ground.	

Source: Research data (2022)

After further investigation, it was ascertained that two of the four institutions promulgated by policy are active within the Hennops River Basin. These two include important institutions meant to facilitate stakeholder engagement and community participation. Their activity within the Hennops River Basin was investigated through engagement with relevant Key Informants, key stakeholders, and the community of Tembisa. Specifically, it was necessary to assess if

stakeholders and communities were aware of the existence of these institutions. Focus was put on the Hennops River Forum and their relationship with Tembisa. Table 5.10 details some of the responses attained through engagement with the community and key stakeholders.

Table 5.10. Stakeholder and community awareness of the Hennops River Forum.

Type of Response	No. of Responses	%	Visual Representation
I know about the HR Forum	16	17,02	
I do not know about the HR Forum	16	17,02	
No Response	62	65,96	
Total	94	100	

Source: **Research data (2022)**

As articulated in Table 5.10, an even mix of responses were received regarding stakeholder and community awareness of the existence of the Hennops River Forum. In this regard, 17,02% of participants indicated that they are aware of the presence of the forum, while 17,02 of participants indicated that they were unaware of the institution's presence. Above and beyond this, majority of participants (65,96%) did not have a response, as they were unaware of the role of such an institution. This large number reflects mainly community members and community groups in Tembisa who are otherwise not engaging with the Hennops River Forum.

Further engagement explored the role of the Hennops River Forum considering the viewpoints of key stakeholders. Following investigations, the Hennops River Forum represents the decisions and viewpoints of the community around the Hennops River itself, and not the entirety of the river basin, given that the forum itself is represented by a small group. Further, this forum does not have the support necessary to address the concerns of the entire River

Basin. These sentiments are captured in Table 5.11 considering codes identified through engagement relating to the role and responsibility of the Hennops River Forum.

Table 5.11. List of codes and example responses in relation to the role and responsibility of the Hennops River Forum.

Theme	Codes	Example of Response
Role and Responsibility of the Forum	Existence of the forum Perception of the forum	"The forum exists, but not much can be said about them" – FGD with stakeholders
	Area of influence/focus Active around Hennops River Active in Centurion	"They are more active around the Hennops River and Centurion" – FGD with stakeholders
	Potential of a forum	"The forum was meant to be much more than what they are" – FGD with stakeholders
	Lack of support Plan of action or agenda	"They have a plan, but they need support" – FGD with stakeholders
	Reconceptualising the forum Redefining roles	"We need to rethink the role of the forum" – FGD with stakeholders
	Uncertainty Lack of clearly defined role	"I don't think I can say much about the forum" – FGD with stakeholders

Source: Research data (2022)

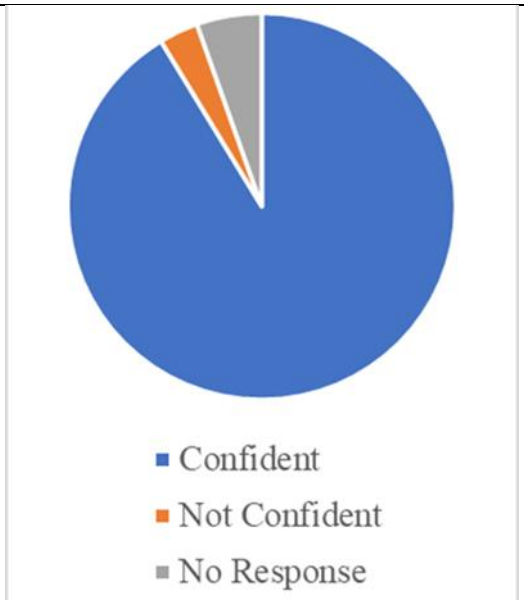
As seen in Table 5.11, the role and responsibility of the Hennops River Forum was defined as per the viewpoints of stakeholders. Several responses were exacted from these engagements,

suggesting that the forum has been interacting with stakeholders. Although stakeholders acknowledge the existence of the forum, stakeholders suggest that its role is limited because of lack of support, and lack of resources to carry out their responsibility. Further, some stakeholders, particularly those working in Tembisa have not engaged enough with the forum and believe that its work has not much to do with their activities along the Kaalspruit tributary.

The above sentiments have led to different stakeholders working independently of the Forum or any institution prescribed by legislation. As a result, these stakeholders have assumed the role of addressing the interests of the community. This is particularly observable in Tembisa, where EnviroCare Tembisa has assumed most of the responsibility of the Hennops River Forum along the Kaalspruit tributary. Further investigation corroborated these observations demonstrating that stakeholders and community members are confident in the work that such representatives do. Table 5.12 captures the type of responses gathered relating to stakeholder and community sentiments around the role of key groups such as EnviroCare Tembisa and Hennops Revival.

Stakeholders and the community express overwhelming confidence in the work that groups Hennops Revival and EnviroCare Tembisa do for the wellbeing of the Hennops River Basin. Majority (91,3%) of participants expressed their confidence in the work of the two NGO groups. This contrasted dramatically with those who expressed no confidence (3,27%), or those who did not have a response (5,43%). For the most part, those who did not have a response were unaware of the work the organisations were doing and could therefore not provide an opinion. In terms of those who were confident, these stakeholders expressed continued interest in the activities of the organisations, some of whom also stated that they support the activities in any way possible. While this may be true to some degree, the work of organisations is still under-supported with both organisations needing to fund their own activities. In this regard, the few responses expressing a lack of confidence, or no confidence in the work of the two NGO groups is based on this point. In essence, some stakeholders are of the opinion that some challenges still exist which must be considered as a hindrance to the potential of the two stakeholder groups and their activities.

Table 5.12. Stakeholder/ Community confidence in key stakeholder groups, Hennops Revival and EnviroCare Tembisa.

Type of Response	No. of Responses	%	Visual Representation
I am confident in the work of the organisation	84	91,3	
I am not confident in the work of the organisation	3	3,27	
No Response	5	5,43	
Total	92	100	

Source: Research data (2022)

5.4 TOWARDS THE MODELLING THE EFFECTIVE MOBILISATION OF STAKEHOLDER ENGAGEMENT AND COMMUNITY PARTICIPATION FOR SUSTAINABLE RIVER BASIN MANAGEMENT

The above findings present several opportunities and challenges for the modelling of a sustainable framework for the management of the Hennops River Basin. In essence, several considerations must be applied drawing from the information learned through engagement in this study. These related to (1) the role of legislation, (2) the role of key stakeholders, (3) community interest or disinterest, and (4) the role of government. Although this is further discussed in Chapter Six, some observations need to be considered in the context of the Hennops River Basin prior to the presentation of the models this study has formulated for River Basin Management on a national level.

As observed in the case of the Hennops River Basin, legislation, particularly considering the principles of the NWRS2 (Department of Water and Sanitation, 2013), is not being implemented. While some institutions exist such as the Hennops River Forum, their role is yet

to be defined, especially considering emerging challenges. Further, some opportunities exist in legislation, for example, the option to establish Water User Associations and partnerships between government and stakeholders. However, in the context of the Hennops River Basin, the guidelines of legislation, and how it is implemented on the ground is dependent on the role of key stakeholders. In the case of the Hennops River Basin, this refers to NGOs.

NGOs play a critical role in mobilising stakeholders and the community. In this regard, their role as key stakeholders needs to be considered in potential models around addressing the challenges of the Hennops River Basin. Their efforts continue to address the management of the river basin, despite being limited by the resources at their disposal. For this reason, other key stakeholders are important as they have the power to contribute resources and form partnerships with the NGOs who spearhead mobilisation. As has been observed, clean-up campaigns are effective tools through which mobilisation of stakeholders and the community can take place. However, community interest must be established or enhanced should efforts be sustainable.

As a key observation made, the sites in Tembisa which were addressed through clean-up campaigns were revisited to establish the effectiveness of these initiatives. Considering two sites, that is Thiteng, where Hennops Revival's campaign was held, and eSiphetweni-Vusimuzi, where the researcher's campaign was held, different results were observed. These results were highly based on the amount of effort and resources put into follow-up maintenance. After two months following clean-up, the Thiteng site was maintained in the state it was left following the initiative. Further, Hennops Revival made efforts to engage the municipality and the private sector, ensuring that the location remains maintained. It was reported that municipal waste management services visited the area removing waste which was still being illegally dumped after the campaign. Efforts were further taken to ensure that the site remains maintained through collaborations with local police forces who patrolled the area ensuring that illegal dumping does not affect the site's state. Eventually, the site was overburdened with waste once more several months later, with the local Key Informant, EnviroCare Tembisa reporting that the site was *"Back [sic] to square 1[sic]"* (Pers. Comm. D).

A similar observation was made following the clean-up campaign organised by the researcher in eSiphetweni-Vusimuzi. Not differing from Hennops Revival's efforts, the clean-up campaign was held, leaving the area in a much better state than before. However, further efforts following clean-up with not taken to ensure the site remains maintained as it was hoped that

the community would take the initiative to ensure it is maintained. However, the site returned to its former state, rendering clean-up initiatives almost superfluous. As observable in Figure 5.2, the state of the site worsens month after month after clean-up, with the site still victim to the challenge of illegal dumping. These observations demonstrate the importance of community buy-in, and meaningful participation should the efforts of key stakeholders such as NGOs be sustainable.

Government itself needs to assume a particular role allowing for a top-down approach to the management of the Hennops River Basin. In many cases, it was observed through engagement with government representatives that many are unaware of the challenges Tembisa faces. Further, government itself feels overburdened and requires organisations on the ground to establish the mobilisation of stakeholders and communities. While underlying challenges still exist such as the lack of services and political will, the role of government needs to be redefined.

To conclude this chapter, these considerations and experiences need to be accounted for in a framework towards sustainable River Basin Management in South Africa. As discussed in Chapter Six, the experiences and empirical evidence drawn from the case study of the Hennops River Basin is key in understanding the link between stakeholders, communities, government, and the potential each play towards modelling sustainable River Basin Management in South Africa.



Figure 5.2. The state of the eSiphetweni-Vusimuzi clean-up site (A) during clean-up, (B) One month after clean-up, and (C) two months after clean-up.

Source: Field photographs taken by researcher (2022)

CHAPTER SIX
DISCUSSION

6.1 INTRODUCTION

This study yielded a range of data as presented in Chapter Five. These data cover several key considerations related to the case study of the Hennops River Basin. Several assumptions can therefore be made in terms of the ways stakeholder engagement and community participation can be conceptualised. From these assumptions, some key opportunities and challenges stand out. These need to be considered when formulating a framework for the management of the Hennops River Basin, and further, River Basin Management in South Africa. This chapter draws from these data and the associated experiences of the case study of the Hennops River Basin to formulate a sustainable River Basin Management framework to be applied at a national level.

Considered in this chapter are the objectives of this study and the implications thereof. Firstly, before a framework can be proposed, current policy and frameworks that promote stakeholder and community participation must be considered. Drawing from experiences of the Hennops River Basin, these policies and frameworks are critiqued and subsequently contextualised. Second, several challenges exist which hamper participatory initiatives. At the same time, several opportunities exist facilitating stakeholder engagement and community participation. Considering the observations of this study, a potential framework needs to be able to circumvent foreseeable challenges while taking advantage of opportunities. Finally, considering the potential role of stakeholders and communities, a sustainable model incorporating different social elements, policy, and actions, can be formulated.

This chapter is dedicated to a critical analysis of the findings of this study, discussing these in the context of South Africa's River Basin Management. This chapter essentially advocates for a reformed model based on the experiences and lessons learned through engagement with the Hennops River Basin, its challenges, and opportunities.

6.2 POLICIES AND FRAMEWORKS THAT PROMOTE STAKEHOLDER ENGAGEMENT AND COMMUNITY PARTICIPATION

Following a review of policy, it has been noted that South Africa's policy indeed advocates for the application of stakeholder engagement and community participation. Policy makes provision for participatory principles, to the point of supporting a decentralised approach to Water Resource Management. It is for this reason that some have even described the country's policy framework as among the best in the world (Pollard & du Toit, 2008). Policy makes provision for engagement and participation at almost every level of water governance. Over the years, South Africa's water policy has been reformed, encouraging participations and the decentralisation of decision making (Backeberg, 2005). As a result of these reforms, different institutions have been incorporated into South Africa's model for Water Resource Management (Backeberg, 2005; Thiam *et al.*, 2015). Most notably, these include Catchment Management Agencies (CMAs), Water User Associations (WUAs) and, to engage communities, Catchment Management Forums (CMFs). A contextualisation of these institutions in relation to the case study of the Hennops River Basin is necessary. Figure 6.1 details the different levels of institutional structures that policy advocates for highlighting disconnects and the overall provisions of policy, considering the case study of the Hennops River Basin. As presented in Figure 6.1**Figure 6.1**, policy supports the inception of four structures under the Department of Water and Sanitation which are meant to encourage stakeholder engagement and community participation. Of these, the Strategic Water Partnerships Network (SWPN) is concerned with national stakeholder engagement, through which, key stakeholders can contribute to addressing national-level concerns. While this institution exists, engagement, participation, and mobilisation are not so much its concern. Two of the other institutions have not been established. These include a CMA, as well as a WUA. CMAs are concerned with the management of the entirety of the WMA, once again limiting their capability to address local challenges. However, a WUA is positioned to address challenges at River Basin level. For this reason, the nature of a WUA has been further contemplated. Besides these institutions, the only existing structure currently in any position to address local concerns, is the Hennops River Forum, essentially acting as the CMF of the Hennops River Basin. As illustrated in Figure 6.1, there is an apparent disconnect between the Forum and the DWS, mainly because of the lack of a CMA. However, the CMF is still present and active.

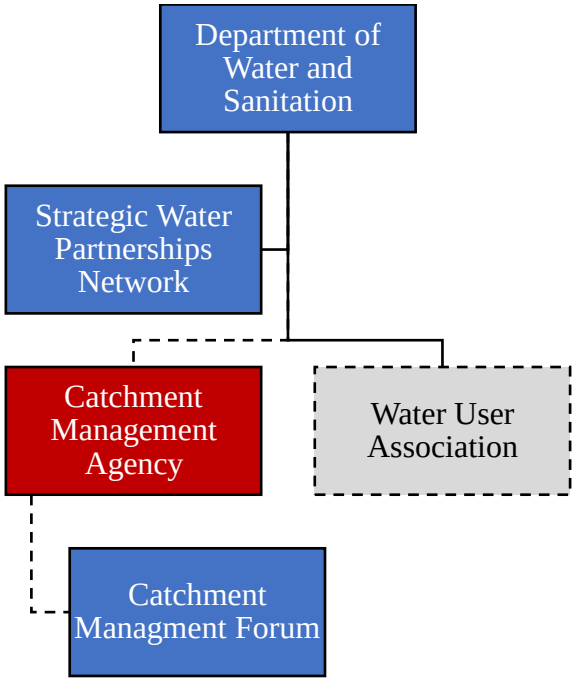


Figure 6.1. The different institutions advocated in policy, considering the Hennops River Basin and existing structures.

Source: Researcher's own diagram (2023)

The presence of a CMF representing the Hennops River Basin has no bearing on the reality experienced in Tembisa. The Hennops River Forum does not hold the capacity to address all the concerns of the community of Tembisa, especially considering their socio-economic bearing. Members of the forum are also not attuned with the reality of Tembisa. Further, the Hennops River Forum is associated with the management of the Hennops River itself, being estranged from the challenges experienced along the Kaalspruit. Therefore, a repurposing or redefining of the forum is necessary. Alternatively, a new forum needs to be established to address the concerns of the Kaalspruit, while still liaising with the Hennops River Forum. In this regard, a new forum is proposed which, not only addresses the decisions of the community, but also has its own agency to address challenges through the mobilisation of stakeholders and the community. In this regard, a forum with the agency of a WUA is proposed, empowering the community while able to address challenges through active participation.

WUAs in the context of South Africa's water policy have interesting roles. The National Water Act (36 of 1998) advocates for their establishment, suggesting them as tools for a local level management of water resources among water users. WUAs have been a key feature of the reforms of water policy in the country, and in some cases have proved effective for the

management of water resources (Backeberg, 2005; Colvin *et al.*, 2008; Kemerink *et al.*, 2012). The ideal of a WUA is not limited to South Africa. Instead, their potential has been observed in some case studies from Africa such as the Mara River Basin in Kenya (Richards & Syallow, 2018). In South Africa, however, WUAs have become an institution more related to agriculture and farmers, who have established their organisations even before legislative reforms (Colvin *et al.*, 2008; Kemerink *et al.*, 2012; Madigele, 2018). In the case of the Hennops River Basin, and particularly in the case of the Kaalspruit, the nature of a WUA would not suit the context, given that land uses along the tributary do not require water resources as agriculture would. Further, the current state of the Kaalspruit is so poor that use of the water would not be advised. However, the concept and agency of a WUA can be harnessed for effective River Basin Management, essentially empowering those who have an interest in a river basin.

Discussed here is the need to consider policy and establish institutions or structures that correspond to it. At present, the community of Tembisa as well as stakeholders are under-represented, and therefore are unaware of the existence of current institutions. For this reason, a forum that represents the communities, as well as interested stakeholders must be founded to facilitate mobilisation as prescribed by policy should a framework for sustainable River Basin Management be achieved. This is positioned as adaptable on a national level as many spaces suffer with similar challenges (Kemerink *et al.*, 2012). This new institution should include cooperative members from the community, particularly those who are currently involved with the wellbeing of the river basin.

6.3 CHALLENGES AND OPPORTUNITIES THAT HAMPER AND FACILITATE SUSTAINABLE RIVER BASIN MANAGEMENT

6.3.1 Towards Funding Initiatives and Fostering Community Engagement

Considering the empirical evidence gathered, the lack of funding, support, and resources is perceived by stakeholders as one of the main challenges hampering stakeholder engagement and community participation. At the heart of this is a discussion necessitating the funding of the rather expensive clean-up campaigns. However, a discussion of funding must go beyond the supporting of clean-up campaigns and consider other aspects that make them a success or failure. It is suggested here that these clean-up campaigns must be considered in the context of the community which, as observed, remain bystanders to the happenings in their space.

The provision of funding must be problematised as simply describing funding and the support of clean-up initiatives or the work of NGOs is insufficient. This notion is supported by past research that highlights issues in funding models towards encouraging participation. Mansuri & Rao (2013) maintain the importance of contextualising participatory efforts according to the nature of the community or organisations involved. In this sense, it is debated that a funding model must consider the history, political systems, and other factors before it can be implemented. In the case of Tembisa, funding must be approached tentatively as historical challenges have rendered many of the community's challenges funding dependent. As such, the fostering of social capital would facilitate participation, and this would be achieved through social funds or social funding.

The potential of the community must be understood in terms of social capital. In this regard, social capital has been understood as social characteristics such as organisations, norms, and networks (Putnam *et al.*, 1992; Bowen, 2009). In the context of community participation, social capital must be understood as the ability of social actors to work together to address a common challenge (Fukuyama, 2002). Essentially, social capital can be understood as the driving-factors which contribute to community interest and subsequent participation. Further to this, it has been suggested that social norms, values, and sentiments within communities play an important role in contributing to the implementation of some of the ideals of IWRM (Lukat *et al.*, 2022). Funding and support need to consider the potential of social capital through which communities can be engaged.

Enhancing or fostering social capital has been possible through social funds (Vajja & White, 2008; Bowen, 2009). Social funds can be described as funds made available for small projects, which may include clean-up campaigns. The effectiveness of funding small projects has been critiqued in different scenarios, some having varied results that need to be considered in context to the approach to fostering social capital (de Haan *et al.*, 2002; Mirwaldt, 2012). Given the many challenges communities in South Africa such as Tembisa face, the support of local initiatives would play a key role in encouraging stakeholder engagement and community participation. Further, the support of local initiatives should look beyond the funding of clean-up campaigns alone and address key challenges within the community. Some of these challenges may include addressing the community's access to basic services, addressing waste management through community initiatives, and empowering individuals and groups through skills development.

A model towards funding and fostering community engagement is therefore proposed as illustrated in Figure 6.2. This model considers social capital, as well as the potential of social funds to address small projects. In essence, funds from sponsorship and key stakeholders can be introduced to the community in different ways. For example, clean-up and awareness campaigns can be initiated through funding. Further, the empowerment of local organisations involved in different industries can be funded, lending to improving the services available to communities. As a key element of this model is the vehicle through which the social funds are distributed, that is, community-based organisations which may include active NGOs. As established in this study, a sense of confidence exists within the community related to the work NGOs do. As supported, community-based organisations have the potential to enact the decisions of the community being part of the community themselves (Carey & Braunack-Mayer, 2009; Krivelyova *et al.*, 2013; Hasan *et al.*, 2020).

While it is fair to suggest that the role of the community-based organisation as captured in Figure 6.2 would be assumed by local NGOs, the position of the NGO within the community must be problematised. It has been demonstrated in the past that the injection of funds into the functioning of community-based organisations may result in shifts in power relations (Carey & Braunack-Mayer, 2009). As previously reviewed, power relations are critical in the understanding of CBNRM and how it can be effective (Taylor, 2009; Musavengane & Simatele, 2016). Therefore, the definition of roles and responsibilities in relation to key stakeholders is argued critical in ensuring a sustainable model for River Basin Management supported on a social funding model to enhance, and not govern community participation.

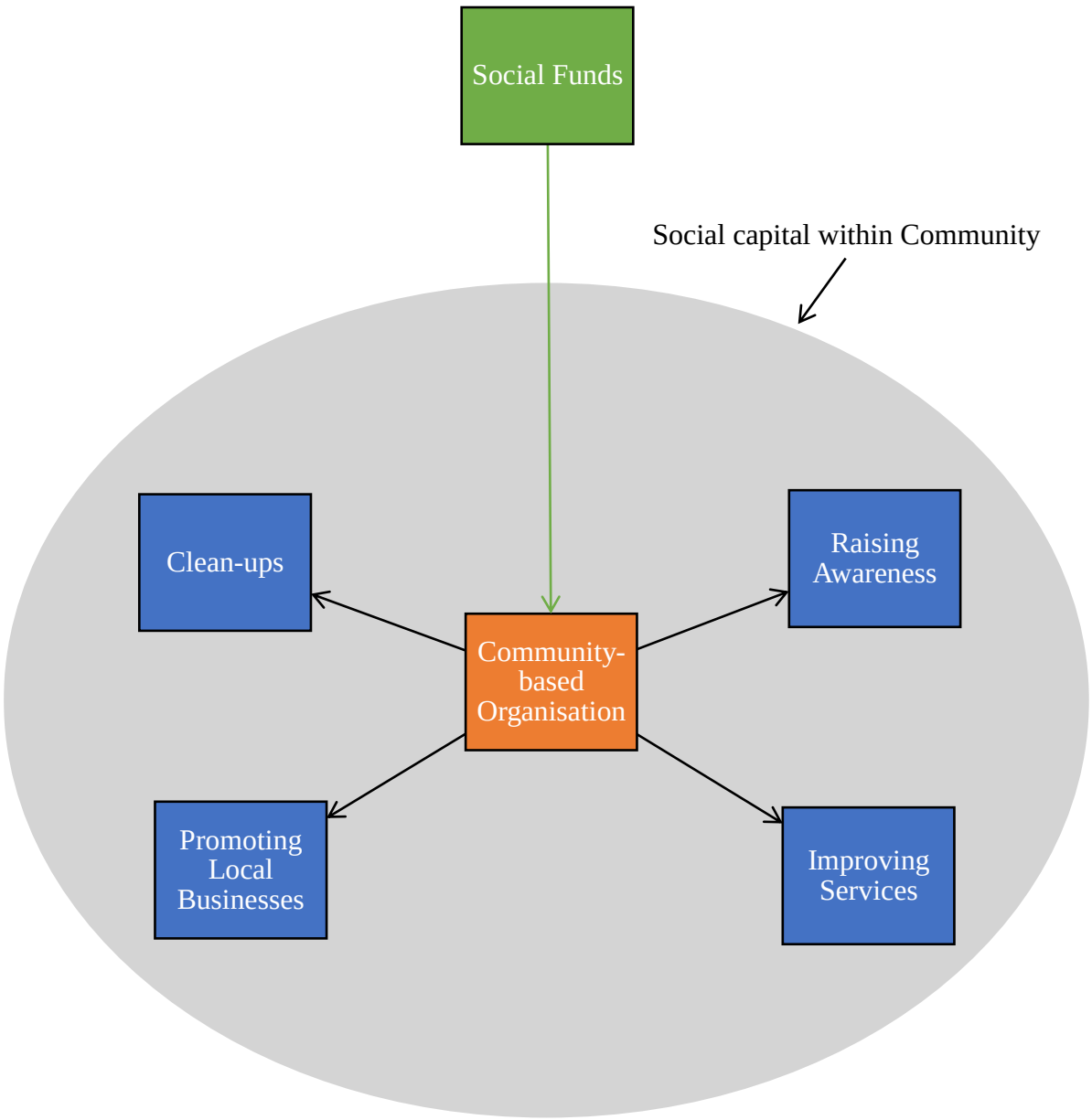


Figure 6.2. Proposed model for the introduction of Social Funds through Community-based Organisation for the enhancement of Social Capital.

Source: Researcher's own diagram (2023)

Further discussing a funding model for sustainable River Basin Management, the data gathered through this study suggests that funding is also necessary for maintaining infrastructure. Although small project initiatives can address some concerns, infrastructural and maintenance challenges must be considered as separate from engaging the community. In this sense, some challenges continue to hamper stakeholder engagement and community participation because

of external challenges which must be perceived as outside the control of the community, and therefore addressed as such.

6.3.2 Addressing the Wicked Problem: Community Challenges

As previously discussed, social capital is also dependent on several factors that influence the way the community feels towards participation. This includes socio-economic standings, historical influences, and community member relationships among themselves and with different organisations and entities. Some of these factors define the nature of participation and extent to which the community can be mobilised. Considering the case of the Hennops River Basin, Tembisa is here presented as a community that is challenged over and beyond what is perceivable. Some of these challenges are beyond the efforts of the community, yet the community currently bears these alone.

An example of such problems, as highlighted previously, is the growing population of Tembisa itself, which is currently overburdening available infrastructure. As observed, stakeholders need resources and funding to address the maintenance of infrastructure. Another problem is the ongoing challenge that is illegal dumping. This study perceived these challenges as a wicked problem altogether, being the result of multiple legacy challenges (Jürgens *et al.*, 2013). Rittel & Webber (1973) define wicked problems as societal and political situations that cannot be addressed through clear solutions. In this regard, a wicked problem differs from a benign or tame problem, where a scientific or engineered solution would suffice. Instead, social problems become more difficult to address, often requiring improvisation and trade-offs to resolve the challenges observed. In this context of what has already been discussed, some community challenges are beyond the contemplation of a funding framework, resonating with the views of stakeholders. In this sense, some stakeholders suggested that the challenges hindering mobilisation are linked to more than a lack of funding, support, and resources. It is here posited that these challenges are over and beyond the formulation of a sustainable River Basin Management framework. However, to establish a sustainable framework, these problems, and potential solutions to these must be considered.

The challenge posed and framed here as a wicked problem has been modelled and contextualised in relation to stakeholder engagement and mobilisation. This complements previously presented models establishing new ways to define the role of other stakeholders who may have an interest in the wellbeing of the community. At the same time, these

stakeholders may not be able to contribute financially to a social fund, or funding model. However, their interest or skills may better position them to attain social capital through the addressing of the wicked problem, that is community challenges. While infrastructural challenges are problematic, and require the input and aid of government, other challenges in the community present opportunities for local business and key stakeholders.

Considered here is the potential of Community-based initiatives such as Community-based Waste Management (CBWM). Following the reflection of the role of stakeholders and the community, CBWM has been slated as a novel concept worth exploring in the context of challenged areas such as Tembisa (Mongkolnchaiarunya, 2005; Sekito *et al.*, 2013). The NGO has been positioned as a key element in such strategies (Colon & Fawcett, 2006). However, the key consideration here is to identify stakeholders who are best positioned to participate in such initiatives. In the context of a River Basin Management, these approaches to community challenges would allow for the further determining of the roles of different stakeholders, ultimately including more into a participatory framework that goes beyond River Basin Management and empowers the community.

To address identifiable challenges effectively, a reflective cycle model was designed as part of this study. Drawing from a model as defined by Baum *et al.* (2006), this model encapsulates an approach through which challenges can be identified, relevant stakeholders considered, and actions then taken. Further, this model incorporates the different steps in the process which is ultimately supported by the principles of PAR. As presented in Figure 6.3, this model involves six steps through which wicked problems can be addressed. As previously discussed, wicked problems cannot have clear or definitive solutions, and therefore a reflective cycle is effective. A reflective cycle or reflective cyclic model allows for the problem to be re-evaluated, effectively re-initiating the process to address emerging challenges.

As the first step to this model, challenges associated with wicked problems are identified, for example, illegal dumping. The second step follows, through which relevant stakeholders, for example, local businesses, are identified and engaged. As the third step, a strategy is formulated through which the challenge can be addressed. As part of the fourth step, this strategy is then presented to stakeholders and community members for their approval and further inception or implementation. Individual initiatives then follow as part of the fifth step. These initiatives may include interventions or actions taken by the community, such as clean-up campaigns. This proposed model then moves to the sixth step, through which, as previously discussed, involves

the re-evaluation of the situation. The process will be recommenced where needed, employing the aid of other stakeholders where necessary, all for the aim of addressing the wicked problem at hand to the best of the community and stakeholders' capability.

It is important to reiterate the relevance of this model for the formulation of a sustainable River Basin Management Framework. Although not dealing directly with River Basin Management, this model is critical in addressing problems which continue to threaten the progress of stakeholder engagement and community participation. Further to the point that addressing wicked problems would essentially foster social capital, the model presented here is to be considered as part of the framework. At the same time, such a model does espouse the principles of exploring the role of stakeholder engagement and community participation and hence addresses the aim of the framework altogether. Through this model, it is also considered that key stakeholders' roles can be defined through action and reflection over successes and shortcomings.

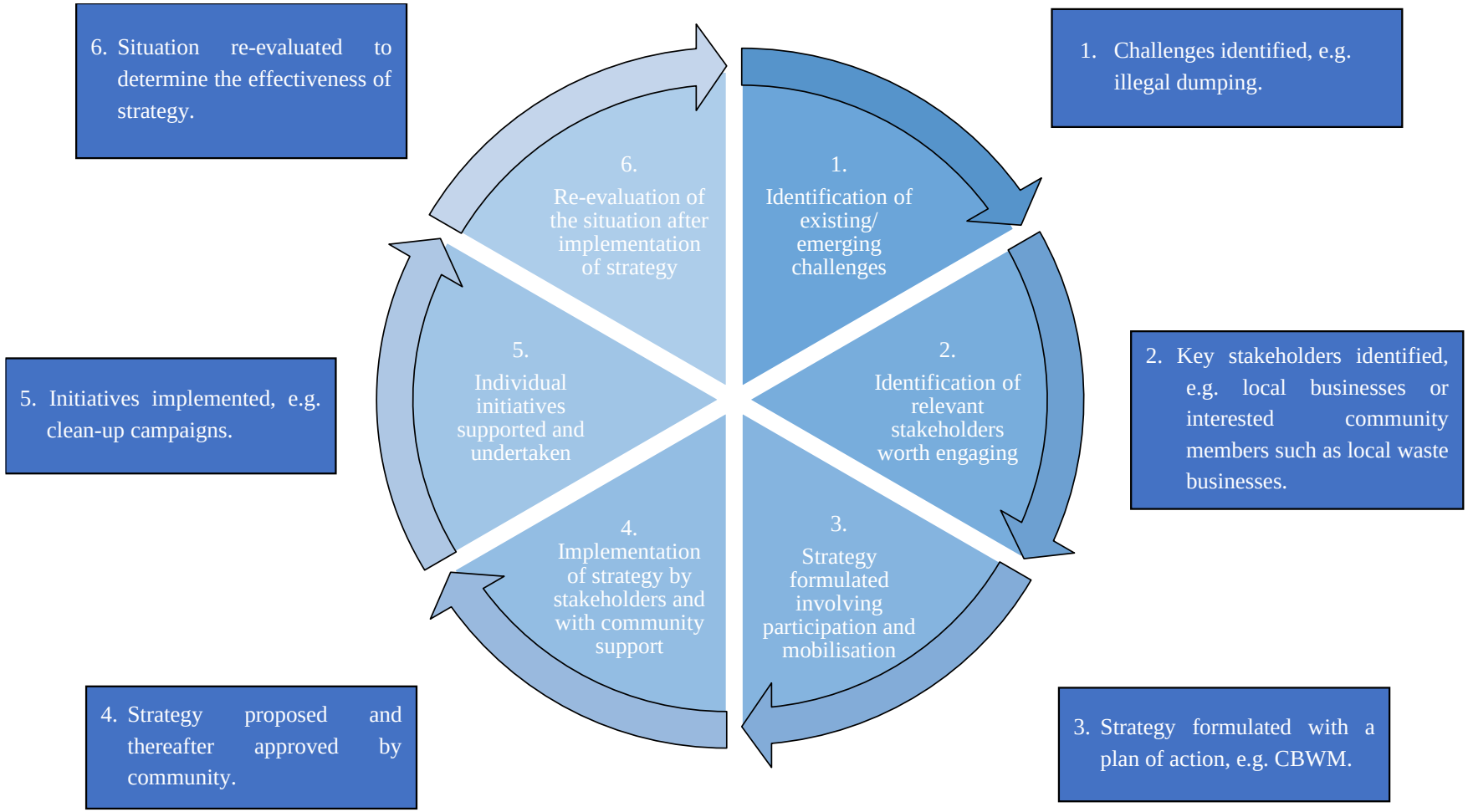


Figure 6.3. A reflective cyclic model proposed to address challenges or wicked problems in the community (Source: After Baum *et al.* (2006).

Source: Researcher's own diagram (2023)

6.3.3 The Role of Government: Addressing Political Will

As a framework towards River Basin Management constructed considering the findings of this study, the role of stakeholders has already been presented as vital. However, while considering the different roles and responsibilities of key stakeholders, the role of government becomes uncertain. This is particularly evident when formulating a model for River Basin Management where decision-making and action is appropriated to stakeholders such as NGOs who supposedly work independently of government. It is therefore critical to assess the role of government, especially considering the case study of the Hennops River Basin, where government's influence is conceptual, yet perceivable as non-practical.

Already characterised by a lack of political will, incorporating government into a sustainable framework to manage the Hennops River Basin is problematic. This is exacerbated by the idea that stakeholders are of the opinion that, more than unaware, government is ignorant of the problems the Hennops River Basin faces. It is here argued that policy should be considered, and the role of government therefore defined as part of a model of relationships between government, community, and other stakeholders. As already discussed, the effectiveness of South Africa's policy around water resource management is characterised by its motion towards decentralising governance (Backeberg, 2005; Funke *et al.*, 2007; Pollard & du Toit, 2008).

Considering experiences and observations of the case study of the Hennops River Basin, a model highlighting the potential relationship between government, community, and key stakeholders was created. This is presented as Figure 6.4. This model proposes the equal standing of the three entities, that is, government, stakeholders, and the community. As per Figure 6.4, stakeholders are represented collectively under a single WUA or Forum as proposed in the next section. Essentially, the role of government would be to provide additional support and empowerment where needed, while remaining removed from the efforts and activities of the community and Forum. As previously discussed, the Forum acts to address the concerns of stakeholders and the community, with their input in the relationship model resulting in the implementation of decisions, and mobilising of the community through initiatives. The community engages directly with the Forum, as prescribed by policy, therefore imparting decisions, observations, and concerns. Both, community, and Forum would liaise with government infrequently or when necessary, relaying feedback on the effectiveness of initiatives and current framework's achievements.

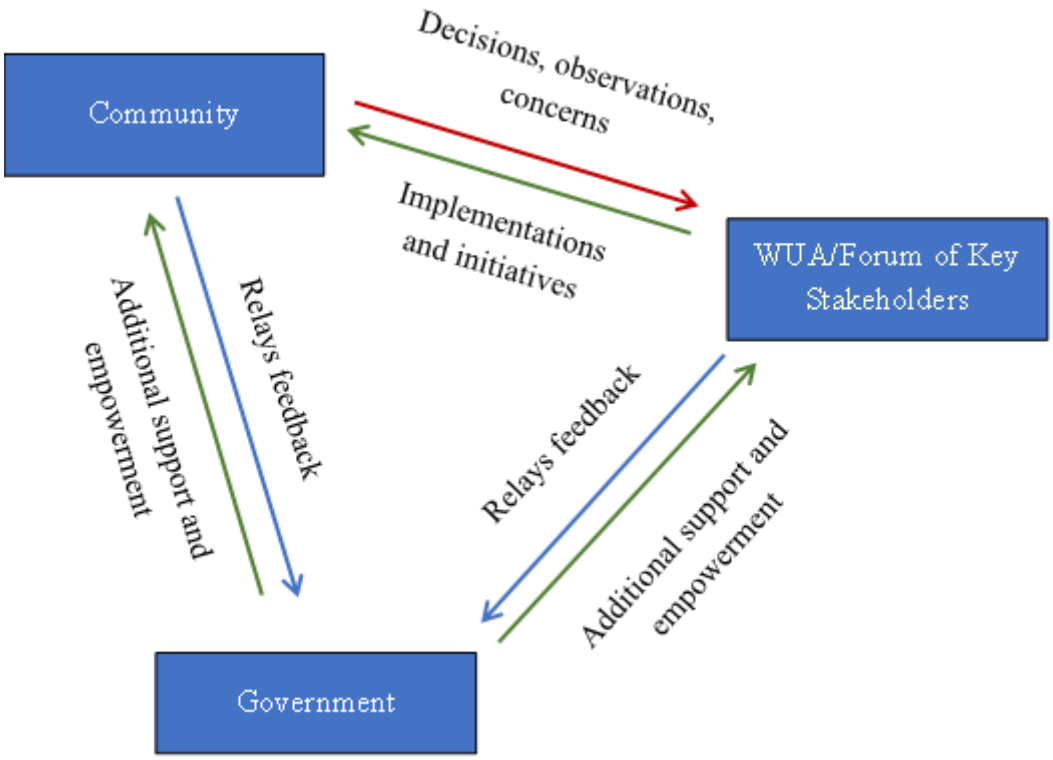


Figure 6.4. Government-community-stakeholder relationship model proposed by this study.

Source: Researcher's own diagram (2023)

This study, and therefore the framework for River Basin Management, supports the role of government being decentralised as supported and discussed by international and local examples (Dinar *et al.*, 2007; Mirumachi & van Wyk, 2010; Agyenim & Gupta, 2012; Anokye & Gupta, 2012; Dyer *et al.*, 2014; Inguane *et al.*, 2014). Further, it follows the ideals set out by South Africa's policies, embracing the concept of decision-making at community-level, while other institutions carry out implementation. Therefore, government assumes the passive role of providing support and empowerment depending on the information relayed to them by the community and stakeholders. Altogether, this model encompasses the key principles of policy, adjusting implementation thereof drawing from the experiences of the case study of the Hennops River Basin.

6.3.4 The Role of the NGO in River Basin Management

It is at this point where a reflection on some of the challenges and opportunities identified through the case study of the Hennops River Basin is necessary. Considering the potential of a WUA or additional Forum to address the role of stakeholders and the community, some opportunities have been identified through this study to aid in the institution's establishment. This relates to the critical role NGOs such as the Key Informants of this study play in mobilising stakeholders and the community. As observed in the case study of the Hennops River Basin, Hennops Revival and EnviroCare Tembisa currently address stakeholder engagement and community participation in ways that no other organisation or institution does. Therefore, their work needs to be institutionalised and form part of a framework to address the overall management of the river basin.

However, as it stands, a disconnect exists between different stakeholders, government, and the community. As presented in Figure 6.5, different stakeholders (including NGOs) exist within a conceptual space, with limited engagement between each other. Stakeholders, including local businesses, NGOs, etc., act independently, as well as without the direct intervention of government or the community. The is mainly because none of the three main role-players, that is government, stakeholders, and the community, have defined roles. As a result, no collaboration or collective effort is possible through this model. At the bottom of the model is the community, which has no part to play in anything, and remains at the bottom of the otherwise disconnected structure. For this reason, the contemplation of the role of different entities such as NGOs is critical to necessitate a reform of such models.

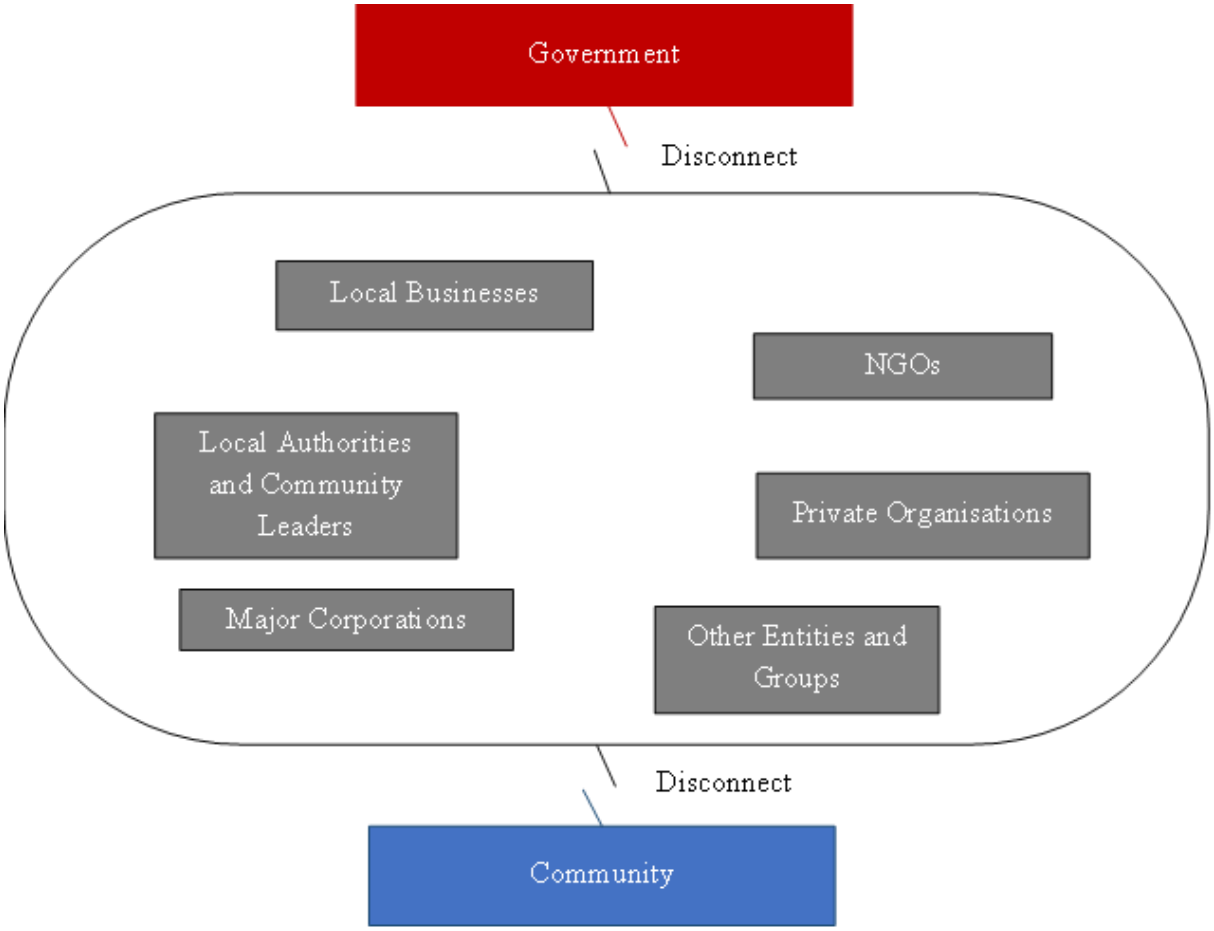


Figure 6.5. Relationship between main role-players as observed in the case of the Hennops River Basin.

Source: Researcher's own diagram (2023)

The role of NGOs has been previously discussed in the context of CBNRM and IWRM. To start, NGOs are necessary role-players in IWRM (Biswas, 2008). Further, the potential of NGOs has been qualified time and time again. For instance, in the case of Brazil, NGOs play a valuable role in supporting the wellbeing of several river basins (Brannstrom, 2013). Further to this point, the potential of NGOs has been exemplified in the case study of Nicaragua and its establishment of rural water committees (Romano, 2019). It is therefore suggested that NGOs working in the space of River Basin and environment Management take a central role in a framework towards sustainable River Basin Management in South Africa. This is especially applicable in the context of the establishment of WUAs or Forums. However, the work of NGOs need to be focused on empowerment, instead of considering short-term goals as demonstrated in past research (Thomas-Slayter, 2008; Hasan *et al.*, 2020). The role of the NGO can therefore be modelled as presented in Figure **6.6**.

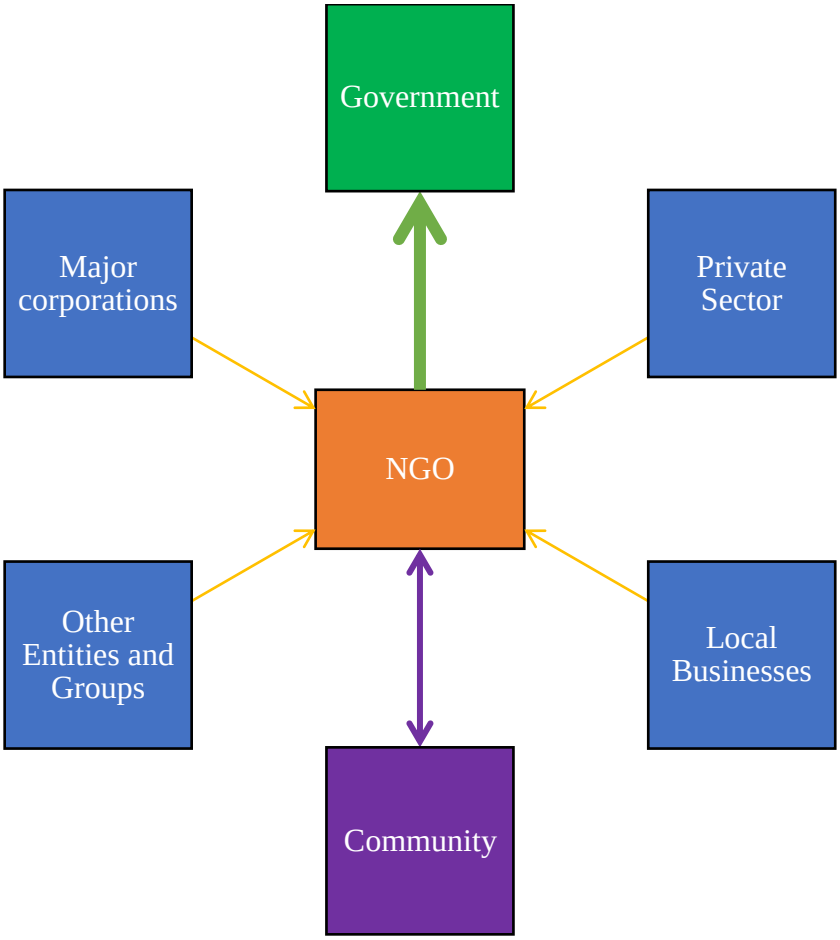


Figure 6.6. A model of the potential role of the NGO for sustainable River Basin Management.

Source: Researcher's own diagram (2023)

Figure 6.6 presents a model of how the NGO can be conceptualised in the context of a framework for sustainable River Basin Management. As articulated in this model, the NGO would draw from other stakeholders the necessary experience, resources, and insight. This will essentially inform its initiatives and hence, its approaches to stakeholder engagement, participation, and mobilisation. The community plays a key role in informing the efforts of the NGO. The NGO needs to remain open to the decisions and views of the community, while also able to address new challenges that may arise within the community. The NGO-community liaison should be considered a two-way interaction, with the feedback of the community essentially guiding the nature of participatory initiatives. The NGO would then consult with government, reporting success or shortfalls in terms of engagement, participation, and mobilisation. To ensure that the NGO performs its role effectively, government may engage in compliance auditing to ensure that no malpractices are embedded in the process.

Therefore, the NGO embodies potential to transform River Basin Management. While their actions on the ground continues to shape how stakeholder engagement and community participation is perceived, their capability to mobilise active participants must be harnessed. The NGO finds its value in its ability to engage the community, where other entities fail. However, as observed, the implementation of engagement activities is costly and often unsustainable if left to the NGO to undertake. Therefore, a reflection on sources of funding and resource acquisition must be necessitated.

6.4 A SUSTAINABLE FRAMEWORK FOR STAKEHOLDER ENGAGEMENT AND COMMUNITY PARTICIPATION IN RIVER BASIN MANAGEMENT

This study draws from a range of experiences and observations considering the case study of the Hennops River Basin. From these findings, and understandings gathered from the body of knowledge, several models have been designed and therefore proposed. Each of these models address key observations related to the objectives of this study. Ultimately, these models form the basis for an argument towards a sustainable River Basin Management to be applied in the context of South Africa. This framework is supported on premise that the Hennops River Basin presents is an example of a worst-case scenario in terms of River Basin Management, but also a critical point at which some of South Africa's most profound challenges can be addressed.

This study holds true to South Africa's water policy, which as discussed, has been reformed time after time, now presenting the opportunity for its implementation and trial (Backeberg, 2005; Swatuk, 2005; Funke *et al.*, 2007; Pollard & du Toit, 2008). As a point of departure, there is a need to establish or redefine institutions promulgated by policy. The Hennops River Forum was of particular interest. It was ascertained that this institution does not adequately represent the community of Tembisa. It is therefore suggested that a new institution be established, either as a Forum, or more effectively, as a WUA. This institution would address disconnects between the community, government, and stakeholders, essentially establishing the channels through which IRBM can be achieved. As such, this study draws from past experiences and takes on the opportunities these have presented (Hering *et al.*, 2010; Anokye & Gupta, 2012; Owusu *et al.*, 2016).

The NGO is perceived in this study to be the most powerful catalyst for sustainable River Basin Management. This is not estranged from experiences within the body of knowledge

(Mongkolnchaiarunya, 2005; Carey & Braunack-Mayer, 2009; Brannstrom, 2013; Romano, 2019). In this sense, their role has been modelled through which the decisions of the community, and intentions of key stakeholders can be realised. The NGO also holds a key role in promoting small projects and initiatives. For this reason, they have been considered a key part in a funding model which draws from insight on the importance of enhancing social capital through social funds (de Haan *et al.*, 2002; Mirwaldt, 2012). Enhancing social capital would allow the community to move from a bystander standpoint to an active agent for community upliftment and at the same time, River Basin Management. However, critical to this argument is the importance of securing funding through engagement with stakeholders who would be able to provide the social funds needed.

Enhancing social capital is not as easy as injecting funds into the community. Given the socio-economic background and history of each individual community, wicked problems exist that need to be addressed (Bowen, 2009; Mansuri & Rao, 2013). Wicked problems can include challenges such as illegal dumping exacerbated by the lack of services within a previously disadvantaged community. Therefore, a reflective cyclic model is needed to address wicked problems on a sustained, and continuous basis. A reflective cyclic model necessitates continued participation and is founded on the principles of PAR (Baum *et al.*, 2006). It stands to reason that this model would allow for continued participation of key stakeholders and communities in efforts aimed at solving a wicked problem, which requires complex solutions (Rittel & Webber, 1973). Altogether, such a model would further empower the community, enhancing social capital, and cultivate a community which takes interest in the wellbeing of their river basin, not for incentives, but because of the social value it gives them.

With a well-fostered amount of social capital, a Forum which focuses on River Basin Management, and a funding model to support upcoming new small projects, good relationships between social actors or entities is envisaged. Within this network, government takes a background role, being decentralised, allowing the community to make decisions, and the Forum, through stakeholders like NGOs, to act upon these decisions. A model for continued communication and strong relationships is therefore formed allowing for the community to see the changes they wish to see, averting fear, anger, and ignorance. Meanwhile, government remains at the background, with little opportunity for a top-down approach to take hold and otherwise upset the balance of the relationship (Dinar *et al.*, 2007; Taylor, 2009; Mirumachi & van Wyk, 2010; Brannstrom, 2013).

In essence, the above is presented as the result of this study, formulating a sustainable model for River Basin Management which can be applied to the South African context. The relationship between the models advocated for in this study is presented in Figure 6.7. Figure 6.7 is the culmination of the different considerations, observations, and experiences of this study, resulting in what is presented here as the framework for sustainable River Basin Management in South Africa. Although appearing as a high-level summary of the different models and arguments this study has conceptualised and upholds, profound complexity is captured within. Firstly, the models embedded within need implementation. This framework will not be possible as each step, and therefore model, is dependent on the other. Secondly, implementation of these models must account for further complexity in different situations. While this framework is built upon a worst-case scenario, it can be adjusted to address other cases. In this regard, the framework is flexible, and able to be adjusted accordingly.

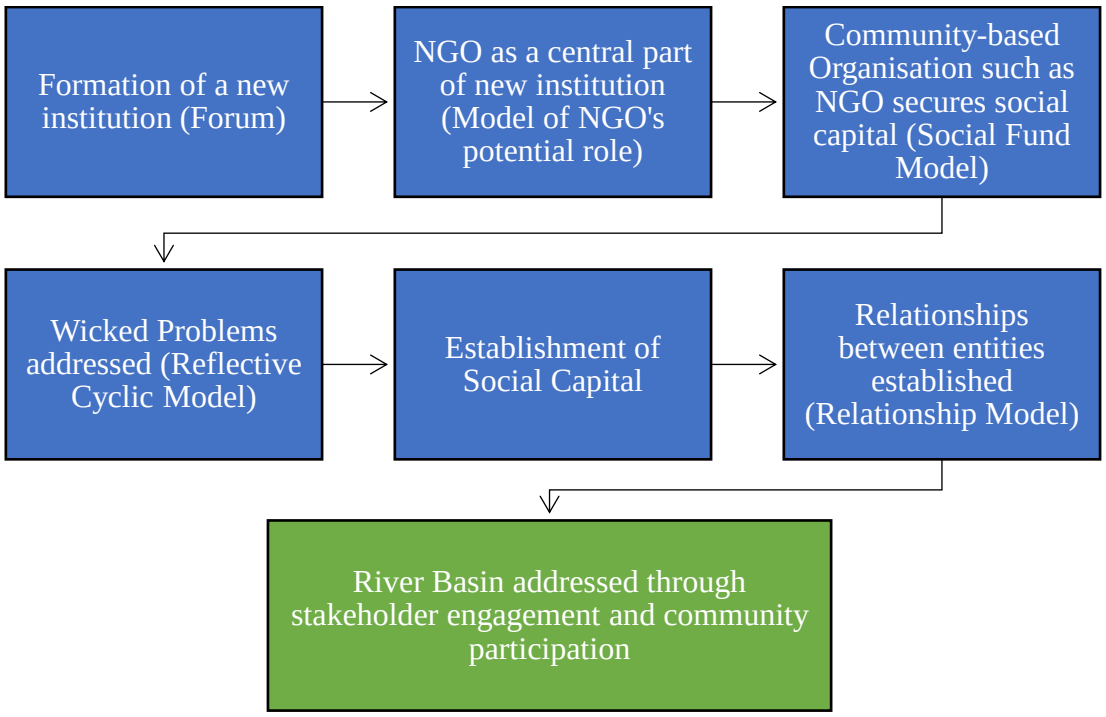


Figure 6.7. Framework for River Basin Management in South Africa as contemplated in this study.

Source: Researcher's own diagram (2023)

A framework such as Figure 6.7 presents a novel approach to River Basin Management in South Africa, considering the country's complex past of colonialism, Apartheid, and the disadvantaging, and therefore, deterioration of stakeholder and community empowerment. The models presented here address the need for community empowerment and upliftment, through

which River Basin Management will follow. The lessons learned through engagement at the heart of Tembisa, and even the hosting of a clean-up campaign in one of the poorest areas of the country has brought to light key considerations which have now been considered as part of a comprehensive framework to address multiple challenges.

CHAPTER SEVEN
CONCLUSION

7.1 INTRODUCTION

As the final chapter of this thesis, a conclusion to this study is presented here. This chapter addresses several aspects of the completed study, first and foremost summarising key findings. This summary reflects on the research questions, aim, and objectives, and considers the approach this study took to address these. The findings obtained after the application of a methodology are then considered. Finally, the inferences and implications of these findings are summarised, capturing the main points of this study's discussion, arguing for a framework for River Basin Management in South Africa.

Drawing from a summary of key findings, inferences, and implications thereof, key policy recommendations will be made. In this regard, this study has made several observations in terms of policy and how policy is implemented. These will be considered, further defending the findings of this thesis. Although this study addresses policy, policy recommendations also consider the implications of this study in terms of its contribution to the body of knowledge. This feeds into a consideration of other recommendations which go beyond policy, reflecting on the limitations of this study.

Finally, this chapter will consider this study, having contributed to the body of knowledge, as the doorway to future research. Having considered several key aspects in policy, practice, and other areas, this study presents new avenues through which new additional insight can be harnessed. In this regard, this study represents a particular approach to research questions, aim, and objectives, having accomplished what it set out to do. However, along the way, it encountered new opportunities for further inquiry. These will be presented as part of the recommendations this study makes.

7.2 SUMMARY OF KEY FINDINGS

7.2.1 Addressing the Hennops River Basin as an Example of a Challenged River Basin

While South Africa grapples with multiple challenges, effective water resource management stands out as one of great urgency. Relying mainly on water resources found in rivers, River Basin Management is critical in this regard. Contributing to one of South Africa's main dams,

the Hennops River contributes greatly to the water resources captured by the Hartbeespoort Dam. However, recent observations have rendered the Hennops River's water resources for consumption or use, essentially threatening its potential to contribute to South Africa's overall necessary water resources. Further, the Hennops River's state has been related to poor management of the Hennops River Basin, particularly in relation to its Kaalspruit tributary, which finds its source at the heart of Tembisa.

Tembisa is a poor community, established and defined by the regime of Apartheid, much like other townships in South Africa. As observed, despite Tembisa's deteriorating state, the wellbeing of the Hennops River is dependent on the community and its relationship with the Kaalspruit tributary. Therefore, it was imperative that focus be placed on the reality that is experienced in Tembisa. Through this, opportunities and challenges were identified considering the potential role stakeholders as well as the community in River Basin Management, particularly in spaces of decision-making and active participation in engagement activities.

7.2.2 Applying a Research Design and Obtaining Key Findings

It goes without saying that this study represents an approach to River Basin Management which has not been contemplated in the context of South Africa, let alone the context of the Hennops River Basin. It engaged with aspects that most empirical research does not, that is, some of the poorest communities, to better understand their role and potential in River Basin Management. Through the application of an active and participatory methodology, this study has been able to draw key findings in terms of IWRM, IRBM, and the role of PAR and CBNRM within these. Before considering these findings, it is worth reflecting once more on the methodology applied.

This study applied a research design founded on participation to understand participation itself. This involved engagement with Key Informants, through which further engagement with the community of Tembisa, as well as key stakeholders was initiated. Together with ground-truthing and participation in activities of Key Informants, a better understanding of the implementation of current strategies was gained. Further, focus group discussions allowed for the gathering of information in relation to stakeholder and community sentiments on River Basin Management, the challenges the community faces, and their willingness to participate in a framework for the management of the Hennops River Basin. Finally, clean-up campaigns were observed as critical tools through which River Basin Management is currently being

addressed. After having observed these tools in action, the researcher undertook to host their own clean-up campaign. Key themes emerged from this campaign, relating to participation, the interest of the community, and the longevity of the results of clean-ups. Altogether, the applied research design represented a participatory approach, identifying key role-players, opportunities, and challenges.

As it relates to policy, South Africa's policy is effective on paper but lacking in implementation. As it pertains to institutions, policy is not being implemented as it should, leading to a lack of institutions meant to facilitate stakeholder engagement and participation. Further, institutions that do exist do not effectively represent who they are supposed to, given their lack of definition or incapability to address larger, more complex challenges. Instead, the NGO stands out in this regard, essentially adopting the role of institutions such as Forums. Further, communities support the activities of NGOs, affirming their confidence.

Although NGOs do much for the community, their potential is limited by their current unsustainable funding model. Further, a lack of partnerships and support from onlooking stakeholders further limits their ability to address the challenges they seek to. A lack of resources goes beyond the challenges faced by NGOs, threatening the potential of other avenues of participation. At the same time, the lack of fund and support is but one of the several challenges hindering the potential of engagement, participation, and mobilisation. Other challenges exist, which are tied to the reality of the community.

Wicked problems continue to threaten community participation. For instance, a divide in stakeholder and community relationships renders a bleak outlook on the potential of collaboration and participation. For example, stakeholders believe that the problem lies with communities. At the same time, communities are aware of their challenges, but because of their perceivably poor understanding of their role and relationship with stakeholders and government, communities become bystanders to their own reality. It follows that the community is characterised by feelings of disempowerment, ignorance, and uncertainty.

Because of the poor relationships fostered between the community, stakeholders, and government, government is perceived to be estranged from the challenges the community faces. Further, through observation, the role of government in ameliorating situations is not apparent, leading to the belief that government is either overwhelmed, or ignorant of challenges. This is exacerbated by the idea that communities believe in a top-down approach

to River Basin Management. As a result, participation is avoided altogether, with social challenges continuing to affect the Hennops River Basin's wellbeing.

Initiatives in themselves do not improve the situation as communities are disconnected from stakeholders and government. This was observed after the hosting of clean-up campaigns demonstrating the efforts NGOs put into maintaining temporary achievements. The unsustainability of such initiatives was therefore of particular interest when considering potential models and an overall framework through which River Basin Management through participation could be possible. Therefore, potential models and the framework itself was formulated to address the disconnects between different entities, but also encourage the efforts of stakeholders and communities.

7.2.3 New Models and a Framework for River Basin Management in South Africa

The findings of this study allowed for a contemplation of policy, its implementation, and shortfalls. Further, the role of stakeholder engagement and community participation was contextualised through a discussion of key observations. To define a sustainable framework for River Basin Management in South Africa, several models were contemplated and designed around the potential of stakeholder engagement and community participation. Different models were contemplated addressing challenges, but also taking advantage of identified opportunities. These models were based on the experiences and findings of this study, as well as findings of other studies in the body of literature. As highlighted in Chapter Two, key conceptual models which theorise stakeholder engagement in the context of water governance played a critical role in informing the current study. Further, this study builds upon these models, exploring the applicability of stakeholder engagement in defining leadership for River Basin Management. Further, considering how water governance has been studied in South Africa, the models and framework presented here add new understandings to the body of knowledge.

Theories such as the ambiguity theory of leadership, as well as the agential power of stakeholders are contextualised through the case study of the Hennops River Basin. This study adds a new perspective on water governance and how it has been conceptualised until now. Through the models presented, new approaches to some of the gaps in policy implementation are supported.

It was ascertained that current institutions are ineffective in representing stakeholders and communities. The lack of a CMA in place, and the absence of a CMF that represents the

Kaalspruit itself essentially disconnects the community, stakeholders, and government. Therefore, this study proposes the establishment of a CMF, or better, a WUA, which would have powers as prescribed by legislation. A WUA or Forum with the powers of a WUA will not only have the capacity to engage stakeholders and the community but can also mobilise them through different initiatives. Still adhering to South Africa's robust legislative framework, the inception of a WUA will allow for effective implementation of the decisions of the community and aspirations of key stakeholders.

As it stands, key stakeholders are isolated from each other, representing a fragmented reality of stakeholder engagement. Therefore, a catalyst for effective engagement is proposed in the form of the NGO. At the basis of this argument is the amount of work NGOs currently do in the community. A model was then designed to best capture the relationship the NGO can establish between stakeholders, the community, and the government. Essentially, the NGO holds the potential to transform the potential of stakeholder engagement and community participation. However, as observed, the efforts of NGOs, stakeholders, and the community are hindered by the resources available to them.

To address the challenges associated with the lack of funding, a model was designed incorporating a proposal for the founding of a social fund. This social fund would be supported by key stakeholders, some of whom contribute to disparate initiatives within the Hennops River Basin. This social fund would make funds available for the supporting of small projects, ultimately fostering social capital through the upliftment of the community. The fostering of social capital is highlighted in this study to be the opportunity through which community interest can be enhanced. As the main vehicle through which small projects are initiated, a community-based organisation, which may be the NGO assumes this central role. Small projects offer the opportunity to address key concerns in the community, while empowering community members and key stakeholders.

As not all issues can be addressed through the injection of funds into the community, other key challenges must be considered. For this reason, the fostering of social capital is once more emphasised for the addressing of wicked problems such as illegal dumping. A reflective cyclic model was therefore designed to address concerns of the community through the empowerment of local stakeholders. This model essentially encapsulates an approach to challenges the community has which are ongoing and provide an opportunity to local businesses, such as the issue of illegal dumping. As a reflective cyclic model, the strategies of the model can be

redefined and re-evaluated to address other challenges. Altogether, this model would foster social capital while engaging the community in active participation to address challenges otherwise observed as wicked problems.

Finally, through the application of the above models, it is argued that an effective government-stakeholder-community relationship will be attained. This relationship has been modelled, demonstrating the decentralisation of River Basin Management, and defining of the role of government. Addressing the concern of political will through this model, government is removed from the implementation of initiatives, which would now be the responsibility of the Forum, or WUA. The community would engage directly with the Forum, through which new initiatives are proposed. Government's role, therefore, becomes one of support and further empowerment, essentially removing itself from the potential of creating a top-down approach to River Basin Management.

The result of these models and the study that backs them is a sustainable framework for managing the Hennops River Basin, and therefore for River Basin Management in South Africa. This framework therefore draws from this study, contemplating the lived reality of Tembisa, a disadvantaged community victim to history and its different regimes, as well as socio-economic pressures. The reality of Tembisa characterises many of South Africa's communities and therefore, this framework is an effective approach to River Basin Management, capturing the potential of stakeholder engagement and community participation.

7.3 KEY POLICY RECOMMENDATIONS

A few recommendations can be made, drawing from the key findings of this study. Firstly, as discussed, South Africa's policies, particularly its water policy has been supported as among the best in the world, having been refined and reformed numerous times. It is the position of this study that yet another reform of the key principles of policy is not necessary. In this regard, policy should remain flexible to potential shifts in the potential of communities and stakeholders, however, implementation of its key principles is vital. For instance, the establishment of recommended institutions must be followed through. This will necessitate the involvement of stakeholders and communities in water resource management, ultimately allowing for the full realisation of policy in practice.

Stakeholders, particularly those who work arduously for the improvement of community conditions, must be empowered, and further encouraged to continue their work. Partnerships

are key in this regard, through which sharing of resources can take place. NGOs currently do a lot to secure the environmental wellbeing of South Africa. Therefore, their efforts need to be acknowledged through new funding models aimed not to fund them but fund the work which requires resources. By empowering the NGO, and funding their initiatives, their role is defined as key stakeholders who can make a difference, not only for water resource management, but the upliftment of communities in other ways.

The provision of funds through a framework will not solve all problems. Instead, this study demonstrates that an integrated approach to challenges is needed. As in the case of River Basin Management, the community and stakeholder have potential to be mobilised to address other issues in South Africa's communities. For this reason, it is recommended that when approaching community-based efforts and CBNRM, wicked problems that threaten the success of initiatives be addressed through stakeholders and communities themselves. Advocated here is the need for the integration of stakeholder engagement and community participation in more than just River Basin Management. Ultimately, communities and stakeholders hold the innate capacity to address their own issues. To make use of this, structures and models must be implemented.

In summary, the most important recommendation this study makes in terms of policy is implementation. Time and time again, it has been demonstrated that implementation is lacking, and a reform of policy and institutions unnecessary. This point must be tried and tested to allow for the further evaluation of policy in practice. Further, the design and application of different models can be based on South Africa's legislative framework. This challenge is their implementation and gathering information on the result of this implementation.

7.4 RECOMMENDATIONS FOR FUTURE STUDIES

It follows that recommendations for future studies should consider the potential of the framework proposed here. In this regard, multiple avenues are presented through which future studies can be initiated. These relate to (1) the findings of this study as compared to others, (2) the implementation of the framework proposed, (3) the recommendations made through this study, and (4) the potential application of this framework on another site, or further, on a national level. Considering the findings of this study, a key area which needs to be explored is actual implementation of the conceptual models which make up this framework. Further, as these findings relate specifically to the Hennops River Basin, more research is necessary to

refine these models before it can be applied to other river basins with similar problems. For instance, the models and framework presented here may be applicable to the Jukskei River Basin, where the township of Alexandra interacts with the space in a very similar ways as with the Hennops River Basin (Mgquba & Vogel, 2004; Webster & Iqani, 2024).

While this study does evaluate the relationship between the body of knowledge and the novelty of the findings presented, future research could involve more profound comparisons. For example, a side-by-side comparison of local and international models for River Basin Management can consider the findings of this study. For example, the framework presented here can be compared to international examples drawing from larger policy frameworks such as the WFD. For instance, how does this framework differ from approaches such as in Denmark? Further to this, some of the observations made about stakeholder and community sentiments can be compared to those observed in other studies of a similar nature. Essentially, this study offers new opportunities through which other studies can engage with the concept of River Basin Management, having dealt with stakeholders and communities directly, through which key information was obtained.

As a critical opportunity for future research or studies, the framework formulated in this study is yet to be applied as a strategy for the management of a river basin. The application or implementation of this framework will create the opportunity to study it in action. Although this study was concerned with its formulation, this framework must be adopted before it can be studied. The adoption of such a strategy involves the application of its various models. The application of these models presents opportunities for active research in themselves. In the case of the current study, the application of these models and framework would have extended past the time allotted to this research. Hence, future studies are advocated for should these models be accepted by the entities and role-players they involve.

Although these models and overall framework is supported and defended, this study makes bold recommendations for their implementation, as well as the effectiveness of South Africa's current policy. Future studies may be in a better position to critique this notion, highlighting a deeper understanding of policy from a different perspective. In this regard, the framework and models proposed can be studied from a political studies perspective, for example, were political theory, agential theory, etc., can be assessed at a much deeper level. This study essentially captures the role of policy in enabling stakeholder engagement and community participation. However, other factors in policy may be studied in a similar way, with the potential to highlight

shortcomings of policy hindering implementation of such frameworks. Further, considering the recommendations made in this study, future studies can position themselves to critique these viewpoints, drawing from other fields such as sociology, psychology, etc.

Finally, at the heart of this study was the need to address River Basin Management in a community which is seemingly abandoned and left to their own devices. Although many of South Africa's communities, particularly those situated around rivers and water resources face similar challenges, there is need to study each in their own context. Drawing from the findings of this study, and the recommendations made, this study opens the door to new opportunities through which other communities can be addressed. This in turn will qualify the recommendations made here, establishing additional insight, and further supporting the value of such as novel study. As this study has demonstrated, opportunities exist to better understand stakeholder engagement and community participation, however, these opportunities must be harnessed with the potential to discover much more than is already known.

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APPENDICES

APPENDIX 1

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

Research Office

HUMAN RESEARCH ETHICS COMMITTEE (NON-MEDICAL)
R14/49 James

CLEARANCE CERTIFICATE	**PROTOCOL NUMBER: H22/05/15**
PROJECT TITLE	Perspectives on the role of stakeholder engagement and participation in river basin management in South Africa: A study of the Hennops River
INVESTIGATOR(S)	Mr L James
SCHOOL/DEPARTMENT	Geography, Archaeology and Environmental Studies/
DATE CONSIDERED	22 May 2022
DECISION OF THE COMMITTEE	Approved Risk Level: Low
EXPIRY DATE	20 June 2025

DATE 21 June 2022 **CHAIRPERSON** _____
(Professor J Watermeyer)

cc: Supervisor : Professor M Simatele

DECLARATION OF INVESTIGATOR(S)

To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University. Unreported changes to the application may invalidate the clearance given by the HREC (Non-Medical)

I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to submit an amendment of the protocol to the Committee. **I agree to completion of a regular progress report. For Minimal and Low studies, this is due annually on 31 December. For Medium and High Risk studies, this is due twice annually on 30 June and 31 December.**

_____ _____/_____/_____
Signature **Date**

PLEASE QUOTE THE PROTOCOL NUMBER ON ALL ENQUIRIES

APPENDIX 2

Interview Guide: Discussions with Stakeholders and Community Members

Time of interview:

Date:

Place:

Interviewee:

(Brief description of the project by interviewer) (Will be provided with the participation information sheet)

(This is followed by a consent form)

Questions:

Introductory/ Ice-breaking Questions

1. Please describe your household/ organisation/ business?
2. If an organisation/ business, what is your space of expertise or market?

Main Questions

3. What is your/ your organisation's/ household's relationship with the Hennops River Basin?
4. Are you familiar with organisations working around the area and community?
5. Would you say that you/ your organisation has an interest in the Hennops River Basin's wellbeing?
6. How did you first meet Hennops Revival/ EnviroCare Tembisa?
7. How do you perceive the work that they are currently doing in relation to the Hennops River Basin?
8. Since it is evident that the River Basin faces challenges, in your opinion, what are some of the underlying causes that need to be addressed?
9. How would you describe your/ your organisation's potential role should you be involved in managing the Hennops River Basin?

10. How is your life/ organisation connected or related to the Kaalspruit and its water resources?
11. What are your opinions on our water policy in relation to the challenges the Hennops River Basin?
12. Would you be interested in joining a management panel/ community forum dedicated to the management of the River Basin?
13. If not, why would you not want to participate in River Basin Management?
14. What are some of the potential ways forward for the River Basin and its management?

Cooling-off Questions

15. Based on our discussion, is there anything we have left out?
16. Who else could I speak to who might be of interest for this study?

Thank you for your participation!

APPENDIX 3



Design of Flyer/Poster circulated to advertise clean-up initiative.

Screenshot of website advertisement of clean-up initiative.

APPENDIX 4

EXTENDED PHOTO GALLERY OF CLEAN-UP CAMPAIGN IN ESIPHETWENI-VUSIMUZI

Link to YouTube coverage as part of the Wits 100 Celebration:

https://www.youtube.com/watch?v=v35RxIgRU28



Photograph of site and engaged stakeholders in the background.



Section of the Kaalspruit that runs through eSiphetweni-Vusimuzi area.



Registration of participants.



Meeting point and proceedings before clean-up activities.



Different stakeholders and community members engaged.



Prof. M.D. Simatele giving a talk during the campaign.



EnviroCare Tembisa leader (Mr Samuel Mashimbyi) giving a talk during the campaign.



Gathering of stakeholders and community members during the campaign.



Condition of the Kaalspruit noted during the campaign.



Prof. L. Chimuka of Wits participating in clean-up activities.



eSiphetweni-Vusimuzi Bridge in Tembisa.



Clean-up activities underway during the campaign.



Amount of refuse bags of waste amassed after the campaign.



Wits Students who participated in clean-up campaign wearing the event’s branded t-shirts.