

# Investigating the Perceptions of Water Managers on IWRM and Adaptive Management in the uMngeni Catchment

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**Abstract:** *Integrated Water Resource Management (IWRM) is a water management approach that integrates water-use sectors and water users in the decision-making process, while considering the dynamic physical environment. IWRM is characterised by the management of water resources at a catchment level, but does not cater to the uncertainties that arise, such as climate change. Adaptive Management (AM) is an approach that aims to reduce uncertainty at management level by improving knowledge generation, to better inform decision-making in a changing environment. IWRM and AM improve the effectiveness in water resource management and are evident in the uMngeni catchment. However, the catchment still faces challenges e.g., water leaks, failing water infrastructure, poor water quality, and erratic rainfall. If the approaches are applied, why does the catchment continue to face these challenges? This demonstrates an underlying issue with how the approaches are perceived and implemented on the ground. Literature rarely investigates the water managers who are charged with making decisions and how their perceptions of water resources management may influence decision-making. Twenty-one semi-structured interviews were conducted to investigate the research question, 'Do water manager's perceptions and understanding of the management approaches hinder or facilitate their implementation?' The findings show that although the respondents are more knowledgeable on IWRM as compared to AM, other factors that hinder the implementation of the approaches include a lack of political will and poor decentralisation of water resource management.*

**Keywords:** IWRM, adaptive management, South Africa, water sector, perceptions

## 1. Introduction

Conventional water resource management approaches are described as top-down, technical, highly fragmented, and uncoordinated due to the multiple role-players involved in decision-making. These approaches have resulted in the unsustainable management of water resources and have not yielded positive outcomes regarding water resource protection (Godinez-Madriral et al., 2019; Elias, 2017; Dent, 2012; Pahl-Wostl, 2015; Nyamwanza and Kujinga, 2016). Thus, Integrated Water Resource Management (IWRM) has been the point of conversation for the past two decades, as the management approach that embodies principles such as participation, efficiency, equity, transparency, accountability, and inclusivity to ensure integration in resource planning (Pires et al., 2017; Suhardiman et al., 2017; Van Dorp et al., 2018). IWRM is a management approach that focuses on integrating different water-use sectors, institutions, stakeholders, and natural systems in the decision-making process of water resources; to reduce the high environmental, economic, and social costs on society. IWRM is mainly characterised by a suit of legislation that specifically govern water resources, and the formation of institutions within Water Management Areas for the decentralisation of management, that promotes decision-making processes within a catchment. Global reforms in water governance were increasingly evident in the 1980's as the international water community held multiple conferences discussing the experiences of implementing IWRM (Al Radif, 1999; Swatuk, 2005; Wilkinson et al., 2015). IWRM as an approach achieved better coordination and integration in water management. However, IWRM has been criticised as being an approach that is universal and assumes an assured water supply (Biswas, 2004; Fischhendler, 2008; Medema et al., 2008; Bourblanc, 2012; Dent, 2012; Lubell and Edelenbos, 2013; Muller, 2015); without considering the uncertainties that exist such as climate change, the constant change in hydrological functioning of river systems, and the lack of knowledge water managers have on socio-ecological dynamics (Mosley, 2015; Albareda and Campos, 2018; Allen and Garmestani, 2015; Summers et al., 2015) which IWRM does not address.

Considering these uncertainties, Adaptive Manage-

ment (AM) has been identified as a complementary approach to IWRM, as the underlying premise is to reduce uncertainty in water management (Pahl-Wostl, 2007). AM seeks to achieve this by ensuring that decision-making is based on improved knowledge generation and institutionalising Social Learning in water management bodies. AM is characterised by including diverse stakeholders (i.e., decision-makers, society, water companies and managers, environmental authorities, water users, physical and social scientists) in finding solutions to specific water issues. These stakeholders work together in identifying a specific issue in a catchment, designing a hypothesis toward addressing the issue, designing a management system and/or an approach, pooling resources and knowledge, implementing the solution and identifying indicators that will assist in measuring the progress (Pahl-Wostl, 2007). Therefore, the successful implementation of IWRM is evident when there are a suit of legislation governing water resources and an institutional landscape that manages water resources at a catchment or river basin level. In addition, AM is successfully implemented when there is cooperation among the affected parties of a particular water issue, pooling of resources, and the allocation of sufficient time, in achieving the identified objectives. The two management approaches are identified in the South African context and specifically in the uMngeni catchment.

In 1994, the abolishment of Apartheid and discriminatory laws in South Africa, enabled the transformation of water governance within the country, which formed part of a larger process of political change (Ashton et al., 2006; Bourblanc, 2012; Dent, 2012). Thus, South Africa began implementing IWRM principles with the promulgation of the National Water Act 36 of 1998 and the Water Services Act 108 of 1997 (Wilkinson et al., 2015). Furthermore, these acts required the formation of water management institutions within the respective Water Management Areas across the country. These institutions are further outlined in the description of the study site. Despite the adoption of IWRM, challenges remained as the effects of climate change caused a drop in water availability and poor water quality (Mosley, 2015; Albareda and Campos, 2018). The uMngeni catchment in the KwaZulu-Natal (KZN) Province of South Africa, faces numerous challenges that also affect water quality and quantity such as inadequate solid waste management, high levels of

sewer leaks into river systems, and failing water services infrastructure which are evident through water leaks (Awuah et al., 2023; Kidd, 2011). Moreover, the eThekweni and Msunduzi Municipalities which are the most populous in the province, recorded a loss of non-revenue water of 40% and 45% respectively, which are attributed to direct water leaks from pipes (Hay, 2017).

The shortcomings of IWRM were further evident in the Palmiet River catchment which is located downstream in the uMngeni catchment. Specific issues such as industrial pollution and high solid waste was prevalent in the Palmiet River. In addressing this, the Palmiet Rehabilitation Project (PRP) was initiated which consisted of the eThekweni Municipality, the residents of the Quarry Road informal settlement, and the University of KwaZulu-Natal School of Development Studies. Non-Governmental Organisations included uThekwane Conservancy, Palmiet River Watch, Durban Green Corridor, and the eThekweni Conservancies Forum. These stakeholders formed a committee, developed, and implemented an action plan, whilst pooling together essential resources. Consequently, there has been a reduction in waste dumping, the launching of recycling initiatives, engagements with the local community and improved monitoring systems for water quality. The implementation of the PRP mirrors the characteristics of AM. Although the implementation of the two management approaches is evident in South Africa and in the uMngeni catchment as described in the Palmiet River catchment, there are still challenges that are prevalent in the catchment. This has led the researchers to investigate the potential factors that may influence the implementation of IWRM and AM as they are relevant in this context.

IWRM and AM literature rarely investigates the human resources that make up water resource management institutions (Lubell and Edelenbos, 2013; Ngene et al., 2021; Saravanan et al., 2009); which is noteworthy considering Water Managers are responsible for making decisions and implementing the approaches. Therefore, the research questions posed are, “How do water managers perceive and understand IWRM and AM?” and “How do these perceptions hinder or facilitate the implementation of IWRM and AM?”. To gain a contextual understanding, an in-depth qualitative study was conducted through semi-structured interviews, to

investigate Water Managers perceptions on IWRM and AM in the uMngeni catchment. The study is highly relevant in the context of this catchment, given the approaches relevancy in the catchment and how pertinent it is to investigate the perceptions of Water Managers who are responsible for implementing them.

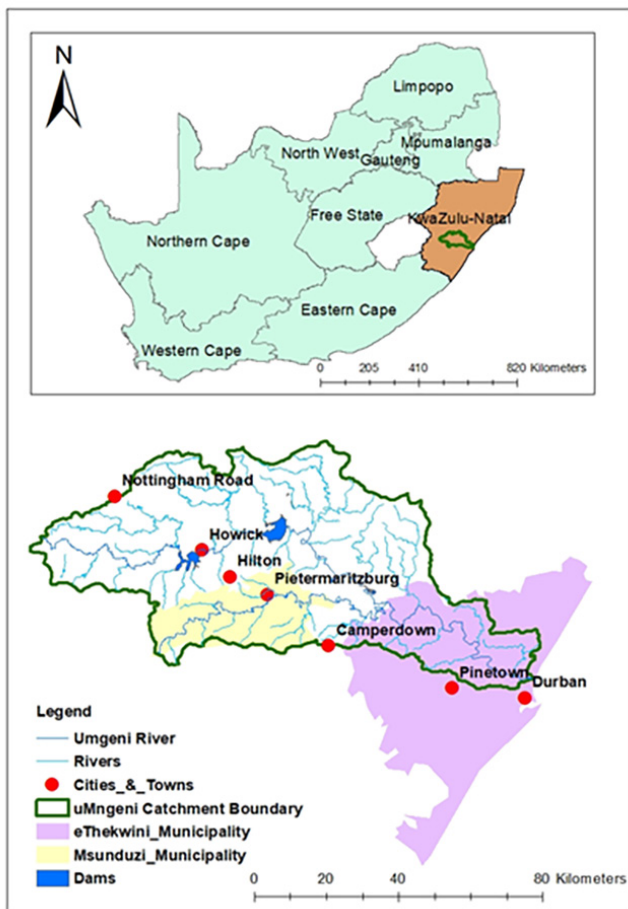
## **2. Water Resource Management in the uMngeni Catchment**

### ***2.1 Study Area***

The uMngeni catchment is approximately 4 439 km<sup>2</sup> and is in the province of KZN, South Africa as shown in Figure 1. The area upstream of the uMngeni is predominantly wetlands, grasslands, and numerous irrigated farmlands. The central region of the catchment is characterised by built-up areas and towns before reaching residential areas, natural bush, sugar cane fields, and industrial activities which dominate the regions downstream of the uMngeni River, toward the estuary as it opens out into the Indian Ocean (Shoko et al., 2016). Informal settlements can be found along the entire river due to the reliance on the water resource for domestic water supply. The catchment has an ongoing challenge of sewerage discharge from residential areas and informal settlements, and illegal dumping of solid waste which negatively affect the quality of the uMngeni River. Furthermore, water quantity is an issue as the uMngeni is a closed catchment that has no additional water rights available for use. These issues compounded by inconsistent rainfall makes the catchment a suitable case study to investigate the perceptions of Water Managers.

### ***2.2 Institutional Landscape***

The current management structure that exists begins at the national level with the Department of Human Settlements, Water and Sanitation (DWS). DWS is the custodian of all water resources in South Africa and is responsible for water resource planning. Their mandate includes implementing the guidance tools and water legislation, allocating water-use licences that have been authorised, designing the national water resource strategy, establishing water



**Figure 1.** The uMngeni catchment in KZN, relative to the Msunduzi Municipality and the eThekweni Metropolitan Municipality, which are the most populous municipalities that rely on the catchment for water supply.

reserves, determining the pricing strategy regarding water-use, and setting Resource Quality Objectives (Makaya et al., 2020; Momberg et al., 2020; South Africa, Department of Water and Sanitation, 2019). Thus, DWS is the regulator and main institution responsible for the planning of water resources. The Water Research Commission (WRC) is another institution at the national level and is however, a non-governmental and non-statutory institution that focuses on research funding regarding water resources. The WRC plays a vital role as the institution funds research that has been identified as a research priority in the country, and researchers play an influential role in knowledge generation which informs decision-making concerning water resources. In addition, the institution sets research

agendas and facilitates the dissemination of information (Awuah et al., 2023).

According to the National Water Act 36 of 1998, DWS is responsible for establishing 19 Catchment Management Agencies (CMAs) in the respective Water Management Areas, to facilitate the management of water resources at the regional and catchment level. Moreover, CMAs are statutory river basin organisations. Thus, upon the establishment of the CMAs, the DWS delegates most of the national responsibilities concerning water resource management listed above to the functioning CMAs.

Additional responsibilities include establishing a Catchment Management Strategy, collecting water-use charges, managing water transfers, facilitating river health, commissioning research studies that inform planning, involving civil society and water users in decision-making, and protecting the water resources within the Water Management Areas. Unfortunately, after fourteen years, only two CMAs have been established namely the Inkomathi Usuthu CMA and the Breede Gouritz CMA. The Pongola-Umzimkulu CMA which would be responsible for the Pongola-Umzimkulu Water Management Area (of which the uMngeni catchment falls under), is one of the 16 CMAs which had not been formed (Awuah et al., 2023). In 2012, the DWS consolidated the proposed 19 CMAs to nine and expanded their areas of jurisdiction (Munnik, 2020). Due to the delay in forming the Pongola-Umzimkulu CMA, the DWS formed a Proto-CMA under the DWS, to facilitate some of the responsibilities that would have been delegated to the CMA. However, the Proto-CMA has been criticised of lacking the capacity to effectively facilitate water resource planning and coordinate land-use practices in the Water Management Area (Awuah et al., 2023). This was evident in 2018, when the Proto-CMA had a two-page proto-Catchment Management Strategy which was supposed to govern the water resource planning in the Water Management Area. Progress was made in February of 2020, when the proto-CMA released a new proto-Catchment Management Strategy which was 90% complete and in the draft phase. The drafting of the proto-Catchment Management Strategy provides the basis for the establishment of Catchment Management Plans for each catchment within the Water Management Area. Furthermore, it was reported that by October 2020, DWS would

have finalised the Pongola-Umzimkulu CMA, as the advisory committee had already discussed the formation and appointment of a governing body (Awuah et al., 2023). Although there is progress in forming the Pongola-Umzimkulu CMA, water resource management had largely been reactive to the challenges faced in the Water Management Area, with not much water resource planning taking place.

Another regional level organisation is the water board known as Umgeni Water. Umgeni Water also fulfils the role of a Water Service Provider as they are primarily responsible for treating raw bulk water at the Darvil treatment works and managing bulk water infrastructure on behalf of DWS (Awuah et al., 2023). The water board works alongside DWS in the allocation of water, monitoring water quality and have recently formed a Catchment Management department, to coordinate catchment wide activities with water-use. Umgeni Water plays a vital role in the management of water resources in the catchment as it is well positioned to bridge water resource planning conducted by DWS or the proto-CMA and the reticulation of water services by the municipalities. Furthermore, Umgeni Water supplies potable water to six Water Service Authorities which includes the Msunduzi Municipality and the eThekweni Metropolitan Municipality of the uMngeni catchment. The municipalities are by law, responsible for providing access to basic water and sanitation services which include the supply, removal, disposal, purification, and regulation of water services. These services are detailed in the Water Services Development Plans which are drafted by and implemented in the respective municipalities. Figure 1 illustrates the location of the municipalities in the catchment and due to the eThekweni Municipality being downstream, it has a limited role in resource planning. Thus, participatory bodies such as the Umgeni Ecological Infrastructure Partnership (UEIP) seeks to increase the participation and coordination of catchment wide activities regarding ecological infrastructure (i.e., water resources) (Pahl-Wostl et al., 2023). The UEIP is a non-statutory partnership which consists of representatives from the DWS, Umgeni Water, academic institutions such as the University of KwaZulu-Natal, and NGOs, just to name a few. Although the partnership does not have any mandates, it operates in the uMngeni catchment to bridge the gap in ecological infrastructure planning, within the respective institutions. The partnership meets

regularly, and the representatives use the platform to improve coordination of catchment wide activities. The Department of Economic Development, Tourism and Environmental Affairs (EDTEA) is the province's commenting authority which approves or rejects developments within the province. EDTEA's role in water resource management is evident in their efforts of protecting water resources by limiting development in proximity to strategic water source areas. Although the department does not play a major role in water resource planning, they are regulators in the province and participate in community engagements where water issues are often raised. The University of KwaZulu-Natal also plays a limited role as they participate in research that benefits the catchment. Furthermore, the university has a good relationship with the institutions involved in water resource management. Lastly, the university plays an essential role in capacity building and the training of water professionals, many of whom graduated from the institution (Awuah et al., 2023).

At the local level, there are two main institutions that facilitate water resource management. The National Water Act 36 of 1998 requires that Irrigation Boards (which were formed and managed by farmers to facilitate farmers participation in water resource management) were to be transformed into Water User Associations (WUAs) and to be representative of all water-users in the catchment, rather than being representative of farmers (Kahinda et al., 2015; Wilkinson et al., 2015). WUAs were to include all water-users who have or do not have formal water entitlements. This was done to include previously disadvantaged groups in the discussion of water resource management in the catchment (Tekwa and Adesina, 2023). Despite its statutory status, WUAs have not been formed in the uMngeni catchment and the ramification of this is that water-users are excluded from water resource management and planning processes (Mugejo and Ncube, 2022). The second institution is the Catchment Management Forums (CMFs) which are non-statutory bodies. CMFs are platforms where residents in the catchment can meet and discuss the prevailing issues and water challenges. DWS and EDTEA representatives frequent CMF meetings to connect, consult and communicate initiatives, conduct follow-ups on issues in the catchment, and facilitate discussions on future development plans. The Msunduzi CMF focuses on the water quality of the Msunduzi River,

which feeds into the uMngeni River, and operates in the mid region of the catchment (Lukat et al., 2022). The Upper uMngeni CMF focuses on the areas upstream, that drain into Midmar Dam (near Howick in Figure 1). The Institutional Management Directorate: Catchment Management Sub-Directorate in the DWS is responsible for communicating with the CMFs and assist in the functioning of the institutions (Awuah et al., 2023). Therefore, the current institutional landscape demonstrates the basis of IWRM implementation through the institutional structures that have been formed and yet to be formed. The management of water resources is done based on Water Management Areas.

### 3. Methods

#### 3.1 Research Design

The research question that is posed is ‘Do the water manager’s perceptions and understanding of the management approaches hinder or facilitate their implementation’. In answering this research question, a case study where IWRM and AM are implemented is necessary. Thus, the uMngeni catchment was identified for reasons stated in the introduction. Furthermore, the case study approach enables the researchers to employ a critical questioning approach to investigate the Water Managers perceptions on the water management approaches (Crowe et al, 2011). Lastly, this case study is identified as an instrumental case study as it is a typical case example. IWRM and AM are applied in many catchments, however, will differ in the way that they are implemented. Thus, to understand the context of whether Water Managers in the uMngeni catchment may or may not be facilitating the implementation of the water management approaches, this research method is appropriate (Bhattacharjee, 2012; Lam and Law, 2016).

#### 3.2 Data Collection and Analysis

Primary data was sourced from 21 semi-structured interviews which were conducted between the months of May and December 2019. Semi-structured interviews were selected due to the lead

researcher’s lack of knowledge on the current water resource management and planning processes prevalent in the catchment. Therefore, to source relevant and detailed information that was not available in published literature, and to ensure that the researchers did not limit the interviewees responses, open ended questions were pre-planned (Adeoye-Olatunde and Olenik, 2021; Kallio et al., 2016). The interview schedule consisted of 13 questions which were divided into background questions and contextual questions. The background questions were designed to understand the interviewee’s role in their respective organisations and the sphere of influence the organisation has in the uMngeni catchment, both physically and functionally. This assisted in mapping out the institutional landscape and was addressed in Awuah et al., 2023, which informed this research paper. The background questions also addressed the interviewee’s perceptions on IWRM and AM as they were asked to elaborate on what they understood the approaches to be. The contextual questions explored the management dynamic that exists in the catchment, the issues that are prevalent and the interviewee’s willingness to make necessary management changes in the catchment. The full interview schedule is attached as (Appendix A). Although spontaneous questions were raised as follow-up questions to the interviewee’s responses, the 13 questions were standardised to ensure a level of data reliability and possible replication in a different study (Barriball and While, 1994). In addition, Social Desirability is a term used when respondents in a study provide what they deem as favourable answers, thereby not expressing their true thoughts. Efforts toward avoiding Social Desirability included the respondents signing a Consent Letter which ensures anonymity. Therefore, all the interviewee’s identities are unknown to the reader and are referred to as Water Managers or respondents (Bergen and Labonte, 2019; Barriball and While, 1994), allowing them to speak freely. The interviews were conducted and analysed by the lead researcher.

The initial sample size consisted of ten interviewee’s who were identified by the researchers. Through the snowball sampling technique (Waters, 2015; Etikan et al., 2016), the sample size increased totalling 21 interviewees. The interviewees hold various positions in the following organisations: Department of Environmental Affairs (DEA); Department of Human Settlement, Water and Sanitation (DWS);

Department of Economic Development, Tourism and Environmental Affairs (EDTEA), Duzi Umgeni Conservation Trust (DUCT); eThekweni Metropolitan Municipality; Mooi River Farmers Association and Mooi-Mpofana Agricultural Association; Msunduzi Municipality; Msunduzi Catchment Management Forum; South African National Biodiversity Institute (SANBI) of the UEIP; Umgeni Water; the University of KwaZulu-Natal (UKZN); the Upper uMngeni Catchment Management Forum; the Water Research Commission (WRC) and WWF South Africa. From the 21 interviewees, one interviewee holds an Executive position in the water board; three holding a Director or Deputy Director position of catchment management and natural resource management, ten holding a Manager or Senior Manager position in the departments of Water Services Authority, Planning Services, Environmental Planning, Catchment Management and Water Governance; and three holding Chairperson roles in catchment

management forums and ecological infrastructure related platforms. The remaining four interviewees are frontline employees in the academic space, water quality and water services planning departments. The selection of these interviewees was vital as they are involved in water resource planning in the uMngeni catchment, most of whom are in a managerial position. Each interview session was voice recorded and lasted between 40 minutes to an hour.

### 3.3 Analytical Framework

After each interview session, the recordings were transcribed and analysed through Thematic Analysis and Coding (Clarke et al., 2015; Vaismoradi et al., 2016; Kyngas, 2020). To categorise the water manager's perceptions on IWRM and AM, each of the responses were analysed according to five themes.

	<b>Theme 1</b>	<b>Theme 2</b>	<b>Theme 3</b>	<b>Theme 4</b>	<b>Theme 5</b>
<b>IWRM</b>	Understanding of the concept by referring to the aspects of integration, decentralisation, coordination/cross-sectoral planning, and soft management approaches (deviating from highly technical or hard engineering solutions to water issues).	Positive reflections and views on the concept	Negative reflections and views on the concept (lack of belief for the concept).	Lack of knowledge or certainty of the concept.	No response to the question or provided a response that did not relate to the question.
<b>Adaptive Management</b>	Understanding of the concept by referring to the following aspects: time frame, funding, identifying objectives, collaboration, monitoring systems, management strategy/ies, Social Learning, and experimentation				

**Table 1.** Five themes categorising the Water Manager's responses concerning IWRM and AM as management approaches.

Theme 1 comprised of key aspects of IWRM and AM which were informed by Pahl-Wostl and Sendzimir (2005) and Pahl-Wostl et al (2010), which compared different water management approaches and transitional processes. Water Managers who demonstrated an understanding of these aspects and who were able to provide a reflection based on these indicators, were identified as understanding the concepts. The second theme entailed the positive reflections and views on the concepts by the Water Managers. The third theme is the collection of responses that indicate a negative reflection and view of the concepts. Moreover, Water Managers' responses which indicated a disbelief of the concepts were grouped into the third theme. Water Managers who expressed a lack of understanding of either of the concepts or who indicated that they were not certain of what the concept entailed were grouped into the fourth theme. The final theme entails the responses provided by the Water Managers which did not particularly relate to the questions, or those that did not respond to the question. The former includes responses on adapting to climate change, enforcing water saving measures during a drought and raising awareness on wise water-use.

## 4. Results

### 4.1 Respondent's Perceptions on IWRM as an Approach

Out of the 21 respondents who were interviewed, 18 expressed a good understanding of IWRM. This is determined because the respondents explained the concept based on the indicators listed in Table 1, informed by Pahl-Wostl and Sendzimir (2005) and Pahl-Wostl et al (2010). These respondents described aspects of the approach and what it entails such as the integration and coordination that is necessary among departments, and water-users. These respondents further elaborated on the importance of linking upstream activities with the activities occurring downstream within a catchment, by including interested and affected stakeholders in the decision-making process. Furthermore, these respondents detailed the importance of decentralising water resource management through the establishment of water governance institutions at varying

levels of management. Another aspect of IWRM which was spoken about in detail was the transition in management styles from focusing on technical and hard engineering solutions, toward human and ecologically centred management regimes. Box A provides the quotes from respondents demonstrating their understanding of IWRM.

#### Box A. Representative quotes reflecting the respondents understanding of IWRM

1.	"IWRM is very important...There needs to be much more coordination between stakeholders."
2.	"you need the local level institutions. The model of water user associations at the local catchment level I really do think is the way to go...decentralised, local level water resource management will be far more effective."
3.	"Around IWRM it is difficult to say you have achieved it because it is a process with no end point. It is a way of doing things, being aware of processes that impact on water resources and to coordinate it...Our environmental law and regulations gives us the opportunity to practice IWRM"
4.	"If people understand that they live upstream from a dam, and they constantly clearing their land (topsoil is flowing into the river system silting up the dam), they will reduce the storage capacity of the dam increasing the risk of not meeting water supply."
5.	"Historically, water planning has been focussed on engineering solutions where we abstract water and supply more water, but we are becoming more aware that the natural environment doesn't operate like that... the move towards ecological infrastructure and rehabilitation to secure water for the future is important."
6.	"My view of IWRM is that it is management that involves all the stakeholders in meaningful analysis, planning and management."



7.	“For me IWRM is an approach of how we should manage water resources which should be inclusive, should be delegated (decentralised) at the local level so that people can manage the water for themselves”
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Seventeen of these respondents have a positive view on IWRM as an approach as they stated that the concept is good, and Water Managers should work toward implementing IWRM. One of the 17 respondents described how a shift was occurring in the catchment as more resources were being directed toward restoring ecological infrastructure (e.g., wetlands) rather than implementing hard approaches like building dams which is discouraged by IWRM. Reference was made to a rehabilitation project where the team opted to convert a degraded wetland to a waste dump rather than installing canals. The 17 respondents further highlighted that implementing IWRM will result in better water resource management and acquiring baseline data that is essential for the decision-making process, through improved integrative processes, as listed in Box B. These respondents mentioned that IWRM advocates for the decentralisation of water resource management which is a good addition to management styles. These respondents further praised the South African legislation for guiding the establishment of institutions that would include previously excluded water-user groups in the management of the resource. Each of the 17 respondents outlined IWRM as a good approach theoretically and recognized the difficulty in implementing it due to poor capacity, financial resources, a lack of participatory and integrative tools to facilitate IWRM implementation. These respondents highlighted that the institutional landscape still needs attention and regulatory documents such as the Catchment Management Strategy, National Water Resources Strategy and the water legislation need to be updated.

**Box B.** Representative quotes reflecting the respondents with a positive outlook on IWRM.

1.	“Your social side has to be integrated with your plans otherwise it (IWRM) won’t work, so you have to involve communities, farmers and understanding how important water resources are.”
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2.	“Can’t have IWRM and exclude water services because they are in the same value chain and cycle. So, you get water to drink, treat it and put it back into the resource. If we are not planning resources, we cannot accommodate services.”
3.	“The idea is we need to understand what the other departments are doing, if there is a need to collaborate on something then we will collaborate.”
4.	“There are aspects (of IWRM) that make complete sense...the underlying logic is that you cannot manage water in isolation from the landscape in which it finds itself.”
5.	“With regards to IWRM, I don’t think there is enough of it. There are some cooperative governance mechanisms in place to assist in IWRM, they not well attended or really achieving the purpose set out to do... This should be driven by the provincial committee/office of premier and should not be voluntary.”
6.	“The concepts have been around for so long they make sense. The conceptual idea of what IWRM should be like, it’s there, it doesn’t always happen in reality because we live in a fallen system where we are working with the limitations of people, interference of politics, state of our country, economics. I think as a country we have made some encouraging progress with that space, the fact that there are these platforms that exist for discussion... We have made good progress but there is always room for improvement.”
7.	“IWRM is a good concept on paper.”
8.	“They are both very necessary because it is not enough to know how much water is coming down the catchment, you have to build a dam, make sure the landscape is protected, make sure users understand how valuable the water is. So, you need a lot of line functions, catchment management, sanitation etc. working together for a common solution...IWRM is very important.”

The remaining four respondents hold a negative view of IWRM and have criticisms of the approach. These four respondents outlined that IWRM as an approach is not suitable for the South African context and the idea of decentralisation further complicates water resource management. The quotes in Box C highlight the negative view on IWRM, held by the four participants.

**Box C.** Representative quotes reflecting the respondents with a negative outlook on IWRM.

1.	“CMA’s are a waste of time...we already have wards, ward councillors and councils so why set up another structure.”
2.	“...the concept is waved around by big development agencies (World Bank)...The problem with IWRM is that it has tried to be flexible and vague so that it means everything to everyone.”
3.	“I think IWRM is very broad and idealistic. I don’t think it was developed to work at a local scale...There are a lot of political and social issues to look at. IWRM does not look into these realities and what is happening on the ground.”
4.	“We haven’t seen it come to life anywhere. It is still just a theory. How will we operate? What is the difference that it will make? Because whatever it is supposed to do, we should already be seeing it by DWS, so I don’t know why a switch of government structure should change overnight like that. So I don’t understand what will change.”

One respondent stated that they were not fully certain on their understanding of IWRM by stating that “I feel like my opinion on IWRM is still being formed, the more I read the less certain I am about how I feel about it” and went on to describe some aspects of the approach. Therefore, three respondents demonstrated a lack of understanding of IWRM by either stating that their understanding is still being formed or provided vague responses to the questions.

#### 4.2 Respondent’s Perceptions on Adaptive Management

The respondents understanding of IWRM compared to AM is greatly reduced as six respondents demonstrated an understanding of AM, which is determined based on the indicators listed in Table 1 and informed by Pahl-Wostl and Sendzimir (2005) and Pahl-Wostl et al (2010). These six respondents described AM and the importance of Social Learning, integrating a disciplinary management approach in decision-making, the extended time frames necessary to implement AM, the financial commitments required for experimentation, and the different skillsets that are necessary. One of the six respondents described the formation of the Durban Research Action Partnership (D’RAP) as a working framework for research programmes and described how implementing the partnership as a learning component was possible. In addition, the same respondent described the time frame that was needed to initiate the partnership and the programme. These respondents further explained the difficulties in implementing AM, stating that conducting transdisciplinary research is difficult as many researchers are not open to the transdisciplinary approach. This is attributed to researchers being entrenched in a discipline-specific approach with set goals and methodologies. Secondly, the financial year of organisations does not align with the academic year in South Africa (i.e., financial year is from March to February in the following year whereas the academic year is from January/February to November). This is an issue because organisations can only invoice work that has been completed. Thirdly, research output is in academic format and budget needs to be allocated to change that into a useable format such as a guide. In addition, research organisations and stakeholder organisations were previously not used to the approach of identifying research needs and communicating them to research bodies. The norm was that they brought on a researcher as a consultant who would produce a report. However, this did not allow for adaptability to novel situations.

Another of the six respondents expressed the need for stakeholders to be open to research programmes, to realise the associated benefits which include reducing consultancy costs, capacity building in less experienced personnel or students and increased willingness from communities to participate in

problem solving when working with students rather than government officials. The respondent further elaborated on the need to understand the time-consuming process associated with social learning, the slow impact of capacity building, the financial resources required, and the importance of defining the project's objectives and presenting the project well to stakeholders.

**Box D.** Representative quotes reflecting the respondents understanding of AM

1.	"...but everywhere you go now, there is cross sectoral or cross departmental discipline work happening because the problems we face now are so much more complex."
2.	"The key thing that distinguishes social learning from individual learning is that it happens at a higher level, organisations and systems...it is simply closing the loop on when you get feedback from the external environment, and deciding what you do and how you do it."
3.	"The kind of ongoing monitoring and data collection that is such a core part of AM... implementers need to take on the role for monitoring."
4.	"a certain skillset is needed such as leadership, negotiation power, managerial skills, and conflict management. Capacity building is needed to equip individuals with these skills. Goalsetting, timeframes and monitoring processes are just as important...it needs monitoring, people, organisations, elements of collaboration...you need to define it very clearly for yourself, who would be involved and defined boundary."
5.	"AM means being able to match one's plans and interventions to realistic data collected and what is available."
6.	"if objectives have not been achieved, you need to change your methodology."

The same six respondents hold a positive view on AM and highlight the need for more institutions

to take on AM implementation. These respondents recognise the difficulty in implementing AM compared to IWRM but still hold the view that AM is necessary, as indicated in Box E. In addition, another respondent admitted that they were not familiar with the approach by stating that they would need an explanation of AM (Box G, quote 4). However, the same respondent understood Social Learning and creating a pilot before implementing a change in a management approach. Thus, this respondent is familiar with the aspect of Social Learning but lacked an overall understanding of the approach.

**Box E.** Representative quotes reflecting the respondents with a positive outlook on AM.

1.	"Adaptive management implementation will be way more challenging...adaptive management has been out there that long and there isn't a main organisation that drives it like the GWP (Global Water Partnership) does for IWRM."
2.	"It (Adaptive Management) is simply closing the loop on when you get feedback from the external environment and deciding what you do or how you do it."

Although all six respondents shared a positive perspective on AM, one of these respondents believe that AM should be implemented by academic and research institutions, provided in Box F. This respondent does not believe that AM should be incorporated in institutions management systems and processes. Despite their understanding of the approach, this is categorised as a negative view on AM as the approach entails the implementation by any institution and is not limited to academic and research institutions.

**Box F.** Representative quotes reflecting the respondents with a negative outlook on AM.

1.	"I don't think there is a need, but they need to be in touch in the research that is going on. There needs to be research that responds to their needs, so they need to collaborate with the university."
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Four out of the 21 respondents declared that they did not know or understand the approach. These respondents explained how they were not exposed to AM and had not heard much about the approach, provided in Box G.

**Box G.** Representative quotes reflecting the respondents who declared a lack of understanding of AM.

1.	“it’s not a word that you hear all the time and I’m not too familiar with it, it doesn’t seem like it’s out there.”
2.	“I do not know the details of it.”
3.	“You would have to explain adaptive management a bit more.”
4.	“IWRM I get, adaptive management not so much”

A total of three respondents did not respond to the question concerning AM and only elaborated on IWRM. Therefore, eight respondents provided an answer regarding AM however elaborated on adaptive measures which they perceived to be AM. These quotes are provided in Box H. Therefore, only six respondents understood AM as a management approach and eight believe that AM is about implementing adaptive measures during water stress.

**Box H.** Representative quotes reflecting the respondents who elaborated on adaptive measures rather than AM. elaborated on adaptive measures rather than AM.

1.	“To me Adaptive Management is how we... use our water...when there are water shortages, we should be able to reduce water usage.”
2.	“They undertake studies for climate change impacts then they incorporate the results into their planning because they need to know how much water will be available in the future.”

3.	“Adapting is something else because even in planning it is difficult...”
4.	“We are a bit disconnected from our water because we switch on taps, and often we don’t think about where the water is coming from...so that is where Adaptive Management and Social Learning can play a bigger role.”
5.	“When there were water restrictions, we were drilling bore holes for water then applied restrictions to farmers.”

### 4.3 Respondent’s Perceptions on What Hinders the Implementation of IWRM

Each of the respondents provided their views on the issues that are prevalent in the uMngeni catchment and the factors that are hindering the implementation of IWRM. A total of 20 respondents explained in detail about how poor decentralisation of water resource management and the lack of political will is hindering the implementation of IWRM. These respondents described that the ramifications of the delay in establishing CMAs and WUAs within each Water Management Area included poor capacity in dealing with water issues, overlapping functions between departments and insufficient accountability among Water Managers. These quotes are provided in Box I below.

**Box I.** Representative quotes reflecting decentralisation and the lack of political will as hindering the implementation of IWRM.

<b>Respondent 1:</b> “It (change) has to start at the top. If we get a minister who is serious about this, who delegates the necessary instructions to provincial departments.”
<b>Respondent 2:</b> N/A
<b>Respondent 3:</b> “We can improve on issues, but to do this we need to change how we (government) have operated before...But essentially it is about the political element that comes into play, and

<p>how do you change that which is another challenge.”</p>	<p>(Quote 3) “Municipalities and other government departments do not have the budget available to address these issues.”</p>
<p><b>Respondent 4:</b> “Once CMA is established it would be more flexible and resourced because the CMA will rely heavily on the forums in terms of undertaking its functions and fulfilling its mandates as a CMA. They would even go out and establish more forums”.</p>	<p><b>Respondent 9:</b> (Quote 1) “DWS which is the custodian of water resources has been slow... in rolling out CMA even though the legislation (National Water Act) is pretty good.” (Quote 2) “Water pricing had a built-in mechanism to collect funds...CMAs have not been fully established...therefore the mechanism has not been implemented.” (Quote 3) “When there is an issue, municipalities do not know how to stretch their budget to address issues... They are not managing their finances.”</p>
<p><b>Respondent 5:</b> (Quote 1) “A lack of political support...a lack of finances, DWS and CMA are unable to enforce certain things.”</p> <p>(Quote 2) “CMA should be a number one priority which need to be set up with authority in place.”</p>	<p><b>Respondent 10:</b> (Quote 1) “If you look at government...they fail to plan holistically.”</p> <p>(Quote 2) “There isn’t really a Farmers’ Association here in the Msunduzi.” (</p> <p>Quote 3) “Infrastructure failing, lack of governance or leadership, Msunduzi municipality being under administration which influences what we should be doing with water management.”</p> <p>(Quote 4) “Politicians are engaging just so that they can tick the boxes not because they desire to.”</p>
<p><b>Respondent 6:</b> (Quote 1) “I think there are real problems with water resource management starting with CMAs which haven’t gotten off the ground. That sort of leadership from national government has been very slow to get to where we need to be.”</p> <p>(Quote 2) “There is quite a big gap between local, provincial, and national.</p>	<p><b>Respondent 11:</b> (Quote 1) “Umgeni Water play a big role (in WR planning)...their planning department are always looking at future forecasting.”</p> <p>(Quote 2) “Mpophomeni Waste Water Treatment Works that is hardly functioning and their sewer reticulation needs upgrading... There was a group who were supposed to work on the upgrade which has been interfered with politically...this has halted the improvement of a Water Waste Treatment Facility...with the worst water quality because E.Coli levels...are frightening.”</p>
<p><b>Respondent 7:</b> (Quote 1) “CMAs should have been developed throughout SA to pull the different parties together. In the CMA there would be a water board like Umgeni, irrigationboards for agriculture, DEA, EKZNW, and a number of others. All these bodies use and affect water in some way and there is no body that controls everything. Therefore, as users, we make do with the current situation... organisations go about their mandates.”</p> <p>(Quote 2) “lack of capacity in institutions, lack of various instruments i.e., human resources, financial resources, lack of participatory tools.”</p>	<p>(Quote 3) “There are no CMFs in places where there are traditional leadership...there is a lot more room for grassroots structures...we have a disconnect in meetings from a CMA level, CMF even irrigation boards and that often not being connected to national”</p> <p>(Quote 4) “there are all the smaller level catchment stuff which is unrealistic to think that somebody sitting in an office in Durban or Pretoria will</p>
<p><b>Respondent 8:</b> (Quote 1) “Proto-catchment management agency the Pongola-Mzimkhulu which needs to be converted into a CMA... There should be a Water User Association (WUA) but there isn’t one. At the moment we have irrigation boards which would need to be converted into WUA.”</p> <p>(Quote 2) “Establishing the CMA so as to coordinate and enforce management.”</p>	

deal with issues. They are not familiar with your context and therefore you need the local level institutions. The model of water user associations at the local level I really do think is the way to go. The whole thing got put on hold and there is a lot of uncertainty on whether the minister will bring it back. But in my view, decentralised, local level water resource management will be far more effective...we still got great laws, but there is not enough people to be the eyes and ears on the ground, need to capacitate these structures.”

(Quote 5) “Farmers have a different mentality, they do not want a WUA or irrigation board because they think they will be under more scrutiny and they like flying under the radar. This will only change when they get a directive from water affairs saying: ‘you will form a structure’. So, either a lack of willingness, interest, or local champion.”

(Quote 6) “There should be a nationwide push for WUA”.

**Respondent 12:** (Quote 1) “uMngeni is fortunate because it has some strong capacity and organisations like Umgeni Water, eThekweni Municipality and UKZN...there is some baseline water resource planning driven from national level of government. Whether this translates lower down is another question.”

(Quote 2) “There are institutional failures... Msunduzi Municipality being under administration”

(Quote 3) “We have a national sphere that manages the resource but does not work as closely to the local sphere as it should...the practice of decentralisation where the water services function was assigned to local government; this happened in a way that left local government struggling which is why there are dysfunctional water treatment works. Decentralisation was carried out in a way that was not kind to local government... looking at the consequences of the delays in the establishment of CMAs...the consequences are huge for a range of functions. Root causes could be part of a larger system.”

(Quote 4) “There should have been some institutions that were established after the reforms in 1994 and it is a work in progress to this day.”

(Quote 5) “number one priority is to fix the

institutions, set up CMAs and their powers, set up an independent economic regulator for water and finish moving the operational functions out of the department and into a different entity... Half our problems would be solved.”

(Quote 6) “a lot of the resistance to the establishment of CMAs have come from within the department itself. Individuals perceive that the new institutions will not be good for them personally, so they put their interest ahead of those of the water sector.”

**Respondent 13:** (Quote 1) “What is lacking in the South African context is that it is not seen in its (IWRM) totality... This has a lot to do with the organisation element which is non-existing CMA...Pretoria (DWS) cannot do that because they do not have the man power and mandate to intervene at that extent.”

(Quote 2) “It is extremely problematic because we need some authority or functioning organisation that takes on not only their initial functions but also the delegations that sit within the act... At the moment it would be the CMA that will bring that all together. The main problem is in Pretoria (minister) who are holding the entire system to ransom.”

(Quote 3) “Part of the work in the act is done by regional office and part is by Pretoria, but the totality.”

(Quote 4) “They are more oriented to Pretoria, but they don’t fully understand everything that is going on in the catchment, regional office doesn’t look to the catchment.”

**Respondent 14:** (Quote 1) “Municipality is dysfunctional due to political in-fighting therefore, no political will to deal with water and sanitation.”

(Quote 2) “there is no CMA because of political issues. Once it is established and is politically free, we will have a firm platform for IWRM.”

(Quote 3) “Water needs to be removed from the political arena...more changes to make local forums effective therefore authority”.

**Respondent 15:** (Quote 1) “The problem in the uMngeni catchment is that there are no irriga-

tion boards therefore, no one is responsible or, overseeing the extraction of water...irrigation boards need to transfer to WUA therefore, water is more inclusive to all groups. This was hard because some boards did not have the technical ability to do so. Then transformations were halted because there was no difference between WUA and boards. Till date, minister has not found a solution...Currently, the department seems to want to run it from Pretoria... You cannot satellite manage...An entity needs to exist may it be WUA/Boards, there needs to be an entity with authority.”

(Quote 2) “uMngeni are only looking after potable water and do not get involved in agriculture because there is no platform, and it has always been like that...Boards are voluntary... There are a lot of political aspects to the whole thing.”

**Respondent 16:** (Quote 1) “DWS are actively involved but may not be well resourced to deal with issues. The people I have dealt with...are poorly resourced.”

(Quote 2) “There are political issues with DWS, it has taken a long time to get a CMA off the ground (10 years)...politics involved, overlapping mandates between EDTEA and DWS and other parties therefore no one actually taking responsibility because they are leaving it for the other person”.

(Quote 3) “Prioritisation of funding at any level, not always a push in environment”.

**Respondent 17:** (Quote 1) “At the moment, water management is a bit centralised because there is no CMA therefore no decentralised function. Whatever approach is being developed by department talks to the national and not local level...Now, the department is still more national because we have a national resource strategy...we don't have a localised CMS. We have a vacuum because these strategies speak to the national level and not the local level.”

(Quote 2) “supposed to have CMA but only two operating officially in SA...Other institutions that are supposed to be in place is the catchment management committee's but these will be established when the CMA is in place ad fully operational

because they are statutory body as well”

(Quote 3) “ the department has been weak on making sure these institutions are carrying out their mandate, looking at localised monitoring of water resources and sampling.”

(Quote 4) “there is no CMA, there is a gap that is why there are challenges in the system because there is no institution fully responsible for water resource planning. So, when they do water resource planning, it is done at the national level.”

(Quote 5) “There is a lack of coordination with regards to water resource planning as people are working in silos.”

(Quote 6) “Political willingness or understanding. Unions are saying CMA is privatisation so this could be lack of understanding by politicians.”

**Respondent 18:** (Quote 1) “Umgeni Water who are doing a lot of the water resource planning”

(Quote 2) “The institutional landscape of water resource management is actually absent.”

(Quote 3) “proto-CMA...they have limited capacity and a tenth of the budget. They can't do much by their own omission. Umgeni Water also has a role in water resources, they do a lot of planning and modelling to ensure they can meet demand.”

(Quote 4) “The failure of water services and resources is due to institutional failure...they have not dealt with leaks.”

(Quote 5) “We have good legislation but no way to regulate and enforce”

(Quote 6) “municipality that is under administration.”

**Respondent 19:** (Quote 1) “they seem to throw money at the problem which is not planning.”

(Quote 2) “From DWS I don't think they have had the political buy-in as they should have and that's why it has been a mess, money is dumped to certain areas which have no consequences to the bigger picture.”

(Quote 3) “If DWS used their own documents it would make a difference.”

(Quote 4) “they were going to merge Umgeni and Mhlathuze water boards”.

**Respondent 20:** (Quote 1) “The problem is that most of the country, there are no CMA yet and to my understanding, the reason why they haven’t been established yet is largely political...many of the building blocks haven’t been put in place yet. The process of determining reserves and the classification of water resources is happening as we speak. 21 years have passed, and those determinations are ongoing.”

(Quote 2) “DWS deal with water in systems, but they do not have the capacity to coordinate e.g., land-use practice with river needs.”

(Quote 3) “Department is reluctant to give up power to CMA.”

**Respondent 21:** (Quote 1) “we never intended to focus on IWRM because we felt like the governance issue was what we needed to solve. Once roles and responsibility issues are solved, it will allow the next steps to occur.”

(Quote 2) “municipalities have procurement issues and political issues.”

(Quote 3) “The issue is linked with capacity, skills.”

## 5. Discussion

It is evident that the respondents in the study who are mostly stationed in managerial positions, within the uMngeni catchment, have a good understanding of IWRM. The respondents were able to describe what the approach entails and were able to relate it to the uMngeni catchment. Furthermore, the respondents were able to identify the non-existent institutions that either have statutory or non-statutory status. Due to the respondents understanding of IWRM and their analysis of the uMngeni catchment, it can be deduced that their perceptions on IWRM facilitate its implementation. This is also attributed to the fact that there were only four respondents who believed that IWRM was not suited

for the South African context and demonstrated that the decentralisation of water resource management further complicates decision-making. Therefore, seventeen respondents believed in IWRM as an approach and had a strong will for the formation of non-existent institutions. It should be noted that a factor that is hindering the implementation of IWRM in the uMngeni catchment is the challenge of decentralising water resource management. This has been evident by the non-existent CMA and WUAs which has resulted in a lack of capacity to effectively manage water resources at a catchment level. Poor decentralisation of water resource management has been attributed to a lack of political will as water resource management and governance has been politicised. The respondents expressed how managers at the provincial level do not value the institutional change guided by the National Water Act 36 of 1998 and perceive the formation of the CMAs as a threat to their positions and functions.

On the other hand, there were only six respondents who had a good understanding of AM as an approach. These respondents were able to describe the aspects of the approach and outline the difficulties in implementing AM. Moreover, these respondents held a positive view on AM and recognised that more needs to be done to capacitate professionals on the approach. Unfortunately, there were a total of 15 respondents who either declared that they were not familiar with AM, did not elaborate on AM at all, or understood the approach as implementing adaptive measures such as wise water-use. Consequently, it can be deduced that the respondents lack of understanding of AM is hindering the implementation of the approach. If water professionals are not exposed to AM, they cannot be expected to implement it within the uMngeni catchment. To compound the situation, there are professionals who believe that they are implementing AM but are implementing adaptive measures and labelling it as AM. This is both misleading and inaccurate. Another misleading belief on AM that is held by a respondent is that AM should only be implemented by academic and research institutions. Literature highlights that AM should be incorporated in the management styles of any institution to improve decision-making, and that AM is not a research function. The reality is that many organisations or departments are not equipped or have the time to conduct AM and Social Learning. Moreover, the general idea is that water



professionals collaborate with research institutions such as universities who do research and disseminate the information back to the appropriate stakeholders. IWRM is internationally advocated for by the Global Water Partnership however, there is not an existing institution that advocates for the implementation and guidance of AM. Thus, the approach continues to be misinterpreted or not understood by water professionals.

## 6. Conclusion

IWRM and AM are management approaches to water resource management and are both evident in the uMngeni catchment. IWRM is evident as there is the National Water Act 36 of 1998 and the Water Services Act 108 of 1997 which guide South Africa in implementing IWRM principles and forming water resource management institutions for the decentralisation of water management. The decentralisation of water resources is evident in the catchment as there is a proto-CMA at the regional level and non-statutory CMFs that have been formed. AM is also evident in the catchment as the Palmiet Rehabilitation Project demonstrates the principles of institutionalising Social Learning, experimentation of a new management style, working toward set objectives to solve a water issue, the collaboration of different professionals and the extended time frame necessary to implement AM. However, despite the indications of IWRM and AM in the uMngeni catchment, the catchment faces numerous challenges. A research gap was identified in IWRM and AM literature where the Water Manager's perceptions on the approaches were rarely included. This was essential as the Water Managers are responsible for implementing the approaches. Thus, the research question 'Do Water Manager's perceptions and understanding of the management approaches hinder or facilitate their implementation' was posed and 21 semi-structured interviews were conducted. The findings revealed that 18 respondents demonstrated a good understanding of IWRM, and six respondents understood AM. In addition, the respondents described the challenge of decentralising water resource management and the lack

of capacity to deal with water issues. Therefore, the respondent's perception's on IWRM were identified as facilitating the implementation of IWRM. On the other hand, the respondent's perceptions on AM and their lack of understanding of the approach was identified as hindering the implementation of AM.

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## Appendix A

### Exploring the Implementation of Integrated Water Resource Management (IWRM) and Adaptive Management (AM) at a local scale: A case study of the uMngeni Catchment, KwaZulu-Natal.

#### Semi-Structured Interview Schedule

NAME (optional):	POSITION:
CONTACT DETAILS (optional):	DATE:
ORGANISATION:	
YEARS EXPERIENCE:	

#### Background Questions

1. What is (*Input organisation's name here*) sphere of influence spatially and functionally within the uMngeni catchment?
2. Can you describe the nature of water resource planning in the catchment?
3. How does water resource planning for the whole catchment align or feature with the (*Input organisation's name here*) mandates?
4. Can you describe what your role is within (*Input organisation's name here*)?
5. What is your personal view regarding IWRM and AM as management approaches?  
From your experience of working with other stakeholders, do external and internal stakeholders have an understanding of the approaches?

#### Context Questions

6. How is the past and current institutional set-up/dynamic, and co-ordination with regards to water resource management in the catchment?

7. Concerning the idea of coordination, have the Department of Water and Sanitation actively involved (*Input the organisation's name here*) and other stakeholders in water resource planning, and do these stakeholders feel welcomed?
8. When it comes to water resource management challenges, common themes in literature are Finances, Roles and Responsibilities, Political Support and Co-ordination. How would you describe the true extent of these and what would you say are the current challenges?
9. Considering these challenges and your opinion of IWRM and AM as approaches, what would you recommend should change, improve, and remain the same?
10. Do you think there is room to embrace such changes, and do you think other practitioners or managers would be willing to embrace these changes, yourself included?
11. What are some of the adaptive measures (*Input the organisation's name here*) implement?
12. Does (*Input the organisation's name here*) engage in Social Learning and action research?
13. In your experience working with (*Input the organisation's name here*), are there questions or aspects that I did not highlight that you think may be useful to this study?