UNIVERSITY OF ZULULAND

EQUITABLE ACCESS TO WATER AT ALFRED DUMA LOCAL MUNICIPALITY

NDIMANDE NOKUPHILA

STUDENT NUMBER: 201502284

A dissertation submitted in fulfilment of the academic requirements for the degree of Master of Arts in Development Studies

In the

Department of Anthropology and Development Studies

Faculty of Humanities and Social Sciences

At the

University of Zululand

Supervisor: Dr I.S Nojiyeza

2021

.

DECLARATION

I, **Ndimande Nokuphila**, hereby declare that this dissertation is entirely my own independent work. All the sources that have been used or quoted from have been acknowledged by means of references. I further declare that this dissertation has not been submitted for any other degree at this or any other university.

…….
NOKUPHILA NDIMANDE

……
DATE

DEDICATION

I dedicate this thesis to my caring family.

ACKNOWLEDGEMENTS

First and foremost, I thank God for being with me throughout this mission, it is due to His energy, braveness, unfailing love and expertise that I was able to begin and end this project. May additionally all of the glory and honour be unto God:

"For I am God's own workmanship, created in Christ Jesus to do good works, which God prepared in advance for me to do" (Ephesians 2:10).

I would like to acknowledge the National Research Foundation (NRF) for funding my study, I am grateful to have been a beneficiary of this bursary, and I am honoured for that, these opportunities have come to my way. To my supervisor Dr Nojiyeza, thank you for the guidance and help which you presented me at some point of the research process, for being a super mentor, a source of encouragement and for constantly offering your expertise, wisdom and experience in this subject of study. I value your comments, your prayers and critical contribution, without which I would not have completed the study. I would also like to extend my gratitude to Prosper Bazaanah who edited this dissertation, for guiding and enriching me through the completion of this work and thanks for reviving my hope and challenging my thoughts and character to reveal the hidden potential in me.

To my mom (Goodness Miya) thank you for your patience and encouragement and constant support through my studies. To my entire family I can't thank you enough for love and support you have shown me. In the end, my heartfelt gratitude goes to the community of Alfred Duma Local Municipality and uThukela Water employees who welcomed me and allowing me to acquire the information wanted. This study might now not have been possible without you. THANK YOU!

LIST OF FIGURES

LIST OF TABLES

LIST OF ABBREVIATION/ACRONYMS

ADLM	Alfred Duma Local Municipality
AMCOW	African Ministerial Council on Water
ANC	African National Congress
CMAs	Catchment Management Agencies
COGTA	Department of Cooperative Governance and Traditional Affairs
DPLG	Department of Provincial and Local Government
DWAF	Department of Water Affairs and Forestry
DWS	Department of Water and Sanitation
ECA	Economic Commission for Africa
EE	Ecological Economics
FBW	Free Basic Water Policy
GDP	Gross Domestic Product
GEAR	Growth Employment and Redistribution
HSRC	Human Sciences Research Council
IDP	Integrated Development Programme
IWRM	Integrated Water Resource Management
KZN	KwaZulu-Natal
MDGs	Millennium Development Goals
MIG	Municipal Infrastructure Grant
MSP	Municipal Strategic Partnership
NDP	National Development Plan
NGOs	Non-Governmental Organisation
NWA	National Water Act
NWRS	National Water Resource Strategy
RDP	Reconstruction and Development Programme
SALGA	South African Local Government Association
SDGs	Sustainable Development Goals
UDM	uThukela District Municipality
UN	United Nations
UNESCO	United Nations Educational Scientific Cultural Organisation

UNICEF	United Nations Children's Fund
WHO	World Health Organisation
WSA	Water Services Authority
WSDP	Water Services Development Plan
WSP	Water Services Provider

ABSTRACT

Water plays a crucial role in the life of the society, even though the factors such as pollution, population growth and poor allocation of resources has placed severe pressures on sufficient and equitable water supply. Equitable access to water is part of the Sustainable Development Goals where it emphasise that the provision of water need to be sufficient, efficient, accessible, sustainable and affordable for all people in the world. The aim of this study was to investigate the ecological governance framework that support access to water and equitable access to water in the Alfred Duma Local Municipality. The methodology used was the quantitative approach and the data was collected using self-designed questionnaires. Stratified random sampling technique was used to sample 335 households and official respondents. The data was analysed through the Statistical Package for Social Sciences (SPSS). Using the Chi-square statistical procedure and with 95% confidence, the decision rule for the hypothesis was stated as “accept the null hypothesis if the critical value (p-value) is < 0.05 and do not accept the null hypothesis if p-value is > or = 0.05”. The findings show that ecological scale, decentralised approach to water, women participation in decision making and access to water are significantly associated with equity and human rights to potable water delivery among the population. Most women in the communities feel disempowered, marginalised and excluded from the process of decision making on water and sanitation. The Free Basic Water Policy is confronted with implementation challenges arising from the failure of the Municipality to provide the community with improved and equitable access to water and sanitation services. The study concludes that water is a basic human right and backbone to the economy of the Alfred Duma Local Municipality. Therefore, it is crucial for local communities to be involved in decision making process and their local experiences to be considered in equitable access to water supply. This must be done through the empowerment and recognition of the rights of women in decision making process. Women inclusion in water and sanitation delivery must be at the centre of Municipality’s water governance efforts as it ensures accountable governance and that the needs and interest of women are represented in a fair and transparent manner. The study recommends that the Municipality should develop strategies for effective water governance, promote

decentralisation, and encourage the participation of women in policies and decision making on water in order to improve the rights of the local people to have equal access to water within the Municipality.

TABLE OF CONTENT

CHAPTER ONE: INTRODUCTION TO THE STUDY

1.1. Introduction

Water is the most precious resource on earth's surface, covering more than 70% of the planet and vital to the survival of humans, plants and animals (Hossain, 2015). Since the 1980s, water has become a prominent topic and noteworthy item globally on the political agenda. The motivation behind this is that water resources are very limited and water demand has increased due to factors such as industrialization, urbanisation, population growth, economic development, agriculture, energy and environmental security (Khadza, 2010). Biswas (2008) points out that due to the increasing population, there will be a water crisis in the future and the present trend will affect available water resources. This will affect existing water planning, management and allocation of water resources.

Equitable access to water is all about closing gaps of disparities in water access through treating vulnerable and marginalised groups differently to ensure an equitable outcome (Luh, Baum & Bartram, 2013). Global Water Partnership (GWP) (2000) contends that equitable access to water aims at satisfying the need and rights of people and people must be in the centre of water management to ensure social equity goals of access to water. Therefore, water access will be understood to be equitable when it contributes to making change within the society more equitable. Equitable access to water should be analysed within the framework of historical processes and ensuring equal opportunities in water resources management through maintaining fair play and justice in water, where society should be involved in water resources (Hamberto, 2011).

Water inequity must be measured in the context of uneven distribution of various impacts affecting poor water supply and inequality in water access can be measured based on income, household size, economic status and dwelling unit (Nastiti, Komarulzaman and Sudradjat, 2018). Goff and Crow (2014) suggest that most vulnerable people in the world have not benefited from the progress of equitable access to water as it is the basic human right of all people to have access to water of adequate quantity and quality for the sustenance of human wellbeing. The study posit that human

right to water must be universally recognised in addressing the equitable access to water and also consider gender dimensions, rural and urban disparities. The Sustainable Development Goals (SDGs) approved by the United Nations in 2015, especially Goal 6 of SDGs aims to ensure that by 2030 it achieve universal and equitable access to safe and affordable drinking water. This goal is measured by an indicator of the proportion of the population using safely managed drinking water and this must be available when needed (WHO, 2017). Clifford-Holmes et al., (2017) notes that more than one-third of the world's population does not have sufficient water and the situation is getting worse. Most of the people affected by the lack of safe drinking water are the people living in Sub-Saharan Africa and in Asia.

The Sustainable Development Goals (SDGs) have set us on a common course to push back poverty, inequality, hunger, and illness. Access to water directly impacts daily life and human survival. Water access provides social power, healthy bodies, viable livelihoods, transformed landscapes, energy generation, wealth and the existence of life itself (Goff and Crow, 2014). WHO (2017) suggest that water management is a key factor in the global battle to remove extreme poverty and build secure and prosperous lives of people living in the world, whereas Sen (2001) suggest that poverty robs freedom of the people to satisfy their need of clean water. The protocol on water stipulates that equitable access to water must be adequate in terms of quantity and quality where it should be provided to all the members of the population especially those who are from disadvantaged or face social inclusion (United Nations General Assembly, 2016).

South Africa is one of the signatories of SDGs. South African Government agreed to meet the target of providing 100% reliable and sustainable water supply services by 2030 as asserted in the National Development Plan (NDP) and the global Sustainable Development Goals (SDGs) (United Nations, 2015). Meyer (2007) notes that rural poor who constitute just under half of the black population in South Africa has inequitable access to water and sanitation because many South Africans live in conditions with a high poverty rate. The demand to rectify these historical imbalances has shaped the

fundamental human rights entrenched in the 1996 Constitution (De Visser, Cottle & Mettler, 2009). The Constitution provides under section 27(1) (b) that everyone has the right to have access to sufficient water. This is valued in the Constitution as there are huge inequalities that exist between the rich and the poor households (Meyer, 2015). The Free Basic Water Policy was established as a response to the specific historical situation around services in South Africa in order to provide six kilolitres per household of 8 people per month as it recognised that everyone has a right of access to basic water supply and sanitation and reasonable steps must be taken to realise this right (Muller, 2011). The Water Services Act (1997) legislates municipalities to implement the FBW policy with no less than three tiers of tariffs, the first being 0-6kl. Saner et al. (2018) maintains that the gaps in inequitable access to water are huge due to poverty and the unavailability of proper infrastructure. Equitable access to safe drinking water, survival, growth, and development are important basic necessities that are still needed to be fulfilled in many developing countries (Workman, 2019).

Hassan et al. (2014) posit that decentralization of water management and governance through Integrated Water Resources Management (IWRM) approaches has been proposed as the appropriate framework to deal with such problems. Decentralization of water management means local stakeholders' involvement in the decision-making processes concerning water. Hassan et al. (2014) firstly suggest that decentralisation should improve all the water users and ensures more equitable allocation of the resource among competing sectors. Second, a more efficient use of water can be reached if local knowledge about water demand and supply is mobilized to design and implement allocation strategies. Therefore, decentralized water management should improve disadvantaged domestic water user's representation in the decision-making process concerning water access and uses which would improve their access to sufficient water supply and reduces exposure to waterborne diseases among the urban and rural poor. The economy growth of many local municipalities is very low as it is associated with high unemployment, poverty, lack of water and inadequate water and lack of infrastructure (Sebova, 2015). This brings hardships to local municipalities as they cannot support the provision of services to local communities. Municipalities need

to address capacity constraints through increasing the supply of local infrastructure and services as well as through structuring tariffs to moderate growth in consumption especially in water. Sebova (2015) also suggest that small municipalities have bigger problems of efficiency and have insufficient funds for the provision of services in their local communities and thus can be determined through values of capital income and expenditure and the lower the economic efficiency of the small municipality, the greater are the effects the competitiveness of the whole economy.

According to the Alfred Duma Local Municipality (2017), the low levels of economic growth indicate that the municipality has growing levels of inequality. The municipality suggest that inequality is set to increase over the years, as the rich continues to get richer and poor still becoming poorer. Inequitable access to basic service remains one of the most visible spatial imprints of apartheid where services are provided well in urban areas whereas in rural areas there is high services backlog in the municipality (Alfred Duma Local Municipality, 2017). The institutional structure that is capable of providing water supply within the municipality is uThukela District.

UThukela District made a partnership with Umgeni Water to operate and manage bulk potable water supply to enhance service provision within the municipality and also assesses future infrastructure needs in order to enhance water services provision within uThukela District. UThukela District Municipality was the only Water Services Authority that manages both Bulk Water Services and Reticulation Services in the KZN Province (uThukela District Municipality, 2019/20). Maintenance and refurbishment costs of water and wastewater works are currently unaffordable by uThukela District Municipality due to financial constraints. Therefore, working in partnership with Umgeni Water Board is hoping to address water service backlog and to ensure that there is a sustainable supply of bulk potable water within the time frame that is specified in the National Development Plan (NDP) as Umgeni water has sufficient capacity to maintain, refurbish, upgrade and build new wastewater infrastructure.

1.2. Background of the study

Water access is one of the major challenges for the 21st century. Khadka (2010) notes that water is not directly addressed as a human right at international and national level. Water is central to supporting economic development and provides the foundation for sustainable livelihoods throughout much of Africa and the sustainability of freshwater resources is threatened by overexploitation, increasing demand, and continued degradation of the natural environment (Palmer and Munnik, 2018). It can also be noted that water crisis and inequities does not only pose threats to humans but also produced threats to ecological communities and biodiversity loss through habitat degradation and undermining of ecosystem functions (Lu, Ocampo-Raeder & Crow, 2014).

There is also an enormous challenge of securing sustainable equitable access to water and water crisis consequences from human decisions which results in uneven distribution of resources, benefits and cause the issue of equity critical to water management (Palmer and Munnik, 2018). Nkuna (2012) posit that challenges of water access, use of conservation and distribution of supply are one of the issues of water governance and decision about water are taken, by whom, at what geographical scale and who benefits. South Africa is a semi-arid country where 5 million people, mainly in rural areas, lack access to water. Hove et al., (2019) posits that regardless of legislative and policy commitments to the right to water, cooperative governance and public participation, many authorities lack the means to engage with and respond to community needs. In post-apartheid, the South African government cherished water as basic human rights in the 1996 constitution.

The National Water Act of 1998 and the Water Services Act of 1997 were among the sequence of legislative and policy shifts to redress discrimination, promote equitable access and support municipalities to provide services, in which cooperative governance and public participation were centralised. DWAF (2006) suggest that it is from this background that the Department of Water and Forestry as policy formulator and implementer initiated the water supply and sanitation programme in 1994 in order to achieve a constitutional objective of ensuring that all South Africans have access to

sufficient water and healthy environment with the focus on the rural area. South Africa is facing a continuous challenge in providing equitable access to water for its people and in 1994, at the end of apartheid it shows that 41% of the black household population (15.9 million people) did not have access to water and sanitation (DWAF, 2008). Van Der Mescht and Van Jaarsveld (2012) posits that the decentralisation and developmental agendas relocated a range of responsibilities to local levels, where multiple constraints were faced, which includes inability to raise revenue, financial distress, serious administrative and financial management, corruption and manipulation of public procurement.

Municipalities were also unable to account for large amounts of complex technical information, with no monitoring systems for household usage in most rural areas (Kanyane and Koma, 2014). The Constitution of South Africa placed water as an important tool for changing people's lives and municipalities has made a progress towards proving citizens with basic water services which is recognized by the adoption of the Free Basic Water Policy (Balfour, 2005).

1.3. Problem statement

The Constitution of the Republic of South Africa states that everyone has the right to have access to sufficient water. Equitable access to water aims at ensuring that all vulnerable and marginalised groups have the opportunity for meaningful participation in water and equitable benefit from water access (WHO, 2019). However, many people still cannot claim their fundamental right to water. This brings challenges to disadvantages and marginalised groups socially, economically and environmentally. Free Basic Water Policy aims at ensuring equitable access to water through acknowledging the fundamental rights of all people to basic water and correct the historical situation and injustices of the past through providing equal access to services. The Constitution (1996), the Municipal Structures Act (1998) and the Water Services Act (1997) states that Municipalities are constitutionally mandated to ensure that water is delivered to their respective communities. Alfred Duma Local Municipality have difficulties of equitable access to water and sanitation where many communities in the area have no access to water as a basic human right (Alfred Duma Local Municipality,

2019/2020). The Alfred Duma Local Municipality does not have access to basic services and households cannot pay for services as poverty and unemployment is the main issue in rural communities (Alfred Duma Local Municipality, 2019/2020). Hunter et al., (2010) notes that water in rural communities is usually poor in quality, quantity and it is not easily accessible. This is because many households cannot afford the cost of minimum water supply and sanitation services, receive subsidised water and sanitation services from government. In this case, the community of Alfred Duma Local Municipality cannot pay for basic services and this led to service delivery being ineffective in a municipality where most of decision-making powers and responsibility, together with accompanying resources are inadequate and rural communities cannot express their dissatisfaction with the provision of services and local areas are unable to raise their voice in decision making.

Many authors note that small municipalities are affected by dysfunctional institutions and water management systems in place (Clifford-Holmes, Palmer, De Wet and Slinger, 2016; COGTA, 2009). Hamer et al., (2017) notes that when it comes to understanding of the challenges of equitable access to water in local areas, citizen voices are rarely heard and accepted in the aspects of institutional dysfunction which leaves an incomplete picture of the challenges faced by communities and how to provide solutions to satisfy the needs of the citizens. Therefore, it is important to involve local people to decision making process and local experiences to be considered in order to achieve water access. The Dublin's Principles of IWRM emphasise that people should play an important role in water resource management through voicing their concerns through decision making (Solanes and Gonzalez-Villarreal, 2008).

Thabethe (2011) states that the cost of providing free basic water is borne by District Municipalities and at local levels, the use of subsidies can both constrain and distort the provision of services. Therefore, the study aims to investigate equitable access to water as a basic human right and the challenges of inequitable access to water in communities.

1.4. Aims and objectives of the study

1.4.1. Aim of the study

The aim of the study is to investigate ecological governance framework that support equitable access to water at Alfred Duma Local Municipality

1.4.2. Objective of the study

1.4.2.1. To explore the equitable access to water in rural areas.

1.4.2.2. To establish the ecological governance framework that supports the access to water in local areas.

1.4.2.3. To investigate the ecological scale in the distribution of water supply in rural areas.

1.4.2.4. To investigate the role of local municipality in equitable access to water.

1.5. Research Questions

1.5.1. Main research question.

What is the ecological governance framework that supports the access to water in local areas?

1.5.2. Secondary research questions

1.5.2.1. How equitable access to water is ensured in rural areas?

1.5.2.2. What is the ecological governance framework that supports the access to water in local areas?

1.5.2.3. What is the ecological scale associated with the distribution of water supply in rural areas?

1.5.2.4. What is the role of local municipality in equitable access to water?

1.6. Research hypothesis

1.6.1. Null hypothesis (Ho)

There is no relationship between ecological scale, decentralisation, women participation in decision making and equitable water to access within the Alfred Duma Local Municipality.

1.6.2. Alternative hypothesis (HA)

There is a relationship between ecological scale, decentralisation, women participation in decision making and equitable water access within the Alfred Duma Local Municipality

1.7. Intended contribution to the body of knowledge

This research contributes to the body of knowledge of ecological economics. The researcher believes that this study will be useful in finding out the challenges of water and sanitation in South Africa in order to make an innovative contribution to the Sustainable Development Goals (SDGs) agenda 2030 and to achieve goal number 6 which is clean water and sanitation for all. The study maintains that in order to achieve equitable access to water in rural communities, integrated water resource management should be prioritized to communities and municipalities.

The researcher believes that this study is useful to rural communities and local municipalities in finding out the challenges of water access in South Africa in order to make an innovative contribution to Agenda 2030 and to achieve goal number 6 which is clean water and sanitation for all. This study contributes to the knowledge of water as a basic need, the knowledge of water subsidies, encourage women's empowerment and emphasize the importance of water governance and decentralisation. The study will also encourage decentralisation and good governance in water sector and positive impact of ecological scale in water supply and sanitation in rural areas. The findings of this study provides insight on difficulties faced by communities in equitable access to water as access to water is a basic human right to every individual person of South Africa.

1.8. Definition of concepts

Local Municipality

A municipality that shares mutual executive and legislative authority in its area with a distinct municipality with those areas under which it falls. It is described in Section 155 (1) of the Constitution as a category C (Republic of South Africa) Sec (xx 111).

District municipality

This is a municipality that has a mutual executive and legislative authority in the area that includes more than one Municipality and which is described in Section 155 (1) of the Constitution as a category B Municipality (Republic of South Africa, 1988: Sec 20).

Water Service Provider (WSP)

Water Service Provider (WSP) is defined as “any person who provides water services to consumers or another water services institution, but does not include a water services intermediary” (DWAF, 1997:11).

Water Service Authority (WSA)

WSA is “any municipality, including a district or rural council as defined in the Local Government Transition Act, 1993 (Act No. 209 of 1993) repealed by Municipal Amendment Structures Act, 2000- responsible for ensuring access to water services” (DWAF, 1997).

Household

This indicates a family unit decided through the municipality constituting a traditional household by using and considering the number of persons in the house, the relationship among the individuals of a family, age of the humans who are participants of it and any other elements that the Municipality considers to be applicable, for instance, dwelling together (DWAF, 2005).

Equitable access to water

Equitable access to water is all about closing gaps of disparities in water access through treating vulnerable and marginalised groups which includes women, people with disabilities, non-discriminatory race, safe, acceptable, accessible, affordable, age, income, housing situation, gender identity, gender expression, or any other status etc. to ensure an equitable outcome (Baum and Bartram, 2012).

Decentralisation

Overton et al. (2014) states that decentralisation involves bodies separated by means of law from the national centre, in which nearby representatives are given formal powers to determine on a number of public matters, political base within the locality and a limited area of authority entrenched with the right to make choices on areas within their jurisdiction.

Integrated water resource management (IWRM)

Integrated Water Resource Management (IWRM) is presented “as a process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems” (Global Water Partnership, 2000).

Water governance

In the place of water more particularly, governance has been described as the variety of political, social, economic and administrative systems which can be in location to expand and manipulate water sources, and the delivery of water offerings, at distinct levels of society (Rogers & Hall, 2003).

Indigent person

Means any household or class of families, consisting of a child headed household, incomes and combined gross income, as determined by way of the municipality yearly in terms of a social and economic analysis of its place, as vested inside the municipal policy, which qualifies for rebates or remissions, guide or a services subsidy, supplied that child help grant is not included while calculating such a family income (Framework for Municipal Indigent Policy, 2005).

1.9. Chapter division

The chapter division of the study refers to the number of chapters that the study is organised into. The study is categorised into six chapters, as follows:

Chapter 1: Introduction of the study

This chapter provides a general overview of the study. The chapter provides the introduction of the study, a summary of the background of the study, the statement of the problem, aim for conducting this study and objectives that the study seeks to achieve, research questions and research hypothesis guiding the study. It further presents the operational concepts and the significance of the study.

Chapter 2: Literature Review

Chapter two discusses previous literature on equitable access to water in South Africa and also focus on literature on equitable access to water from a global perspective and further reviews important legislative frameworks that underpin the equitable access to

water in South Africa. The literature covered the following themes which includes access to water, SDGs, equitable access to water in South Africa, water as a basic need, challenges of inequitable access, ecological governance framework, Free Basic Water (FBW) policy, the constitution of South Africa 1996, role of local municipalities in access to water, Integrated Water Resource Management (IWRM) and ecological scale in the distribution of water supply.

Chapter 3: Theoretical framework

This chapter discusses the theoretical framework that underpins the study. The study uses ecological economics as the theoretical framework of the study. The following themes are covered in the ecological economics, principles of ecological economics, water as a basic human right, scale relative to the economy, equity in water, allocations of resources, and distribution of wealth, water governance and decentralisation of structures.

Chapter 4: Research methodology

This chapter describes the steps followed to collect data for the study. This chapter focuses on the study's research design and methodology. It discusses in detail the process followed to collect the data for this study, research philosophy, research instruments, sampling methods and sample size, validity and reliability, ethical considerations, limitation of the study, delimitation, dissemination of the study findings, and the process of data analysis.

Chapter 5: Research findings and interpretation of data

This chapter presents the interpretation of data and findings of the study. The chapter encompasses the analysis of data and the main findings of the study will be further discussed. The data analysed is represented through pie charts, bar charts, descriptive statistics as well as inferential statistics.

Chapter 6: Conclusion and recommendations

This chapter provides conclusion as well as recommendations for future research. This chapter outlined the conclusions based on each objective of the study and from the results of the study.

1.10. Conclusion

This chapter outlined the introduction of the research projects which focused on the background of the study, problem statement and also included objectives and research questions of the study. It also set a scene on the intended contribution of the study and operational definitions. The next chapter provides literature review (Chapter two) which focuses on the literature review of equitable access to water in rural areas, governance frameworks that support access to water in rural areas, ecological scale in the distribution of water and also the scale of the economy in the municipality.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

This chapter presents a literature review of the study and it is guided by the main research objectives and research questions of the study. The study looks at the equitable access to water as basic human rights and the challenges of inequitable access to water in rural areas, the ecological government frameworks that supports access to water which includes Free Basic Water, Constitution of South Africa etc. and it further looks at Integrated Water Resources Management (IWRM), water governance, decentralisation and water sector institutions in South Africa. This chapter also provides information on the scale of the economy and ecological scale in the distribution of water supply services. The literature reviewed and the theories guided the study in addressing the research questions and objectives.

In South Africa, water is taken into consideration as a social good, essential to transformation and improvement within the country. The Constitution of South Africa (1996) gives everybody the right to sufficient water within available sources and that is reflected inside the country's Free Basic Water Policy (2002). Section 27(2) of the constitution requires the nation to take reasonable legislative and different measures, within its available resources, to gain the progressive realisation of the right. It is valued in the charter that free basic water and sanitation are not supplied similarly or evenly throughout South Africa preferably, water have to be free so that everybody can get the right of entry to water resources and presently the right of access to water is not enjoyed by everyone because water is not delivered freed from price to all the humans of South Africa (DWAF Free Basic Water Policy, 2002).

The most vulnerable amongst the sectors of the community, the unemployed, individuals who stay in awful poverty are amongst the ones denied access to the proper access to water. Equitable access to water is all about closing gaps of disparities in water access through treating vulnerable and marginalised groups which includes women, people with disabilities, non-discriminatory race, safe, acceptable, accessible, and affordable (Luh, Baum and Bartram, 2013). The ecological governance framework

including the legislation, policy and guidelines where appropriate in municipalities are not adhered to and the constitutional rights to basic services are not being realised (DPLG Framework for Municipal Indigent Policy, 2005). A policy for the delivery and provision of basic need services to all indigent households has not been forthcoming.

According to Erasibo (2005) people are classified as indigent if they do not have access to sufficient water, environmental health, basic sanitation, basic energy, health care, housing, food and clothing. Sutherland et al., (2015) acknowledge that beneath the municipal systems Act (1998, Act 117), water provision is delegated to Water Service Authority (WSAs) which in most cases are District municipalities. Each WSA has to produce a plan to step by step to ensure efficient, cheap and sustainable provision of water and sanitation offerings. Most municipalities are affected by the scale of their economy in provision of water services. In most local municipalities the scale or size of the economy is lower; this led to inadequate funds available to support the provision of services because financial constraint limits the volume and range of services that a municipality can provide (Deller, Nelson & Waizer, 1992). Therefore, the scale of the economy affects the provision of services in local areas.

2.2. Access to water: A global perspective

Pink (2016) acknowledges that water is the most precious resource on the planet and the most urgent human rights challenge in the 21st century. Oki and Quiocho (2020) states that water is one of the most significant natural resources and is used practically for everything, this includes household domestic use, industrial and agricultural production and water is needed for economic growth. According to a report by the United Nations General Assembly (2016) it is indicated that the economy is heavily dependent on water and problems of water shortages and water access limits economic growth and job creation. The United Nations General Assembly (2015) has acknowledged that clean drinking water and sanitation is a basic human rights. There are about 193 countries that are part of Sustainable Development Goals (SDGs). The 2015 United Nations Goals for SDGs aims to provide access to safe and affordable drinking water and satisfactory sanitation for all by 2030. Goal 6 of the SDGs stipulates to ensure the availability and sustainable management of water and sanitation for all, is

linked to equity (United Nations, 2015). Water is significant to improvement and critical to all kinds of life. It is far consequently critical that South Africa's confined water sources are controlled and used to assure the eradication of poverty and to promote sustainable economic and social development. Water has already become a limited commodity in many regions of the world in the new millennium (Nickson and Vagas, 2001). It is currently the source of disagreements between neighbours, problems between sovereign states, conflict between countries, and even war between larger groups (Nickson & Vargas, 2001). Indeed, when the United Nations review the implementation of Agenda 21, one of the most pressing topics is the impending freshwater catastrophe that is predicted to impact several countries at the turn of the millennium (Clarke, 1991).

Freshwater resources were clearly recognized as one of the important resources under threat from environmental deterioration at the 1992 Earth Summit in Rio. According to the World Water Council, demand for freshwater resources doubles every 20 years. Bustamente (2004) note that there has been significant progress, but there have been enormous and inequitable increases in regional coverage of urban and rural as well as a bias against the poor. For example Cochabamba in Bolivia has water problem and it is not yet resolved and still around 40% of the population has no access to adequate equitable access to water services (Bustamante, 2004).

The Bolivian government’s answer was to look for the private sector to provide the necessary investment to restructure the water and sanitation system (Bustamante, 2004). The water crisis that has yet to be resolved, and roughly 40% of the population still lacks access to sufficient and equitable water services in Bolivia (Nickson and Vargas, 2001).The Municipal Water Company (SEMAPA) is primarily responsible for these services, which had a number of efficiency and sustainability issues. To expand the network and discover new sources for the city's growing population, further investments were required.

2.3. Sustainable Development Goals (SDGs) by United Nations

The MDGS ended in 2015 and the outcome of global goals beyond 2030 was the SDGs. According to Breuer, Janetschek and Malerba (2019) MDGs marked the historical global mobilisation to achieve a set of essential social priorities, however it showed that not all eight goals were accomplished after the rolled out for 15 years (2011-2015), therefore the introduction of SDGs to proceed with the development agenda is essential. Taylor (2016) suggests that the SDGs Agenda 2030 approve the call to protect the planet, end poverty and guarantee the well-being of people. The 17 Sustainable Development Goals (SDGs) of the 2030 Agenda for Sustainable Development was adopted by world leaders in September 2015 at a United Nations Summit and came into effect on 1 January 2016. SDGs are envisioned to tackle the root causes of poverty, gender equality, water and sanitation, health, education, energy, economic growth, industry, innovation and infrastructure, inequalities, sustainable cities and communities, consumption & production, climate change, natural resources, peace and justice (United Nations, 2016).

Fasoli (2018) noted that the SDGs cannot be separated and they are interrelated in such a way that achieving one goal lead to achieving another goal, therefore they should be seen as vital portions in a huge and complicated puzzle. Spahn (2018) suggest that towards meeting the SDGs, the key problem is to ensure the responsibility and accountability. Whereas Mensah (2019) argues that in order to achieve SDGs, all stakeholders should be involved, including government, private sector, civil society, Non-Governmental Organisations (NGOs) in the global agenda, which will create the feedback loops to and hold stakeholders accountable and responsible in making sure that SDGs are well implemented. It also noted that the sustainable development process must be participatory for SDGs to be successful and sustainable (Guo, 2017). The local and national Non-Governmental Organisations (NGOs) are the important stakeholders group mainly working in the region to improve the citizens access to safe water and concerned with issues of water, sanitation and environment (Schein, 2006). The right to know underpins the right to water. Tsvietkova (2011) claims that in order to make an informed decision about which water to drink, consumers must have access to

accurate information on water quality and other factors of drinking water. Environmental Non-Governmental Organizations (NGO) plays a vital role in enhancing public access to accurate information about local issues, such as drinking water quality and water-related health hazards. NGOs host seminars and workshops for communities and local governments on water issues, multi-stakeholder debates on water supply and sanitation sector development and technical solutions needed to improve conditions, and public hearings on water and sanitation action plans at the local and national levels (Schein, 2006).

NGOs develop and disseminate a variety of educational and information materials on various water and health issues to the general public. Tsvietkova (2011) also noted that women's NGOs are succeeding because they focus on enabling women to take action to increase access to safe water and appropriate sanitation. Women's NGOs, networks, and collaborations are some of the main players who help to make the right to water a reality for everyone at all levels. Therefore, this suggests that SGDs cannot be achieved through individual or the effort of an organisation but it requires the collective responsibility where participation involves all people and relevant bodies. In addition, in order to achieve the SDGs, the meaningful progress with responsibility and accountability should be built on the principle of participation which requires positive attitudes of the people.

The Sustainable Development Goal 6 aims to ensure availability and sustainable management of water and sanitation for all by 2030. The provision of water and sanitation is essential in improving the living conditions of the poor in many countries. The SDGs By 2030 aim to attain commonplace and equitable access to safe and affordable drinking water for all, achieve access to adequate and equitable sanitation and hygiene for all and stop open defecation, paying unique interest to the needs of women and girls and people in prone situations, enhance water high-quality by means of lowering pollution and supply of freshwater to cope with water shortage and extensively lessen the variety of people affected by water scarcity, put in force incorporated water resources control in any respect stages (United Nations, 2016). The following figure represents the component of SDGs

Figure 1.1.: Water components of Sustainable Development Goals 6

Source: (UNICEF, 2015)

2.4. Equitable access to water in South Africa

The Constitution of South Africa (Act 108 of 1996) states that everybody has the right to clean and safe ingesting water and dignified sanitation services. Nzimakwe (2009) posits that the general public zone and municipalities should ensure low priced and sustainable offerings to groups, where strong technical and managerial capabilities are needed to fulfil this. Mulreany and Sapsin (2006) posit that equitable access to water is a cornerstone of public health; however, in many regions of the world, it remains inadequate. Policymakers, public health advocates, and authorities' officials have two challenges of increasing water, i.e. get entry to and developing extra water resources to fulfil the needs of the increasing urban population (Mulreany and Sapsin, 2006).

Some proposed privatisation in the 1980s and 1990s in order to combat the problems of inadequate financing for infrastructure and inefficiency in the provision of water systems and other public services. The South African government implemented the decentralisation model to address service delivery backlogs from the apartheid spatial injustices and improve community participation, accountability, transparency, effectiveness and efficiency in service delivery (Heller, 2001). As a result of the government change, the Reconstruction and Development Programme (RDP) policy was introduced and developed to incorporate the socio-economic development in order

to mobilise citizens, manage resources and to recover economy from apartheid systems (African National Congress, 1994). The White Paper on Water and Sanitation was created and thereafter crafted to portray the RDP policy principles (DWAF, 1994). The Constitution, which is the supreme law of the country, further lays out legislative powers and functions of national, provincial and local government in coordinating and administering service delivery in the country (RSA, 1996).

The government developed the National Development Plan (NDP). The aim of the NDP was to respond quickly to South African's aspirations and ensure that inclusive economic growth was the main agenda for development. The National Development vision is outlined in various national policy documents, and consolidated in the National Development Plan (NDP). The government has made a further dedication by way of officially approving a target of imparting 90% coverage of reliable water delivery services by means of 2019 (DWS, 2014). Similarly, the ladder in the direction of higher levels of services could be climbed step by step for domestic users with the observed progressive success of a complete delivery for facilities, health offerings, commercial enterprise, trade, and enterprise. Kahinda et al., (2007) consider that there is an instantaneous link between the provision of easy water, adequate sanitation, and improved health.

Water as human rights is also supported by constitutional obligation in South Africa, the Free Basic Water Policy (2000) and the South African Constitution (1996) which cherishes water as a right and this reveals that water is an important basic need for all people. Muller (2008) notes that many poor households criticize Free Basic Water Policy as most people in South Africa still do not have access to water in their communities. Rober (2015) suggests that municipalities be given a role to implement water policy and that the municipality's inability to provide the community with water services has been identified as one of the shortfalls of Free Basic Water Policy. Biswas and Tortajada (2008) notes that water is essential and without it, it is not possible to live as water is gradually considered to be the most vital part of the planet.

Mjoli, Sykes and Jooste (2009), notes that no municipalities in South Africa have not begun carried out a situation where all of the indigent in their areas of jurisdiction have won by getting admission to fundamental services. But, many economically strong municipalities have reached the factor in which the numbers of un-served households constitute most effective 5 to 10% of their population (DPLG National Framework for Municipal Indigent Guidelines, 2005). In assessment, in many economically susceptible municipalities 50% in their citizens may not have primary sanitation infrastructure and health offerings can be bad. The institution of human beings in municipalities who do no longer but have access are the maximum marginalised and, consequently, emphasis have to be located strongly at the gaining access component. While national government is placing emphasis on providing sufficient capital, in the form of the municipal infrastructure grant, severe constraints remain the challenge in some municipality where it is not enough.

South Africa is one of the participants of the Sustainable Development Goals (SDGs). Goal 6, which stipulates, to ensure the availability and sustainable management of water and sanitation for all, is central to realizing the vision of a better future for all and South Africa is aligned with achieving this goal (UN, 2015). The South African government agreed to meet the target of offering 100% reliable and sustainable water delivery services by 2030 as asserted inside the NDP and the worldwide Sustainable development goals (UN, 2015).

2.5. Equitable access to water in rural areas

The human right to equitable access to water entitles everyone without discrimination to have access to sufficient and safe water which is acceptable, physically accessible and affordable water for personal and domestic use (United Nation Human Rights Council, 2014). The Human Rights Council prioritize and address the needs of vulnerable and marginalised societies. A challenge of equitable access is often a social exclusion issues and poor governance characterised by lack of coordination among decision makers. Inequities and exclusion in access to water and sanitation have been ranked as highest moral and technological challenges in global health (Humans Right Commission, 2018).

In 2010 the United Nations General Assembly officially acknowledged water as a human right. The SDGs also play a crucial role as it seeks to eradicate poverty and fight inequalities by 2013. SDGs present a new approach to development intervention in water access. This approach does not only focus on availability of services, affordability, accessibility and safe, but it put an emphasis on equality, non-discrimination and accountability for participation (Luh, Baum & Bartram, 2013). Equitable water management calls for addressing water quality issues and protecting supply of water for future generations. Many water resources that communities rely on for drinking water and undertaking are infected because of infrastructure shortfalls or business pollution (García-Valinas and Miquel-Florensa, 2013).

Van Kopen et al., (2017) notes that lack of access to equitable access to water contributes to continuing poverty through the high proportion of household expenditure and economic cost of poor health in many poor communities which lead to an increase need to purchase water and time and energy in water collection. Many people in rural areas are destitute and they cannot afford to pay for basic services, therefore rural people should be provided with basic services at no cost as rural communities cannot pay for water services. Water is a basic human right and it should be totally free, when people are unable to pay for water services. Therefore, equitable access to water is important in rural communities as water is fundamental for human survival and should be treated as social, environmental and cultural good.

2.6. Water as a basic need

The Constitution of the Republic of South Africa states that everyone has the right to have access to sufficient water. However, many people still cannot claim their fundamental right to water. Equitable access to water aims at ensuring that all groups have the opportunity for meaningful participation in water and equitable benefit from water access (WHO, 2019). Saner et al., (2015) posit that water should be considered as a social good, as a human right and water is also seen as a socio-ecological good and as the right to other living beings and ecosystems, highlighting that water is a limited resource. Access to water directly impacts daily life and human survival. Water access provides social power, healthy bodies, viable livelihoods, transformed

landscapes, energy generation, wealth and the existence of life itself (Goff & Crow, 2014). Water access is essential to elevate people out of poverty through realising the creative energy of women and children, enabling small businesses to run and providing domestic work that is needed for dignity and social networking of household members (Koolwal & Van de Walle, 2013). Chiplunkar, Babel and Rivas (2012) states that water is vital to life and all forms of social, economic and environmental development. The SDGs by 2030 aim to achieve universal and equitable access to safe and affordable drinking water for all (United Nations, 2016). Filho et al., (2019) firstly notes that there is an important relationship between water and Sustainable Development Goals Agenda 2030 developed by United Nations. Secondly, they further point out that improving water resource management and development is significant for meeting the broader sets of goals which include end hunger and achieve food security with improved nutrition, inclusive and quality education, promoting gender equality and women empowerment, improving health, reducing child mortality and improving environmental sustainability.

While Emler (1999) posit that water access influence education as it gives people stronger inclination to speak out for change and be able to speak up in their best interest which allows people to manage water resources and without basic literacy people are unable to participate effectively in levels of societal organisation. Varis (2007) points out that water is a backbone of the economy in very many countries of the world. Water resource management plays a significant role in providing the foundation for agricultural sector, urban infrastructure, energy sectors, health care and other functions of society. It also acknowledges that to alleviate poverty the country needs economic growth, but growth alone is not sufficient and emphasise that the well-being should reach the poor households and growth should not draw away from societies (Varis, 2007).

Water can assist people to alleviate poverty and increase the earnings of people who depend on water-based agriculture, including emergent, subsistence and commercial (Deedat, et al., 2009). This means that water is a significant natural resource that plays a vital role in meeting the basic needs of life and water and sanitation are prerequisites for sustaining good health and quality of life. The South African government announced

the Free Basic Water Policy as a step to recognise water as a basic need. This is asserted in the Constitution of the Republic of South Africa Act 108 of 1996 which emphasise water as basic human rights. The government and UThukela District Municipality provides 6kl of water to households and perhaps this indicates that there is a drop in the ocean as there are many household exceeding the 8-member threshold anticipated.

Water is a basic need as stipulated in the indigent policy that indigent people must receive sufficient water, basic sanitation, health care, housing, food and clothing, electricity and environmental health (Framework for Municipal Indigent Policy, 2005). The free basic services should focus on vulnerable groups, among them rural women, children, people living with HIV/AIDS and other diseases, the disabled and the elderly people. However, there is poor state of basic service delivery in rural areas of the district municipalities which points out a lack of transformation within municipalities (Bailey, 2012). Therefore, transformation in district municipalities is necessary to ensure the progressive realisation of socioeconomic rights and developmental state within the municipalities.

2.7. Challenges of inequitable access to water and in rural communities.

The Department of Water Affairs (2000) introduced the Free Basic Water Policy in 2000, where the Water Service Authority (WSA) and Water Service Providers (WSP) were given the duty by the Department of Water Affairs (DWA). This was done to make sure that everyone in South Africa has equitable access to water and receive level of services of 25 litres per household per day. The DWA tried to make sure that all indigent people receive free basic water, however it can be noted that South Africa is still facing challenges with regard to free basic water policy (DWAF, 2008). The Department of Provincial and Local Government (DPLG) (2005) posits that municipalities must implement the indigent policy that is approved by council; the policy should include the verification and investigation of indigent applications as per the qualification criteria set out in the policy. In the 2019/2020 financial year of the Alfred Duma Local Municipality it is projected that R3.1million was allocated towards the provision of free basic services.

The cost of the social package of the registered indigent families is basically financed by means of national government through the local government equitable share acquired in terms of the yearly Division of Revenue Act. According to Alfred Duma Local Municipality (2019/2020) the municipality received 4500 applications from indigent households and managed to approve only 965 applications, due to system challenges and time constraints to process such applications.

Therefore, the institutional framework for water has not yet played its role in the provision of water and sanitation services. However Saner et al., (2015) suggest that there are challenges to accessing water which includes factors such as pollution, population growth and poor allocation and distribution of resources which place difficulties on adequate and equitable water supply and sanitation. Inequitable access to water brings challenges to disadvantages and marginalised groups socially, economically and environmentally if water access is not reaching all groups to have the opportunity for meaningful participation in water and equitable benefit from water access (WHO, 2019).

Weaver et al., (2017) posit that poverty distracted families are mainly from rural areas and cannot manage to pay for water services. This makes rural communities to face a number of challenges of developing themselves economically which means that they lack income to pay for water services. Inadequate access to water lead to poverty position of people residing in rural communities because water is vital to economic development and agricultural activities taking place in communities cannot occur due to lack of access to adequate water, this limit economic growth to take place in rural areas (Weaver et al., 2017). There are many challenges that hinder the equitable access to water and sanitation in rural areas which bring about negative consequences in agriculture and food security, educational attainment, socio-economic complications and health problems. McConkey and Wilsenach (2010) suggest that the main challenges of equitable access to water in rural areas is that the distant from urban areas is long, which causes a delay in water provision and make reticulation economically unfeasible. In most instances that this challenge goes with the factors of physical environment such

as homesteads being far apart and problems of geographic features. Perret et al., (2006) also notes that equitable access to water is delayed by lack of skilled and experience staff working in local municipalities and district municipalities. Simukonda, Farmani & Butler (2018) postulated that water management is poor because people are lacking skills in the use of technology in developing countries. Lack of the necessary managerial skills and technical knowledge affect the delivery of water services. Therefore, it is crucial important that there is efficient performance capacity of provincial and local governments in fulfilling the constitutional mandate to provide equitable access to water.

Moloi (2004) notes that there is a challenge of unsustainable development of water supply in rural areas which is due to lack of economic and non-attraction of investments to provide employment. Saner et al. (2015) posits that there is still a struggle for low income households where there is competing uses of water and there is no access to affordable drinking water. This suggests that if people are employed, they will be able to pay for water services instead of relying on external subsidies from the government. In addition, Heyns (2001) is of the view that the rural communities regard water as a plentiful resource which the government must supply at no cost, however this portrays bad financial implications for the municipalities and therefore the empowerment of people in terms of water awareness campaigns is necessary to sustain equity in water in rural areas.

Furthermore, Koolwal and Van de Walle (2013) suggest that water access is essential to elevate people out of poverty through realising the innovative energy of women and children, supporting small businesses to run and providing domestic work that is needed in social networking and providing dignity to household members. Similarly, Goswami and Bisht (2017) found that water is a key driver of sustainable economic growth and development. Water provides for agriculture, industries and humans, which all contributes to an increase in socio-economic development of the country as water is a source of life and prosperity. By the year 2025, the population is estimated to grow from 7 billion to 8.5 billion and rapid population growth is a universal challenge (McConkey &

Wilsenach, 2010). According to Stats SA (2019) South African population has risen from 57,398,421 million to 58,065,097 million which bring challenges to South Africa. For example, the demand for the supply of water has increased enormously in SA as a result of the extension of the water supply services to rural areas at the beginning of 1994. This is in line with Kennen, Stein and Webb (2018) who notes that water demand is driven by rising consumption rates and population growth. The other challenge faced by South Africa is that there is an uneven distribution of rainfall over the country and water is scarce, with humid subtropical conditions in the east and dry desert conditions in the west (Conley and Niekerk, 2000). Oki and Quiocho (2020) postulate that water scarcity is accompanied by poor management, inadequate infrastructure development and cases of inequitable water allocation access across economic levels. It is, therefore, understandable, why some areas in South Africa have constrained water resources and consequently have challenges regarding the equitable access to freshwater to rural communities.

2.8. Ecological governance framework supporting the access to water in local areas

2.8.1. Legislative and Policy Framework on Water and Sanitation: In South Africa

The South African government is undertaking the responsibility of assuring that all South Africans have access to adequate clean drinking water and improved sanitation services. The importance of accessing these services on an equitable basis has made part of the political debate since the development of the Freedom Charter in 1955. The Constitution of South Africa contains sections on water and sanitation, as well as the Bill of Rights that must be considered during the promulgation and implementation of every policy and strategy developments (Mosili, 2011). The following discussion reviews important legislation of water access and policy framework in South Africa.

2.8.2. An overview of Water Supply and Sanitation Policies in S.A

The water supply and sanitation polices were formulated in 1994 to acknowledge access to clean drinking water and improved sanitation provision. These become central to development; and that these services must form part of a coherent development strategy and that there was a lack of policy on these basic services, the government was prompted to formulate the White Paper on Water Supply and

Sanitation Policy in 1994 (RSA, 1994). The Water Supply and Sanitation Policy was premised on the objectives and targets of the Government's Reconstruction and Development Programme (RDP) that envisioned all South Africans having access to basic water supply and improved sanitation services (Tissington, 2011).

This policy in addition placed the regulation and coordination of both water and sanitation provision beneath the supervision of the national ministry of Water Affairs and Forestry (Mjoli, Sykes & Jooste, 2009). The Water Supply and Sanitation Policy outlines the institutional framework for water and sanitation provision, which changed into finally legislation within the Water Services Act in 1997 (RSA, 1997). Water resources and sanitation provision is currently the competency of the national authorities beneath the DWA (DWA, 2013). The responsibility to manage and deliver water services to the people is imposed on local municipalities, with the countrywide and provincial government having the authority to alter local government in terms of water and sanitation offerings (DWA, 2013 & SALGA, 2006).

The national and provincial governments have the obligation to support and strengthen the capacity of local government to provide these services to communities. The Water Supply and Sanitation Policy further proposes that poor communities who are not able to afford clean drinking water and improved sanitation services, be subsidized to meet minimum services through government grants (Tissington, 2011). This can meet basic needs of poor communities as many poor people cannot afford to pay for water.

2.8.3. Free Basic Water (FBW) policy of 2000/2.

The Free Basic Water Policy (FBW) which mandates a provision of a subsidised six kilo-litres of water to indigent households (DWAF, 2001) was introduced as one of the mechanisms to address poverty and inequality issues suffered by the marginalised. This formed a critical development agenda of the African National Congress (ANC) whose policy focused on addressing issues affecting and locating indigent households to the periphery and marginalisation in service provision through the implementation of the 2030 National Development Plan (NDP) (DWAF, 1994; National Planning Commission, 2012). Free Basic Water policy is defined by the Water Services Act of 1997 Act 108

(Sections 3.1) as the receipt of a minimum quantity of portable water of 6 kilolitres per household per month. It recognised that everyone has a right to access to water supply and sanitation and reasonable steps must be taken to realise this right.

MacDonald and Ruiters (2005) state that Free Basic Water Policy was announced in the December 2000 municipal elections and represents an effort to progressively realize the right to sufficient water. Free Basic Water Policy stipulates that all South Africans have a right to receive at least a common minimum standard of service and it is a duty for all three spheres of government to ensure equitable water and sanitation; this is explained by the Department of Provincial and Local Government (Szabo, 2015). In the context of the uThukela District Municipality jurisdiction the municipality and the water board are unable to cope with the demands of the FBW due to lack of proper meter connections and rural areas that are outside the reach of municipal services There are two different water subsidy provisions in the area. UThukela District municipality lawfully provides the 6KL subsidy. Moreover, it provides free services to their residents whereas national government only subsidies 6kl-12kl to indigents depending on the affordability of local government (DWAF, 2001).

Deedat (2011) suggest that the implementation of the FBW goes together with the features of service delivery which are located within a business paradigm, and which seems somewhat conflicting to the objectives of the policy itself. They include the objectives of cost recovery, water conservation and demand management as tools for cost recovery and innovative technologies such as trickles, or restrictors'; prepaid meters and water demand management devices, and the inappropriate application of the assurance of supply levy (Deedat, 2011). Rober (2015) suggests that the municipal's inability to provide the community with water services has been identified as one of the short falls of Free Basic Water Policy and that the municipality in rural areas finds it very difficult to adopts and implement the FBW. Muller, (2008) notes that the FBW policy and its implementation have been criticized by civil society for failing to reach all the poor, where water provided is insufficient and the FBW policy is reaching the non-poor than the poor. Deedat (2011) posits that FBW policy was established as a

policy to deal with the specific historical situation around basic services in South Africa. The Reconstruction and Development Programme (RDP) in 1994 acts as a policy guiding government to provide services which include water, sanitation and electricity and South African government passionately embraced Growth Employment and Redistribution (GEAR) which was influenced by neoliberal macroeconomics. Deedat (2011) notes that these policies lead to articulating concerns and number of marches and protests against the establishment of GEAR and reversal of the RDP. The Water Services Act (1997) establishes municipalities to implement the FBW policy with not less than three tiers of tariffs, the first being 0 to 6kl. Municipalities were authorized to change into business where there is effectiveness, efficiency and financial sustainability to achieve service delivery and legal action against users for non-payment (Deedat, 2011).

2.8.4. The Constitution of the Republic of South Africa of 1996

The Constitution of South Africa, Act 108 of 1996 Section 27(1) of the Bill of Rights in the Constitution of the Republic of South Africa (1996) regulates that everyone has the right to have access to sufficient water. The right of access to sufficient water is stipulated in section 27(1) (b) of the Constitution, which posit that everyone has the right to have access to sufficient water. Whereas Section 27(2) requires the state to take reasonable legislative and other measures, within its available resources to achieve the progressive realisation of the right to sufficient water for all South Africans, government should ensure that a local municipality plays a role in delivering water and sanitation in communities.

Sutherland et al., (2015) notes that research conducted shows that almost South Africans do not have adequate water and sanitation and this is against with what is indicated in the constitution of South Africa. Water is considered as a social good, fundamental to transformation and development in the country. The Constitution of South Africa (1996) provides everyone with the right to sufficient water within available resources and this is reflected in the Free Basic Water Policy (2001). However, free basic water and sanitation are not provided equally or evenly across South Africa. Deedat et al., (2009) posits that Free Basic Water Policy has been implemented

successfully by most metros and some municipalities, including City of Tshwane, Cape Town, EThekwini and City of Johannesburg because they have a greater degree of flexibility in terms of cross-subsidization as well as a greater level of autonomy in designing an approach to free basic services independent of guidance from DWAF.

Sutherland, et al., (2015) notes that in Durban FBW is now at 9kl and it is given to everyone and not just indigent households. Whereas the City of Cape Town increased its FBW to 12kl; all these increases are as a result of this constitutional obligation of progressive realisation. Deedat et al., (2009) further states that the implementation of free basic services has turned out to be more difficult to implement for less capacitated municipalities and districts such as Amathole, Vhembe District Municipalities etc. uThukela District municipality expressed a need for greater guidance and assistance from DWAF in dealing with the challenge of providing free basic services to poor households as there are still remaining at 6kl and others are not even providing FBW at all (Joe de Beer, 2017)

2.8.5. The Water Services Act (No. 108 of 1997)

The Water Services Act (108 of 1997) prescribes the legislative duties of municipalities as Water Service Authorities (WSA) to supply sufficient water and create an environment not harmful to human health. According to the Water Services Act, every Water Service Institution (WSI) must take reasonable measures to realize that water and sanitation services are accessible to all (African Ministerial Council On Water (AMCOW), 2002 and RSA, 1997). The Act establishes and clarifies the institutional arrangements for water services provision and place local government at the centre. It regulates Water Boards as important water service providers, who have to ensure that there is access to both clean drinking water and improved sanitation services (Tissington, 2011). Sutherland et al., (2015) suggest that it is the local government responsibility to create mechanisms that enable people to have access to sufficient water. In the event of resource constraints, which limit the ability of the state to fulfil its responsibilities, the state should provide a plan of action that demonstrates that the full realisation of the right and how they are going to achieve the right over time. Therefore, available resources should be consumed effectively to give maximum results, with

priority being given to everyone and the satisfaction of the most basic requirements as well as basic services. The Water Services Act compels the Minister of the Department of Water Affairs (DWA) to maintain a National Water Services Information System and to monitor the performance of all water services institutions and to develop a policy to regulate and oversee the provision of sanitation (DWA, 2013). To ensure that sanitation reaches households in an effective manner, the Water Services Act proposes that water and sanitation making plans, implementation and tracking are coordinated on countrywide, provincial and local level, through committed and coordination boards. It also emphasizes the importance of educating communities about managing water and sanitation properly so as to prevent its contamination (Malobela and Sinha, 2011).

2.8.6. The National Water Act (No 36 of 1998)

The National Water Act (NWA) seeks to ensure that the country's water resources are protected, used, developed, conserved, managed and controlled in a sustainable and equitable manner for the benefit of all people. The NWA assigns the national government as the public trustee of the water resources and empowers the Minister to regulate the allocation, use, flow and control of all water in the Republic (DWA, 2013). To achieve its objective, the NWA promises to ensure that the nation's water resources are developed and used in a sustainable manner; all discriminatory laws and practices of the past are repealed and prevented in favour of equal access to water and sanitation and water is protected against all forms of pollution (De Coning & Sherwill, 2004 and Tissington, 2011). This act plays an importance role in water and sanitation as it provides sustainable development to people who have no access to water and sanitation.

This act agrees with ecological economics which aims to ensure that there is a need to conserve the biodiversity and ecosystem because without these, living organism will stop to exist. Biermann, Kanie and Kim (2017) points out that overexploitation of the resources has harmful effects on the environment; therefore, for development to be sustainable, exploitation of the natural resources must be within the carrying capacity of the earth. Collste et al., (2017) posits that there is a need develop human resource management which will provide human knowledge and skills in protection of the

environment, economy and society. This can be done through educating and training people on the importance of conserving environmental resources which could help in developing positive approach towards nature. Therefore, this shows that education can influence society towards conserving and protecting the environment through appreciating human values.

2.8.7. National Water Resource Strategy 2004/ 2013

The NWRS (2004) provides a platform for the essential collaboration and co-operation among all departments in all spheres of government involved in economic development. It is an important input to the evolving National Spatial Development Framework, helping to provide a better understanding of the contribution that water can make to development in all departments' areas of activity. An importance element of the NWRS is the modern decentralisation of the responsibility and authority for water assets control to catchment management organizations and, at a local stage, water user institutions. These institutions, representative of water users and different stakeholders, will facilitate effective participation within the control of water sources of their regions. It's going to also permit the DWAF to move from its present multiple roles as operator, developer and regulator to come to be the arena leader, policy maker, regulator and monitor.

Many challenges face water resource managers in ensuring that water supports the transformation of society and the economy. The NWRS will guide the achievement of the common vision of an equitable and sustainable society. The National Water Act requires the government to address the issues of gender inequity in water as much as it must address inequity arising from race or disability. There are imbalances among women and men, in for example their levels of schooling and the influence they are able to work out, and these imbalances need to be addressed in initiatives to capacitate the two agencies to take part in decision-making. The NWRS (2013) posits that terrible black women are one of the most marginalised groups in South African society. Consequently, an aware effort must therefore be made to involve them in water resources management strategies and to ensure that the control of water contributes to meeting their desires. After its establishment the NWRS will offer the framework within which water sources should be controlled within the country, due to the fact section 5(3)

of the Act states that South Africa's water resources need to be included, used, evolved, conserved, controlled and managed in accordance with the NWRS.

2.8.8. Indigent Policy

Erasibo (2005) posits that people are classified as indigent if they do not have access to sufficient water, environmental health, basic sanitation, basic energy, health care, housing, food and clothing. The National Indigent Framework (2005) suggests that an indigent policy is only functional once subsidies are targeted to the poor households and those who are not indigent pay. The legal framework for implementation of free basic services is essentially that of tariff setting, which is guided by the Constitution of the Republic of South Africa (Act No. 108 of 1996), the Local Government: Municipal Systems Act (Act No. 32 of 2000) and the Water Services Act (Act No. 108 of 1997). The Municipality Systems Act proclaims that the municipalities must develop an indigent policy that assists the poor households to access basic municipal services, such as safe drinking water and adequate sanitation (Tissington, 2011).

South Africa has no authentic national poverty line; it places that municipalities can also set up their very own criteria for what constitutes indigent status. The DWAF considers a monthly income of R800 or beneath to be a poor family, and many municipalities have followed this measure (Department of Water Affairs and Forestry, 2009). The uThukela District Municipality adopts an indigent help coverage which embodies an indigent assistance programme not most effective supplying procedures and suggestions for the subsidisation of service charges to indigent households in its area of jurisdiction, however additionally to growth, the quality of life of the beneficiaries by means of assisting them to exit from indigence. The indigent policy suggests that every household that is registered as indigent receives a credit on their water invoice for the free amount of basic water. Indigents are normally diagnosed primarily based on month-to-month family income (uThukela District Municipality, 2019). The indigent policy has since afforded every household to have access to 25 litres of safe drinking water per person per day or 6000 litres per household of eight people per month for free (DWAF, 2002).

Families below the indigent income level are required to check in with the local municipality with the intention to achieve indigent status and applicants need to have complete family monthly earnings under a certain level and have a South African identity document. Furthermore, some municipalities impose similarly conditions that make registration difficult for poor humans. Similarly, to keep indigent status, households need to reapply every one to two years, a process that is often burdensome (Conteh, Detterman, Langford, Dugard, and Tissington, 2008).

2.9. Water sector institutions

2.9.1. Water Service Provider (WSP)

Water Service Provider (WSP) is described as any person who provides water services to clients or another water services institution but does no longer encompass a water services intermediary (DWAF, 1997). A Water Services Authority is any municipality that has executive authority for water offerings within its location of jurisdiction in terms of the Municipal Systems Act or the ministerial authorisations made in terms of the Municipal Structures Act (DWAF, 2006), because of this, the municipality is accountable for ensuring access to water delivery and sanitation services. The role of the WSP stipulated under the WSA and Municipal Systems Act is to provide water services on behalf of the WSA provided that there is a signed WSDP and agreement between a municipality and an external services provider in alignment with the norms and standards of water provision and Municipal Strategic Partnerships (MSP) to do so (DWAF, 1997; DWAF, 2005a).

UThukela District Municipality made a partnership with Umgeni Water Board to help address the water service backlogs and also to ensure that there is a sustainable supply of bulk potable water within time frame that is specified in the National Development Plan (NDP). Umgeni Water is a state-owned entity established in 1974 to provide water services to other institutions in its service area. Umgeni Water operates in accordance with the Water Services Act No. 108 of 1997 (Section 29 and 30). Therefore, uThukela Water and Umgeni Water Board are now WSPs as they provide water services in their surrounding communities.

2.9.2. Water Service Authority (WSA)

The water services authority is responsible for collection and treatment of sewage, waste water and effluents (DWAF, 2006). It may perform this function itself, or it may contract a water services provider to carry out this function on its behalf. A WSA is any municipality, including a district or a rural council as defined in the Local Government Transition Act, 1993 (Act No. 209 of 1993) cancelled by Municipal Amendment Structures Act, 2000- responsible for ensuring access to water services (DWAF, 1997). uThukela District Municipality is a Water Services Authority as mandated in terms of the Water Services Act No. 108 0f 1997. Section 1 posits that a WSA is any municipality including a district municipality responsible for ensuring access to water and sanitation services to consumers or potential consumers within its area of jurisdiction.

The Act further notes that the WSA may provide water services internally or outsource the provision of water services from other water sectors. According to the municipality they established the Water Services Development Plans (WSDP's) that is compiled to address backlogs in basic water and sanitation services according to the legislation, the Water Services Act (Act No. 108 of 1997). The WSDP helps the municipality to identify the backlogs as the majority of backlogs appear most in rural areas and according to the WSDP, there were some operational problems at the treatment works due to lack of maintenance (uThukela District Municipality, 2019/20). They notice that the condition of some of the components was in a very poor state and required urgent refurbishment and maintenance.

2.9.3. Water board and water committees

A water board is established by the Minister of Water Affairs and Forestry and is a public water service provider. The purpose of establishing a water board is to provide water services to other water services institutions. The establishment of Water Boards and Water Services Committee is to provide services to communities who follow the norms and standards of water service provision (DWAF, 1997, DWAF, 2005). Water Boards are also mandated to provide services to industrial sectors such as mining companies and they also provide catchment management services with the consent of WSA which accept an industrial discharge and perform water conservation duties

(DWAF, 2005). UThukela District Municipality made a partnership with Umgeni Water Board to help address the water service backlogs and also to ensure that there is a sustainable supply of bulk potable water within time frame that is specified in the National Development Plan (NDP). This stipulates that by 2030, all households are to have access to potable water supply and yard connections for human consumptions. Currently an UThukela Water Board is the only water service authority in KwaZulu-Natal province that manages both bulk water supply and reticulation services.

2.9.3.1. UThukela District Municipality: Public partnership with Umgeni Water Board

uThukela District Municipality is a Water Services Authority Municipality as mandated in terms of the Water Services Act No. 108 0f 1997. Section 1 states that a WSA is any municipality which includes a district municipality accountable for ensuring access to water and sanitation services to consumers or capacity consumers inside its area of jurisdiction. The Act further states that, the WSA may provide water services internally or outsource the provision of water services. Umgeni Water is a state-owned entity established in 1974 to provide water services to other establishments in its service location. Umgeni Water operates in accordance with the Water Services Act No. 108 of 1997.

uThukela District Council resolved to work in Public Partnership with Umgeni Water, which resulted in the signing of the co-operative contract of a period of 20 years in order to achieve the objectives of the NDP of eradicating water services backlogs and ensuring sustainable provision of water services to all consumers and potential consumers by 2030 (uThukela District Municipality, 2019/20). This Public Partnership Agreement was signed on the 27th November 2017. The signed contract outlines the role of Umgeni Water as a Water Board that will be in charge of the operation, maintenance of bulk water services, upgrading, extension of water works and construction of new water works to meet current and future water demands.

The rationale and the reason for uThukela District Municipality for working in Partnership with Umgeni Water Board is that uThukela District Municipality is the only

Water Services Authority that manages both Bulk Water Services and Reticulation Services in the KZN Province (uThukela District Municipality, 2019/20). The maintenance and refurbishment costs of water and wastewater works are currently unaffordable by uThukela District Municipality due to financial constraints. Therefore, working in partnership with Umgeni Water Board will assist uThukela District Municipality to address water supply backlogs and ensure sustainable supply of bulk potable water as Umgeni Water has sufficient capacity to maintain, refurbish, upgrade and build new wastewater infrastructure.

2.10. UThukela District Municipality Blue Drop/Green Drop Status

The uThukela District Municipality is involved in the Department of Water and Sanitation regulatory Blue drop/Green drop process. This involvement is proposed to achieve best compliance, working and system controls. Blue Drop system and green Drop system ratings for uThukela District Municipality are very low. The Blue Drop Device (BDS) rating is presently sitting at 34.50% and the Green Drop System (GDS) rating is currently sitting at <30.0%. This means that the management of water schemes under uThukela District Municipality as well as the waste water treatment and purification plants are in a very poor state, and an intervention is required (uThukela District Municipality, 2019/2020). The municipality consider that the water supply demanding situations might be addressed if all relevant role players specifically the community, private zone and spheres of government co-operate and play their respective roles in assisting and dealing with water services. Consequently, the implementation of effective interventions to address water and sanitation issues will not only improve the best of water and sanitation delivery inside the municipality however may also improve the Blue Drop and Green Drop rankings.

2.11. Catchment Management Agencies (CMAs)

The National Water Act 108 presents for 4 different styles of water management institutions which incorporates catchment control agency, water user association, a body responsible for global water control and any individual who fulfils capabilities of a water management organization in terms of the act. South Africa has 19 water management areas covering the entire country. The purpose of establishing the Water Catchment Agencies (CMAs) and Water Catchment Forums (WCFs) is to delegate

water resource management to the catchment level and to involve local communities in decision making process (DWAF, 2004). CMAs are responsible for investigating and advising on the protection use and conservation of water resource management areas (Karodia and Weston (2001). The CMAs are also responsible for development of catchment management strategy and coordinate the activities of water users and water management institutions (DWAF, 2004). This is done by promoting the implementation plan for water services and promotes community participation. DWS argues that reducing the number of national catchments with larger CMAs will enable improved cooperation and coordination on regional, provincial and international levels. However, (Meissner and Stuart-Hill, 2016) argues that such a system does not cater for the localized catchment issues around which domestic water users can engage with CMAs using CMFs. This meant that local government would not have regulatory powers over water allocation and use for bulk systems such as industries, mining and irrigation for commercial purposes

The establish CMAs closer to the local people promote involvement in decision making around water resources management in the WMAs (De La Harpe, Ferreira and Potter, 2013, DWA, 2012). Whereas there is no articulation provided in terms of the benefits of participation of local people in the CMAs and the government presented the intention to meet basic human needs of present and future generations while promoting equitable access to water and to redress the results of past racial and gender discrimination, and facilitate social and economic development. The municipality is uThukela Water Management Area (WMA). The Tugela River forms a part of the Tugela River Catchment, which is about 30 000 km2 in quantity and is one of the critical river catchments in South Africa, which drains from the Drakensberg escarpment into the Indian Ocean (UThukela District Municipality, 2019/20). There is substantial runoff from the Tugela catchment as a result of high rainfall.

2.12. Integrated Water Resource Management (IWRM)

Global Water Partnership (2000) defines IWRM as a procedure which promotes the coordinated improvement and management of water, land and related sources, with the intention to maximize the resultant economic and social welfare in an equitable way

without compromising the sustainability of vital ecosystems. There are numerous definitions which result in observations that due to uncertainty of the concept and different challenges, IWRM is not going to be helpful (Mitchell, Bellette & Richardson, 2015). Mitchell, Bellette & Richardson (2015) state that the underlying ideas of an integrated method encompass managing interrelated resources with interest to ecological procedures and retaining environmental high-quality; facilitating community participation; and coordinating applicable authorities, non-government and network resource management regulations and activities. Jeffrey and Gearey (2008) emphasized that IWRM is imperfect as it places water on the centre even though it is a far simplest one aspect of holistic problem management and has shown that IWRM is invalid of the politics which in reality are at the core of all crucial water decisions.

Global Water systems (2000) sees IWRM as a key approach in coping with water resources and offers a set of thoughts to help us manipulate water greater holistically. IWRM is responsible for the establishment of water policy and laws which use basin as the scale of management, water pricing allocation, establish water rights and participation in decision making (Giordano & Shah, 2014). Biswas (2004) suggest that IWRM promoters must be aware of the desires and demands of a developing country, diversity of crucial, country and municipal institutions, non-public sector, NGOs, and different appropriate bodies. The concentration of fewer government and institutions could expand biases; reduce transparency and proper analysis of their activities (Manzungu, 2016).

In addition, the objectives of increasing stakeholder participation, decentralisation and decision making at the lowest levels are unlikely to contribute to integration especially for meso and macro water projects. Critics of IWRM argue that it has little practical importance on the existing or future water control practices, shortage of water and feasibility as governments are still divided into purposeful areas and further argue that IWRM lacks regulation and suitable policy framework to guide integration (Biswas, 2008, Jayyousi, 2007, McDonnell, 2008). Furthermore, IWRM also points that it lacks quantification of what constitutes economic and social welfare and it does not give clarity on equity, sustainability and ecosystems. IWRM into a large extent is it not

practical to enforce and operate at any degree of government or even more complex in decentralised local authority systems (Manzungu, 2016).

In South Africa the National Water Act incorporates international principles of Integrated Water Resource Management (IWRM). DWAF (2004) defines IWRM as a technique which promotes the coordinated improvement and control of water, land and related resources that allows you to maximize the resultant economic and social welfare in an equitable way without compromising the sustainability of critical atmosphere. The African Development Bank acknowledge that countries should use the ideas of IWRM to create countrywide water policy and supporting legal and regulatory framework policy, undertake the polluter-pays principle, decentralize choice making, and feature participation in irrigation decision making through water user association (Giordano & Shah, 2014). The African Development Bank highlight that water sector funding could be depending on the concepts and ideas for future water projects to present financing precedence to the ones initiatives that comply with country wide regulations which are based totally on the idea of IWRM.

IWRM is intended to provide integration across sectors and it's also driven in most cases through water experts. For this reason, actual implementation often neglects the integration of land with water rights. As highlighted by Grigg (2014) many failures of resource management during the 20th century had been resulting from changing powerful community management with useless or corrupt government management. Lange and Hassan (2006) posit that a country should take an active part to water management. IWRM requires the multifaceted connections among different elements of hydrological cycle and between fresh water systems and the surrounding biophysical and socio-economic environment need to be considered in managing and planning development and use of water resources in the country (Petit and Baron, 2009). Mukhtarov (2009) notes that IWRM also calls for powerful cooperation and coordination between agencies involved in dealing with different components of water and related resources for various purposes which includes poverty reduction and environmental health.

2.12.1. Principles of Integrated Water Resource Management (IWRM)

Solanes and Gonzalez-Villarreal (2008) point out that there are principles that are involved in IWRM. The Dublin principles of IWRM were developed in 1992 to attempt the issues of water resource management.

Principle 1 states that the fresh water is finite and vulnerable, essential to sustain life, development and environment. This principle interpret that water is finite and vulnerable resource which includes surface water, ground water, quality, quantity, soil etc. as part of integrated water resource management. It emphasises the crucial sustainable use and development of water resources through linking economic development with protection of natural ecosystem (Solanes and Gonzalez-Villarreal, 2008). The National Water Act 1998 (Act 36 of 1998) has noticeably changed the framework for access to water through ensuring the better-quality and equitable distribution of this water resource (McConkey and Wilsenach, 2010).

Principle 2 states that water development and management should be based on a participatory approach. This principle emphasises that IWRM should take place at lowest level where decision making is taken by all stakeholders and participatory approach involve all people, planners and policy makers in water projects (Solanes and Gonzalez-Villarreal, 2008). Participatory approach in societies is important because it ensures that water projects are explained and understood which promote effective IWRM (Page and Bakker, 2005). Push (2015) posit that it is essential to make sure that local issues are surfaced, heard and understood; challenges addressed; and distinctive stakeholders made aware about their respective roles and duties. Therefore, community participation is a powerful and creative way to respond to the numerous water supply demanding situations confronted by municipalities and municipal-community partnerships can assist to meet the desires high rates of poverty and equality. Principle 2 is significant in this study as it looks at the local government's delivery and emphasise decision making to take place at the lower levels which provides the concept of decentralization.

Principle 3 sees water as an economic good. This principle points out that water resource should be treated as economic good not as basic human right. Van Koppen

and Schreiner (2014) notes that when water is available without cost, there is a misuse of it, he further emphasizes that water is an economic good where water pricing seems to be a powerful tool to maintain IWRM. The supporters of this principle of IWRM believe that it is critical to understand first the fundamental right of all humans to have access to clean water and sanitation at an affordable fee. There's a contradiction which appears in the Africa Water Facility (AWF) and African Council of Water Ministers (AMCOW) that assert that poor people are willing to pay higher prices. AWF argues that past failure to recognise the economic value of water has led to careless and damaging environmental resources. The African Development Bank also posits that managing water as an economic good is an important way of achieving equitable use and protection of resources (Nojiyeza, 2014).

In most African countries and elsewhere, it reflects a different direction towards recognition of water as an economic good (Moriarty, 2003, Jayyousi, 2007, Lloyd, et. al, 2006 cited in Nojiyeza, 2014). Many people in South Africa mostly in rural areas are against the water pricing policy because water should be treated as basic human rights (Khadzi, 2010). Livingston (2019) argues that if water is treated as economic good it only favours economic growth and this deprive people to water as basic human right. This study maintains that water should be treated as a basic human right and it is supported by the Constitution of South Africa that everyone has a right to water and water should be available without cost.

Principle 4 state that women should play a central role in the provision, management and safeguarding of water. This principle acknowledges and state that women should play a central role in the provision, management and safeguarding of water. This principle acknowledges that women should be involved in the decision making process and implementation at all levels of water issues. This increases the role of women in water resource management and promotes women empowerment (Solanes and Gonzalez-Villarreal, 2008). The Sustainable Development Goals also aims to promote gender equity and women empowerment. Aladuwaka and Momsen, (2010) notes that

most women in rural communities have no voice in the decision-making process and this deprives them of water resource management.

There is no discrepancy that women play a central part in the provision, management and safeguarding of water. Preferably access to water and use of resources should be equitable distributed among stakeholders including gender. Economic Commission for Africa (1999 cited in Nojiyeza, 2014) notes that it has commonly accepted that the gender issue remains critical for IWRM to be realised in a sustainable manner and inadequate access to water and sanitation adds hugely burdens to women's work and affects their health and that of their children. Water and sanitation sector have recognised the benefits of providing to basic services to women's and girls' lives as they become freed from daily chores of fetching water. Therefore, the roles of women as custodians and guardians for food and water requirements for the household should be considered in equitable access to water.

This will make contributions to powerful public participation and community involvement which could assist in the direction of attaining higher success in IWRM. Women need to be endorsed to be motivators, and they need to be absolutely concerned in preservation and operation of water improvement schemes (Winter, Barchi and Dzombo, 2018). Moriarty (2003) indicates that the implementation of water projects would come to be more useful in lowering the hardships of women and bringing about the well-being of communities in areas of health, education and financial fields.

The principle which states that gender and equity issues need to be addressed during the undertaking cycle represents a change in emphasis and broadening of interest from the authentic Dublin declaration, with its attention on the role of women, to a much wider gender awareness that seeks to perceive and cater for the exceptional needs of men and women, and specifically of poor men and women (Moriarty, 2003, cited in Nojiyeza, 2014). It emphasises that burdens and benefits are shared equally between males and females, necessitating precise efforts to enable women to assert their proper position in decision-making. Men and women use water for different activities. The issue of socio-

financial fairness in allocation of water resources is a central issue to practitioners in community water projects.

2.13. Ecological scale in the distribution of water supply

Ecological scale of the economy is specific to particular technological and environmental services. Czech (2008) posit that local government provides and produce a variety of different services with distinct specific characteristics, no single size of the authorities can be able to produce all services at minimal possible cost for each provider. If councils produce their own services, there are huge combinations of economies of scale. This follows a system of numerous small municipalities failing to grow their economy and these results to an increase in expenditure for same level and composition of output than a system of larger councils (Czech, 2008).

Ecological scale of water supply usually yield important economies of scale since the cost of fixed asset can spread across a greater number of households. If a local authority makes a decision to provide a greater range of various services that yield the expense of scale or size of the economy achievable by specialising fewer services. In most local municipalities the scale or size of the economy is lower, this lead to inadequate funds available to supports the provision of services because financial constraint limits the volume and range of services that a municipality can provide (Deller, Chicoie, and Waizer, 1989).

Dollery and Fleming (2005) emphasise that the union of local municipalities in resource sharing agreement that would allow each municipality to lessen the cost of goods and services it currently provides to the community. The amalgamation of two or greater councils providing and producing a large range of services using different input combination and technological process can increase and generate the scale of the economy. Dollery and Crase (2004) posits that municipal amalgamation is a powerful engine for boosting local authorities' performance based on their economic case, which includes large councils, significance scale of the economy, economies of scope and reduce administrative and compliance cost.

In 2018 the uThukela District Municipality contributed 3.7% to the provincial GDP. This proportion is markedly lower than the proportion that this district contributes to the provincial population (6.3%), which implies that this district is economically worrying on the rest of the province (uThukela District Municipality, 2020). Alfred Duma Local Municipality is the economic hub of uThukela District Municipality and governs the spatial economy of the district. Economic development is irregular across the district, with large inequalities across local municipalities. Other municipalities including UKhahlamba Local Municipality and Langalibalele Local Municipality have relatively small economies that are dependent on community services.

The economic growth of Alfred Duma Local Municipality is very low. The economic boom in the municipality is highly impacted by international trends and because of this within the next 5 years; the economy inside the town is expected by a downswing 2% growth rate. This low charge of financial increase can be attributed to negative planning; the prioritisation of social projects over economic tasks as well as the out migration of professional labour and business possibilities. Therefore, this suggests that Alfred Duma Local Municipality's economy is low and this impact the subsidies of water and sanitation. The ecological scale in the distribution of water supply within the municipality affects the provision of services as the economic growth of the municipality is not strong.

2.14. Scale of the economy and provision of services in rural areas

2.14.1. Effect of ecological scale in distribution of water supply

There is a relationship between the scale of the economy and provision of services. The Principle four of Dublin principles acknowledge that to ensure that water resources are not exploited access to water resources should not be free. This is the principle that dominates the implementation of IWRM and accounts for the greater part of its failures in Africa. However, there's a contradiction between water as economic good and water as basic human right. Jayyousi (2007) and Nojiyeza (2014) presents an opportunity argument that water is human rights with social price and social good; therefore, it is complicated to treat water similar to any commodity that is priced in this sort of manner only few who could afford to buy it. Therefore, the economic cost and good of water

contradicts the human right and social good. However, access to water resources should be provided to all people with affordable quality of managing water as an economic good. It is said to be an important way of achieving efficient equitable use and a way of encouraging conservation and protection of water resources (Dublin principles, 1992). Malthusian population trap suggests that a threshold population to be reached, where population growth stabilizes because the amount of resources available for lives are only limited (Todaro and Smith, 2013). This affect the available water resources as an increase in population reduces the available water resources, which affect the ecological scale in the provision of water and sanitation services in rural areas as there are limited resources to support the present population.

Menshar (2019) posit that the population keeps increasing, however, the natural resources available for the satisfaction of human wants and desires will no longer be available. The dialogue concerning whether or not the capacity of the Earth's constrained natural sources could be able to continually guide the existence of the growing human population received prominence with the Malthusian population idea within the early 1800s (Dixon and Fallon, 1989). Malthus postulated that human population tended to develop in a geometric development, even as subsistence could grow in only an arithmetic development, and for that matter, populace growth became likely to outstrip the potential of the natural resources to guide the wishes of the increasing population (Rostow & Rostow, 1978).

The expansion of resources led to an increase in population growth and population size grew beyond the capacity sustainable by available resources. In line with the concept, periods marked by way of the absence of changes within the degree of technology or in the availability of land, have been characterized by a stable population size in addition to a constant earnings per capita. In comparison, episodes of technological progress, land expansion, and beneficial climatic situations, brought about temporary gains in income according to capita, triggering an increase in the size of the population, which led subsequently to a decline in earnings per capita to its long-run level (Multhus, 1978).

2.15. The role of a local municipality in equitable access to water

The local government sphere which is closely located to local people is mandated to provide municipal services as listed in Schedule 4 and 5 of the Municipal Systems Act (Act 32 of 2000) and Structures Act (Category A of the Metropolitans, Category B of Local Municipalities, Category C of District Municipalities) (RSA, 1996; RSA, 1998; RSA, 2000). The Alfred Duma Local Municipality is the result of the redetermination of boundaries in terms of section 21 of the local government: Municipal Demarcation Act 1998 (Act No.27 of 1998) which resulted in sure municipalities being disestablished and their former areas of jurisdiction merged below new municipalities and in this case EMnambithi/ Ladysmith and Indaka Local Municipality are a part of the municipalities that merged and fashioned a new municipality known as Alfred Duma Local Municipality. The municipality is a category B municipality and is within the Northern part of KwaZulu-Natal. The Alfred Duma municipality is one of the three municipalities of uThukela District.

District and local municipalities were given a role of Water Service Authority (WSA) in 2003. This means that the provision of an affordable and potable access to clean water is now the responsibility of local municipalities not the Department of Water Affairs and Forestry (1994). In rural groups, the local government, especially municipalities with the help of the national and provincial governments have a constitutional obligation to ensure that the ones residing in those groups have to get right of entry to sufficient drinking water. In so doing they could be enjoying the constitutional objective which is to redress the injustices of the past apartheid regime. The DPLG Framework for Municipal Indigent Policy (2005) observes that no municipalities in South Africa have yet achieved a situation where all the indigents in their areas of jurisdiction have gained access to basic services.

However, COGTA (2016) suggest that strong economically placed municipalities including metros have provided their people with water and in contrast the weak municipalities are still facing challenges of providing basic services. Berkowitz et al., (2009) outlines that many small municipalities are having a trouble of providing water to rural communities and this is not a trouble at all for huge municipalities and metropolitan

regions. This has contributed to what can be described as tiers of municipal non-viability in respect to useful overall performance, socio-financial vulnerability and an incapability to manipulate infrastructure improvement and investment. As a consequence, most of the rural municipalities are suffering with backlogs and cannot provide services sustainable.

Municipalities have been provided with Equitable Share and Municipal Infrastructural Grants (MIG). Equitable Share and MIG are municipal grants allocated to municipalities through approved WSDP and business plans to finance water supply services in households and capacitate municipalities to deliver on their mandates (Nkuna, 2012). Alfred Duma Local Municipality receive equitable share and MIG, even though they claimed that it is not enough in driving their mandate of service delivery. Bakker (2010) posits that the minimum set amount of water for ecological reserve fails, thus giving in to market prioritisation and territorialisation of nature prioritising the markets, however has resulted in the worsening of ecological problems, as well as a decline in the environment (Bond, Ruiters, and McDonald, 2003). Systemically, public concerns were raised regarding the extent to which the environment is receiving a fair share of water allocation.

The Alfred Duma Local municipality stipulates that municipalities are constitutionally responsible for the provision of fundamental services to its communities at a standard that is ideal to the community and as prescribed by using national legislation, rules and directives. The projects which are required to fulfil this mandate are identified via the five-year infrastructure plan and maintenance plan which will be supported by the Long-Term Development Strategy which the municipality is currently drafting in order to be in line with the review of the KZN Provincial Growth and Development Plan and thereafter use the IDP as the vehicle to achieve our long-term goals (Alfred Duma Local Municipality, 2019/20). At the same time communities and key stakeholders additionally have necessities for various initiatives and programs to uplift and expand the communities. Those requests are commonly listed as tasks on a wish list that need to be included in the IDP.

2.15.1. Challenges at local municipalities

In the context of ADLM, the municipality is facing challenges of poor communication and understanding of roles and responsibilities between local municipalities, district municipality, municipal internal sector department's councillors and officials (Alfred Duma Local Municipality, 2019/2020). The municipality also notes high rates of aging infrastructural services which are the results of water theft and vandalism have been reported to disrupt service delivery to take place. Moreover, the regions contained in the municipality are often rural and job opportunities look like a challenge, this is due to high number of terrible and indigent groups, the geography of the area that in which most of the encompassing areas within the Alfred Duma Municipality is rural, therefore there are huge quantities of indigent customers. It can also be noted that there is unequal service delivery that is more urban bias at the negligent of rural communities.

The Alfred Duma Local Municipality (2019/2020) also outlines the challenges of vacancy rate which also contributes to municipal demanding situations in addition to budgetary constraints, high levels of political interference in administrative processes and techniques, migration of skilled and competent labour, and high crime rates and high levels of poverty. There is also a problem of poor revenue collection, loss of resources for installation of strategic infrastructure which will put into effect municipal catalytic undertaking, poor staff retention strategy and poor intergovernmental relations. COGTA (2009) suggest that local municipalities IDPs and WSDPs are mostly poorly monitored by the national and provincial governments due to low capacity and poor systems to hold municipalities accountable for their service delivery practices. In addition, it has been noted that most municipalities register communities in their IDP, yet the budget and implementation could no longer be impending (COGTA, 2009).

Consequently, with the above mentioned, local governments also face enormous challenges in implementing their constitutional mandates; this includes lack of capacity in the form of skills and human resources to deliver water services in communities (Kings, 2014). These challenges have been highlighted above in the challenges facing Alfred Duma Local Municipality. Calfucoy et al., (2009) notes that there are policy

implementations which move away from service delivery practices which need to take place at communities, for examples, it has been indicated that that municipalities provide FBW to most citizens who are financially stable than the indigents that needs it. This has resulted to unequal resource allocation between rural and urban areas and between the rich and poor social categories (McDonald and Pape 2002; McInnes, 2005). The Development Bank of Southern Africa (2012) posits that there are problems with the political, administrative interface and political interference in municipal operations.

In addition, Madi (2016) notice that there is a huge service delivery backlog; maladministration in addressing ageing water infrastructure is problematic. There is also a lack of planning and budgeting in municipalities which delay service delivery (Kanyane and Koma, 2014). It has been reported that service delivery is slowed by the challenge of corruption and fraud, water leakages, water theft and vandalism and this results in municipalities not to recover from huge municipal debts (McDonald and Pape, 2002; Moriarty, 2003; Skenjana, Ngamlana, Mabhula, Mgwebi, Sokupa, Kimemia, Corplan, 2010).

2.16. Conclusion

This chapter provided literature review based on the ecological governance framework that governs water provision in South Africa and equitable access to water. The literature reveals that water is the basic human rights and it should not be treated as an economic good. The institutional framework governing water in South Africa has not yet played it role in provision of water and sanitation services in many areas of the country. Many municipalities are struggling to provide free basic water as it was stipulated in the free basic water policy that they should comply with. The next chapter focuses on the theoretical framework used in the study which is the ecological economics and it discusses the principles of ecological economics, issues of ecological governance and decentralisation structures in local areas.

CHAPTER THREE: THEORETICAL FRAMEWORK

3.1. Introduction

This chapter discusses the theoretical framework of the study. The study used Ecological Economics (EE) as its theoretical framework to achieve the research objectives and research questions of the study. This includes equitable access to water and sanitation services ensured in rural areas, the ecological governance framework that support access to water, ecological scale in the distribution of water supply and the role of local municipality in equitable access to water in local areas. Constanza et al., (1999) defines ecological economics as trans-disciplinary aspiration by which practitioners incorporate and synthesize ideas and ideas from pure sciences, more importantly notably physics and ecology, and social sciences towards the tip of understanding financial affairs and effecting sustainable, truthful, and environmentally friendly outcomes. Ecological economics believe that it is significant to put restrictions to development of technology and that the redistribution is necessary to resolve poverty and economic improvement as opposed to economic growth (Czech, 2008). The ecological economics integrates economic, social and ecological targets in all fashions and decision-making techniques. It focuses more on the scale, distribution and allocation of resources and also considers the ecological governance frameworks and the ecological scale.

Ecological economics suggest that institutions need to be enablers and regulators of communication action for equitable distribution and delivery of basic needs to their citizens, where they should target subsidies to the poorest and ensure that resources within the environment are managed and protected (Greenwood and Holt, 2008). Ecological economics produces a number of distinct coverage implications where it emphasises that new policies are required in the ecological governance framework where they should be informed by sustainable scale, fair distribution and efficient allocation. Czech (2008) posits that some ecological governance policies did not meet the desires of small communities and alternative structure and systems are required. Perman et al., (2003) further states that ecological economics has a good deal to do with improving the quality of community's human's capital as it does with the increasing length of the local economy. Consequently, it has a terrible drawback with enhancing

the quality of a community's human capital as it does with the growing size of the nearby economic system. The ecological economics emphasise the gendered nature of water management. It makes use of and management as a problem for effective and sustainable water resource management (Coles and Wallace, 2005). The provision of water for the family is a duty of women in most constituents of the sector. Women make the primary customer and resource use choices for their families and the community, and women in all cultures serve as managers of constant assets (Domosh and Seager 2001). Therefore, women experiences and understanding have to be regarded considering development tasks aiming to control and conserve water assets. Constanza et al., (1997) states that ecological economics believes that that there are significant limits to the improvement of technology and that redistribution is important to resolve poverty and economic improvement rather than extra economic increase. Therefore, ecological economics posits that the population could make the important decisions about scale, and then it is essential that training, nourishment, opportunity for effective participation, and luxury are greater, equitably disbursed among humans and amongst generations.

3.2. Ecological Economics

Ecological economics arose in the very last a long time of the twentieth century out of concerns for environmental safety and economic sustainability. Ecological economics addresses the disasters caused by neoclassical economic paradigm through treating goods and services from the natural global and crucial components of the human economy as commodities. Ecological economics is an interdisciplinary paradigm searching for to link and observe the management of nature (Yazdi, Shakouri, Salehi & Fashandi, 2017). Yazdi et al. (2017) posits that ecological economics is a shape of economics that takes into consideration the interdependent and co-evolutionary interactions that exist in a number of the distinctive economic, ecological, and social systems that form the world community.

Ecological economics is a multifaceted paradigm that seeks to fill intellectual gaps between disciplines in knowledge space with the aid of encouraging and nurturing a communication throughout seemingly disparate geographical regions of challenge

discourse (Underwood, 1999). Ecological economists argue that the natural systems operate in a self-renewing cycle, it is not a linear progressive manner; and because of its growth cannot be sustained as it is today; they advocate steady-state economies (Daly, 2004). In addition, Daly argues that neoclassical economics is a beneficial description of how markets allocate scarce resources, but it is far of little use when it comes to policy suggestions for human survival.

Livingston (2001) emphasises that neoclassical economics is against the protection of natural environment and natural resources are general, not seen as a fundamental prevention to economic growth. Livingston (2001) supports Soderbaum's work where he argues for open-minded approach to studying environmental problems. Environmental problems are only described as negative externalities and the effects on economic agents external to the centre of the market theory and neo-classical economics suggests that values are exclusively found in the market, based on the individual preferences of economic agents (Soderbaum, 2000).

Yazdi et al (2017) notes that the focus of ecological economics is on sustainable development, where the main point is that the present generation should ensure that health, diversity, and productiveness of the environment are conserved or enhance to benefit future generations. For this reason, environmental factors need to be greater closely weighted in the valuation of property and offerings to offer extra motivation for the conservation of biodiversity and ecological integrity (Hanh, 2000). Wackemagel and Rees (1997) consider that the ecological world view acknowledges that human financial system operates inside the ecosphere, a thermodynamically closed machine powered almost exclusively through 175000 TW of low entropy solar power. Humans stay in obligate dependency on nature as well as on each different, and that market prices cannot be the only criterion for cost or necessity. Wackermagel and Rees (1997) observe that biophysical approach makes it possible to explore the implications of such ecological principles as Yon Liebig's Law of the Minimum, and the First and Second Laws of Thermodynamics, all of which are ignored by conventional analyses.

Sustainable development is one of key components of ecological economics. In many countries, sustainable development has put in place policies and development programs into balance of environmental, social and economics (Lovren and Willats, 2019). Sustainable development put an emphasis on the environmental, social and financial services which must not threaten the viability of naturally constructed and social structures upon those services depend on (Taylor, 2016). For this purpose, environmental assets need to be protected by putting more emphasis on the boundary set by carrying capacity of the earth and promote anti-growth as means of keeping economic systems with environmental limits of the earth (Fasoli, 2018). The following figure represents a model of ecological economics by Folke and Kaberger (1991).

According to Figure 3.1, the left half represents the ones strategies using several evaluation standards for analysing the interactions among ecological and economic systems, and the right half are those using a common denominator for this evaluation, which includes money or power. Ecological economics explicitly refuses the entire commensurability paradigm and recognises the life of incommensurability among economic and environmental elements (Munda, 1997).

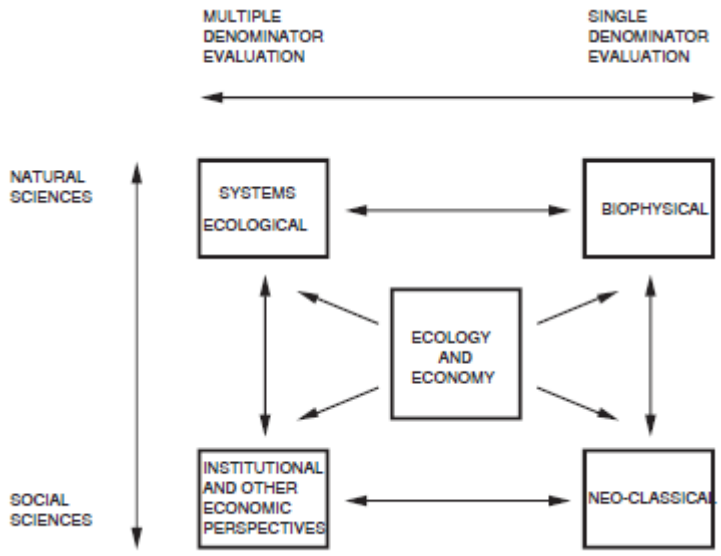


Figure 3.1: A simplified conceptual model of ecological and economic perspectives and approaches to environmental issues: (Folke and Kaberger, 1991)

3.3. Principles of ecological economics

3.3.1. Water as a basic human rights

Humby and Grandbois, (2010) considered water as primary building block of life. The United Nations General Assembly notes that safe, clean drinking water and sanitation is a basic human right and is essential for all full enjoyment of life and human rights. The 2015 United Nations Goals for Sustainable Development (SDGs) strongly supports the access to secure and lower priced drinking water and adequate sanitation and hygiene for all by 2030. Goal 6 of SDGs stipulates to make sure that there is availability and sustainable management of water and sanitation for all (UN, 2015).

Water as human rights is also supported by constitutional obligation in South Africa which includes Free Basic Water Policy (2000) which stipulates that a household should receive 25-30 litres of water per day and the South African Constitution (1996) cherishes water as a right and this reveals that water is an important basic need for all people. Biswas and Tortajada (2008) notes that water is essential and without it, it is not possible to live as water is gradually considered to be the most vital of the planet. Water is the basic human need and needs to focus on enough availability and quality drinking water that is needed for human survival because without water, plants and animals cannot live.

Khadka (2010) notes that there is an immediate link between quality of existence and access to water supply and sanitation services. The satisfactory provision of the water supply and sanitation in the long run contribute toward state-building and prosperity through enhancing the good health of the humans. These are vital requirements for humans and not directly relate to human rights. The quality of the water supply and sanitation ultimately contribute towards nation-building and prosperity by enhancing the good health of the people. These are essential requirements for human beings and indirectly relate to human rights. People are a part of ecosystems and shape them, from local to global scales. This is largely depending on the capability of these structures to provide services for human well-being and societal development (Albert et al, 2014). Ecological economists acknowledge that industrialized societies depend for survival not

most effective on labour and human-made capital, however additionally on natural capital, adequate natural capital stocks are needed to preserve enough ecological flows for the human economic system and growing populations might need to translate in reducing economic inputs per capita (Swaney,1987).

3.3.2. Scale relative to economy

Czech (2008) posits that in ecological economics the issue of scale refers to the size of the economy relative to its containing, sustaining ecosystem. The ecological economics lay emphasis on the circular exchange between firms and households and the economy with all its firms, individuals and government sectors is shown to exist within its containing, sustaining ecosystem (Czech, 2008). The ecosystem provides energy and the natural assets which are required for the manufacturing of consumer goods and services and for the manufacturing of capital and infrastructure. From the ecological economic angle, the growth of the economic subsystem is restrained by using the scale of the overall finite global environment, by using its dependence on the life support sustained via complex ecological connections that are more without difficulty disrupted as the size of the economic subsystem grows relative to the overall device (Munda, 1997).

Khadka (2010) maintains that the most of existence-quality desires the minimum of natural resource depletion and the size of economic activity have to be determined by sustainable stages of resources use and waste production; this is key contribution of ecological economics to any democratic and progressive opportunity to unsustainable capitalist growth. In addition, Khadza (2010) also notes that the issue of scale encompasses all aspects of economic and ecosystem. Factors which includes urbanization, a growing population, industrialization, climate change, economic improvement, and increases in demand for food, energy and environment. This factor increases water demand and affect the water planning, management and allocation of water resources to the world. Czech (2008) notes that ecological economics emphasise the concept of carrying capacity that according to per capita consumption amongst humans varies through orders of significance and therefore, a better metric for expressing human carrying capability is Gross Domestic Product (GDP), that is an

indicator of human population and per capita consumption. Hahn (2000) posits that GDP is a reasonably accurate indicator of the scale of the human economy as an example, the level of manufacturing and consumption of goods and services within the aggregate and it is also a great start line for determining the scale of the economy relative to the size of the surroundings.

According to Statistics SA (2011) in terms of GDP the local municipality contribute less to the economic growth with 0.97% as there are fewer firms to contribute to economic growth of the country. The economy of Alfred Duma Local Municipality is very low as it is associated with high unemployment of 57.2%, poverty, lack of water and inadequate water and sanitation and lack of infrastructure. This is due to a large population depending on social grants for living and participates in subsistence farming. Thabethe (2011) postulate that the cost of providing free basic water and sanitation is borne by district municipalities and further concludes that many South Africans especially in rural areas do not have access to basic services and they cannot pay for services as poverty is the main issue in rural communities. In this case ADLM cannot pay for water services due to low scale of the economy. United Nations (2005) postulated that water is critical and pricing needs to not prevent the poor from getting access to it. Therefore, water is usually under-priced, in particular in developing countries, in which many families acquire subsidised water (Burger and Jansen, 2014).

3.3.3. Equity

The equity principle can be defined as the allocation of the useful resource in proportion to every party's inputs and the allocation of ecological items and burdens in share to each party's inputs to the conservation of resources and the manufacturing of risks (Cohen, Garcia, Apfel and Master, 2006). Therefore, equity emphasise that funds should be distributed to people according to their effort and also indicates that the equally distribution of ecological allocation and decision making should involve all stakeholders. Cohen et al., (2006) postulate that people who exploit ecological resources have immediate profits, while the community has to hold the risks and burdens that are produced. In most societies people do no longer have identical use of ecological resources or the satisfaction of ecological advantages; this is more relevant

in poor communities as well as racial minorities where there is fair distribution of resources. Government policies state that resources should be allocated with equity but what constitute equity is very unclear as this is visible in many countries where equity goals are often stated as priority in water policies (Wichelns, 2015). In practise there is notice that there is skewing allocation between markets and efficiency in favour of those who have the potential and manner to use water to supply the extra economic returns (Roa-Garcia, 2014). Baker (2010) concludes that in terms of equity, it is important to acknowledge water governance in equity of justice as water governance serves as coordination and decision making between different stakeholders that transformed with political culture and power. Equity is an issue in water justice as equities and justices in rural water systems have dimensions of distribution, participation and recognition (Roa-Garcia, 2014).

It is noticeable that there is an increase in industrial demand because water is treated as a social not an economic right, therefore the speedy improvement and adoption of water-efficient technologies is inhibited. Countries that are beginning to expand are witnessing speedy boom in water demand (Biswas, 2007). Udas and Zwarteveen (2014) notes that equity and justice arguments bring opponents to water privatisation, passing the fear that making access to water as feature of human's ability to pay for it and water distribution a function of markets, this may negatively have an effect on equity and justice.

Khadzi (2010) states that water pricing is the solution to manage all these challenges and, however not all human beings agree with water pricing some are against it. Those who are towards water pricing argue that if water is treated as a human right, it has to be supplied without price. Massive section of the population is still laid low with waterborne illnesses due to impure drinking water and insufficient sanitation facilities and this affect more women's and young girls (Abrahams, Mhlongo, and Napo, 2011). The water and sanitation is a major benefit that improved basic services of women's and girls' education when they are freed from the daily chores of fetching water. Gender

inequality is the issue as this become an obstacle to poverty alleviation, health and lifestyle benefits.

3.4. Objectives of Issues of ecological economics

3.4.1. Allocation of resources

Yazdi et al. (2017) identifies three main issues that are involved in ecological economics. This includes allocation of resources, distribution of wealth and scale of the economy relative to the ecosystem. Perman et al (2003) contends that an allocation of resources is stated to be efficient if it is not possible to make one or more humans better off without making someone else worse off. A worthy allocation and distribution of resources is efficient if it depicts a Pareto optimal where resources are reallocated in a way that makes someone better off without making someone else worse off (Yazdi et al., 2017). A good allocation is one that is efficient where resources amongst product end-uses is in conformity with individual alternatives as weighted by way of the capability of the individual to pay (Daly, 1992).

Resources should be allocated in an efficiency way as water becomes a scarce resource for competing users. The Pareto efficiency assumes that goods, products or resources have the same value for everyone, disregard unequal distribution of wealth and ignores the diminishing marginal utilities of worth (Roa-Garcia, 2014). Allocation of resources defines goods that are produced and in what quantities they are produced and resource inputs are used in producing those goods and how the outputs of those goods are distributed between persons (Perman et al., 2003). Water allocation should fulfil the needs of the social and economic development as well as the states of ecological and environmental needs (Yan, Daming, and Haosheng, 2004).

A water allocation decision is traditionally primarily based on water productivity and benefits from using agriculture, vegetation, agroforestry, and fisheries. The approach emphasizes increasing productiveness of the basin and allocating greater water to specific demands, in preference to allocating water extra evenly to a range of ecosystem services or stakeholders. Particularly, allocations are made to boom

agricultural productiveness for food safety, economic growth and poverty reduction (Hellegers and Leflaive, 2015). In developing countries, the optimization uses and allocations of resources between the conflicting demands of domestic, industrial and agricultural users has now become the primary theme of water resources development and management (Seetal, 2005).

3.4.2. Distribution of wealth

Access to quality water services is low in poor and marginalized communities, and the lack of meaningful social participation for citizens in water control is prevalent. Udas and Zwaeteveen (2014) notes that approximately 750 million human beings in rural areas and any other 100 million in urban areas nevertheless do not have any access to secure drinking water around the world and adequate sanitation is needed for 1.75 billion humans in rural areas and for 300 million in city areas. There is a lack of distribution in terms of productivity, incomes and health which impact poor people in rural areas and the human cost remains high until this demand is met. Distribution of wealth and income is important in ecological economics.

Daly and Farley (2004) suggest that a good distribution is one that is just or fair, or at least one in which the degree of inequality is limited within some acceptable range. Income distribution undermines sustainability because negative groups won't be able to manage to pay for, handling environmental affects whilst very wealthy consume large amount of restrained assets which decreases environmental quality and limited resources (Daly, 2003). Willis (2015) notes that income and wealth distribution affect water affordability, accessibility, quality and quantity and this is more especially in urban areas than rural areas where water increases with income level, as domestic use for personal hygiene, food preparation and household cleaning increases. Milan (2016) also notes that richer people typically pay not more than 0.5%, whereas low incomers spend up to 4.7% of their income on water. Women tend to be more vulnerable to equitable access to water and sanitation than men; women are hindered via their social roles and positions (Figueiredo and Perkins, 2013). Women have a secondary role in the participation of water governance and selection making, particularly in settlements from developing nations (Das and Zwarteveen, 2014). Sweetman and Medland (2017)

note that some societies recognise ecological impacts to water more extremely, but equity issues are eluded. Ecosystem´s value perception and water conservation also varies among populations in terms of demographic, social and cultural factors impacts attitudes and behaviours.

3.5. Water governance within the ecological governance framework

According to Solanes and Jouravlev (2006) water governance is defined as a country's ability to organize the development of its water sources in a sustainable way. Water governance raised the need to reconsider the connection between public and private pursuits and reflect the destiny of public governance of water, service provision, equitable access, and attendant health, livelihood, economic development, and ecological consequences (Gleick and Palaniappan 2010). Medeiros and Sivapalan (2020) recognizes that water governance is still problematic as knowledge is poorly accessible and the participation of society in water resource management and is one of major issues in achieving sustainability and water management.

According to uThukela District Municipality (2019/2020) municipalities has implemented the mandate given by COGTA as per Circular no.9 of 2016 of establishing ward committees. Ward Committees are an interesting direction of achieving one of the ambitions of the developmental local government mentioned within the constitution of the Republic of South Africa. In the ward committee, it is where the community and community organisation participate and contribute to issues of improving service delivery. The municipality also established the representative forum that represents the interest of residents, at the level of the district and municipality in the participation of IDP process (UThukela District Municipality, 2019/2020). The representative forum is managed by the uThukela mayor or the executive committee members. This forum includes representatives from the community which might be based on geographical and social hobby, councillors, commercial enterprise sector, Amakhosi, government department and representatives from nearby municipalities.

Rogers and Hall (2015) indicate that water governance involves a range of social, political, economic and administrative systems that are put in place to broaden and

manage water sources through the delivery of water services at specific stages of society. In addition, Medeiros and Sivapalan (2020) argue that water governance is still problematic as knowledge is poorly accessible and the participation of society in water resource management, whereas Di Baldassarre et al. (2019) also note that water governance is one of the major issues in achieving sustainability and water management. Furthermore, governance process assists in project transparency and accountability and improves equitable access to water for the poor, especially in development countries.

Khadza (2010) notes that the governance involves a complex process that considers multilevel participation past the country, where decision-making includes not only public establishments, but also the non-public sector, civil society and society in particular, appropriate governance frameworks refer to new processes and techniques of governing and modified conditions of ordered rule in which the movements and state of being inactive of all parties involved are transparent and accountable (Page and Bakker, 2005). It embraces the relationships between governments and societies, including legal guidelines, regulations, establishments, and formal and casual interactions which have an effect on all the approaches in which governance systems function, stressing the significance of concerning greater voices, responsibilities, transparency, and accountability of formal and informal corporations associated in any manner (Tortajada, 2007).

Khadza (2010) notes that good governance is a major pillar of water management, which improves various elements, which include promoting decentralization, building capacity, and strengthening and monitoring assessment, research and gaining knowledge of at all levels. Moreover, the governance technique assists in project transparency and accountability and improves equitable access to water for poor specifically in developing countries. Appropriate governance is important to decreasing poverty, which promotes effective service delivery and ensure use of public funds this empowers the poor and develop institutional association that boost participation and accountability at local level (Khadza, 2010).

Gleick and Palaniappan (2010) notes that governments have to be enablers and regulators of community motion for the efficient delivery of water and they should target subsidies to the poorest improve the overall links in the water delivery system and protect the environment. Khadza (2010) further states that good governance emphasise policy reform at a country wide level and encourages decentralized institutions, public-private partnerships, participatory methods which permit for extra accountability and transparency, and institutional improvement. This element display that suitable governance and human rights is going hand in hand as water management cannot take place without recognising human rights, thus good governance and human rights are both vital pillars for water management.

3.5.1. Decentralisation at municipal structures for water service delivery

South Africa adopted decentralisation model through the establishment of municipalities (Category A, B and C), intending to bring municipal services closer to the local people (RSA, 1996; RSA, 1999), the study found it very vital to explore the implications of the decentralisation within the municipality of Alfred Duma. Issues of power, participation and impact of governance on service delivery were greatly explored within the Alfred Duma Local municipality context.

Overton et al. (2014) advocates decentralizing management of environmental flow evaluation and states that management should be decentralized to the bottom appropriate stage. The closer the management is to the environment, the more the obligation, possession, accountability, participation and use of local knowledge. Decentralisation includes bodies separated through regulation from the national centre, in which nearby representatives are given formal powers to decide on a variety of public matters, political base in the locality and a limited location of authority entrenched with the right to make decisions on areas inside their jurisdiction (Overton, 2014). Decentralisation emphasise that it is important for local experiences to be taken into consideration and for communities to be concerned in choice making and practical preparations for reliable water supply (Jacobs, Rivett and Chemisto, 2018). The participation will ensure that local concerns are explained, heard and understood which will provide effective and innovative way to conquer the numerous water delivery

challenges faced by neighbourhood municipalities. Jacobs, Rivett & Chemisto (2018) believe that introducing the voice of citizen within the framework of decision making would enable the people to participate and ensure accountability and transparency in the decision making process. Moreover, Sultana (2009) states that it is vital for civil societies to participate in projects in order to enhance equity, efficiency and greater ownership towards projects which increases better knowledge on water resource management and greater ecological sustainability. Women tend to be more vulnerable to equitable access to water and sanitation than men and this is because women are hindered by their social roles and positions (Figueiredo and Perkins, 2013).

Harris et al., (2017) note that women and men often have differentiated relationships to water access, uses, knowledge, experiences and governance. Therefore, women should play a role in water resource management as there are primarily responsible for water provision, especially for domestic needs. Decentralisation educate people to become full citizens, improve service delivery, bring government closer to people and allow government to better understand peoples need in achieving equitable access to water in rural communities (Olum, 2014). The act and policies that were developed give local municipalities a responsibility to access safe drinking water and overcome challenges in infrastructure development and adherence to water quality standards.

Jacob, Rivett and Chemisto (2018) posits that decentralisation emphasise that it is crucial for local experiences to be taken into account and for communities to be involved in decision making and practical preparations for reliable water deliver. Bazaanah (2020) note that decentralisation approach should be perceived as governance pathway which recognises the vitality of sustainable water resource governance and efficiency utilization for sustainable development of the rural communities. Therefore, in achieving equitable access to water in rural communities, it is vital to note the relationship between the ecological economics principles, which includes water governance, women participation and decentralisation in order to promote water resource management and the protection of available water resources.

3.6. Conclusion

Ecological economics changed into developed partly as a reaction to the real and perceived shortcomings of neoclassical economics. A restriction to economic growth in ecological economics is recognized as limiting directly from laws of thermodynamics and concepts of ecology. A key concept is that performance is itself restrained, so that increasing performance is not an opportunity and may not overcome limits to financial boom. Ecological economics suggest that water is a basic human need and should be fairly distributed recognising all the vulnerable groups and marginalised people including women and girls. It also acknowledges the water governance in equity as it put emphasis in participation and decision making. The next chapter focuses on the research methodology used in the study. It discusses the research design, research philosophy, and data collection methods, description of study area and ethical considerations of the study.

CHAPTER FOUR: RESEARCH METHODOLOGY

4.1. Introduction

Research methodology gives a direction on how the study is organized and designed to respond to the research questions and achieve the research objectives of the study. This chapter provides the research methodologies which is the overall research design of how data was collected and analysed. Babbie and Mouton (2010) defines research methodology as the principle, procedures, and practises that governs research. A quantitative research design was used in this study to collect data pertaining to the frequency of occurrence of a phenomenon which is equitable access to water. The study focuses on research methods that assisted in the investigation of the equitable access to water as fundamental human rights at communities. This section explains how the study samples were selected from the broader population and outlines the methods applied in the collection of data, research design and analysis of the results.

4.2. Rationale for the methodology

Creswell (2014) notes that a quantitative research approach uses numbers to explain findings and the findings are then generalised across the selected population. Quantitative research is usually considered to be the more scientific approach in doing social science research than the qualitative approach (Creswell, 2014). Quantitative research mainly generates statistics through the use of methods such as questionnaires or structured interviews, where questionnaires were distributed to a large number of people in the study. Dawson (2007) posits that quantitative research reaches many people that the qualitative research and the contact with those people are much quicker than it is in qualitative research.

The quantitative data collection approach was used in the study. The quantitative research assists the researcher to presents statistical results through numerical, graphs and tables. Bacon-Shone (2013) posits that quantitative research makes use of questionnaires, experiment and surveys to collect data that is revised and tabulated in numbers which allows the data to be characterised by the use of statistical analysis as this study collected data through questionnaires. The rationale for using the quantitative approach in the study is that it can show the descriptions of data and relationships

between variables. The researcher describes and compares water allocation distribution in the local municipality and examines equitable access to the community. The quantitative research is deductive in nature where the researcher draws conclusions based on inferences with the primary goal of describing cause and effect (Creswell, 2014). The quantitative research assisted the researcher to get credible results because there are statistically significant given the number of respondents. In this research, the use of statistical data for the research descriptions and analysis reduces the time and effort which the researcher would have spent in describing the result. The data includes numbers, percentages, tables and measurable figures which was calculated and conducted by a computer through the use of a Statistical Package for Social Science (SPSS) which saved a lot of energy and resources in the research.

The methods of quantitative research help the researcher to produce reliable and quantifiable data that can be generalized to a large population. In addition, it assisted the researcher to test and validate already constructed theories about how and why phenomena occur through testing hypotheses between the ecological scale, women participation, decentralisation and ecological governance; this was constructed before the data are collected. This ensures reliability and validity where the instruments were piloted to the community to check their relevance with experts and assessing their reliability by the use of statistical tests. Quantitative research also helps the researcher to cover different areas within the Alfred Duma Local municipality, including Ekuvukeni, Somsoek and Nazareth.

4.3. Research design

Welman, Kruger and Mitchell (2005) define research design as an overall plan to which the respondents of a study were selected, as well as the means of data collection or generation. Research design offers a means on how to investigate either the research hypothesis or research question in the most economical manner (De Vos, 2002). Fraenkel, Wallen and Hyun (2014) assert that quantitative research design can be classified as either descriptive or experimental research. The purpose of descriptive research is to gain new insight, become more familiar with phenomena, and to formulate a more specific research problem or hypothesis (De Vos, 2002). A descriptive

research design was used in the study to describe and observe the equitable access to water in the community of Ekuvukeni. The study organise data using numbers, tables and graphs (Bar graphs, histograms and pie charts). Furthermore, to summarize the result, the study considered measures of central tendency which includes mean, mode and median. The researcher also used inferential statistics for data presentation in the findings chapter and this assisted the researcher to present data into statistics. Blumberg, Cooper and Schindler (2005) suggest that the purpose of a descriptive study is to provide a picture of a situation, event or person to show how things are related to each other as it naturally occurs. However, descriptive studies cannot explain why an event has occurred and is much suitable for a relatively new or unexplored research area (Punch, 2005). Therefore, in situation of plentiful descriptive information, alternative research designs such as exploratory design is advisable. Exploratory research is conducted when enough is not known about a phenomenon and a problem that has not been clearly defined (Saunders and Lewis, 2012).

The researcher also uses the exploratory design to look for causes and reasons to provide evidence to support or oppose a prediction or explanation. The exploratory design helps the researcher to realise and report some relationships among different aspects of the phenomenon under the equitable access to water. Therefore, exploratory seek to confront new problems on which little or no previous research has been done. As indicated in the previous section, the main objective of the study is to investigate the ecological governance framework that support access to water in rural areas and the study also looks at the relationship between ecological scale, decentralisation, women participation in decision making and equitable water access within the Alfred Duma Local Municipality. To achieve this, it draws statistical quantitative results and further seeks to provide explanations on the established relationship with the analysis of data.

4.4. Research paradigm

Fox (2008) posits that post-positivism balances both interpretivist and positivist approaches. Post-positivism does not aim to approve or disapprove the quantitative elements of positivism of any research rather it put emphasis on a proper understanding of the directions and perspectives of the research study (Fox, 2008). Post-positivism

also focuses on researching issues in the context of involving experiences of the majority and announcing the result of what the majority says is acceptable (Panhwar, Ansari, and Shah, 2017). The study adopts the post-positivism paradigm. Post-positivism paradigm promotes the quantitative methods and triangulation of qualitative that explores the diversity of researchable facts through numerous kinds of investigations but respecting and valuing all findings as the essential components for the development of knowledge (Fox, 2008). Henderson (2011) asserts that post-positivism recognizes that dualistic thinking is socially inadequate and multiplicity and complexity are the reality of all human experiences.

The study looked at the equitable access to water at rural communities. This was done through observing and by means of understanding human behaviour as true knowledge is based on observations and experiments. Therefore, using post-positivist philosophy allowed the study to investigate realities taking place at Alfred Duma Local Municipality with equitable access to water and sanitation services, using statistics to examine the findings. Furthermore, realities taking place in the studied area are expressed through analysing household's perceptions on equitable access to water and sanitation in rural communities.

Post-positivist ontology and epistemology

Bryman (2008) argues that qualitative and quantitative research differs in their paradigmatic approaches with respect to their epistemological ways of knowing and enquiry in nature of reality and ontological realities which involves what is to be known and assumptions about the nature of reality foundations. Creswell (2009) posit that in ontological positioning, qualitative and quantitative researchers are constructivism and objectivism respectively in terms of their strategies. However, in epistemological positioning, quantitative researchers are objectivists and positivists in their research approach while qualitative researchers are subjectivists and interpretivist in their research approach (Creswell, 2009).

Marsh and Furlog (2002) define ontology as a philosophical pattern of view in research which is the study of being and it deals with the nature of reality. Ontology is concerned

with the central question of whether social things need to be perceived as objective or subjective, which implies that ontology describes the researcher's view of the nature of reality on the societal organizational phenomenon studied. Carson et al., (2001) notes that an objectivist view on ontology states that social reality has an existence that is independent on social actors; hence, the world is external with a single objective reality to any research phenomenon or situation regardless of the researcher's perspective or belief. The positivist ontology believes that the world is external and that there is a single objective reality to any research phenomenon or situation regardless of the researcher's perspective or belief (Carson, Gilmore, Perry, and Gronhaug, 2001).

Epistemology is a study of knowledge and is concerned with what is accepted as being valid knowledge (Collis and Hussey, 2014). In other words, an epistemological setting is concerned with the question of what is or should be considered as acceptable knowledge in a discipline (Bryman, 2004). Epistemology undertakes two fundamentally different competing thoughts which are positive epistemology and phenomenological epistemology. Post-positivist seeks to discover precise causal relationships through statistical analysis which solve major practical problems and search for law-like generalizations (Kim, 2003). From the post-positivism epistemological view, it assisted the researcher as the social world exists externally and its properties should be measured through objective means, where the researcher was independent from what is being observed. Therefore, the researcher reality conveyed by variables and measured the reliability and validity.

Easterby-Smith, Thorbe and Lower (2002) posits that the researcher should focus on facts, formulate and test hypotheses, locate causality between variables, operationalize concepts so that they can be measured and apply quantitative methods. Therefore, the post-positivist position appears relevant in the study as it establishes knowledge through the cause-effect relationships between the variables. In this study, the researcher assumes that there is a relationship between the ecological scale, decentralisation, and participation of women and there are challenges of equitable access to water that exist in the world that affects the communities.

4.5. Sampling method and target population

4.5.1. Target population

Sekaran and Bougie (2013) posit that a population is an entire group of people or people of interest that the researcher wishes to investigate that make up the population for a research project. While Turner (2013) defines a population as the larger group of people of interest from which the sample is selected and the target population of this study includes community households and municipality officials as they were relevant to the study of access to water. The population size of Ekuvukeni is 2606 households (Stats SA, 2011). The sampling frame used in the study is the number of household and figure refers to the population according to the census figures. The 2606 households were all in a position to fill the questionnaire and established on the study of equitable access to water, all households are equally able to respond to the questions posed by the researcher and therefore, they should not be confused with the census figures.

The Community Survey (2016) reveals that 77.1% of the population were getting water from a regional or local service provider; with 32% of households have access to piped water inside their backyard. In uThukela District Municipality, 17% of the population are getting piped water inside the dwelling, 32.2% of households had piped water inside the yard, 13.4% from a community stand and a total number of 9.5% from a borehole outside the yard. In terms of sanitation in uThukela district, 50% use a pit toilet, 23% use flush toilets and 18% use chemical toilets. There are a number of rural areas that lack access to appropriate sanitation facilities and the municipality is experiencing challenges of poor and old infrastructure especially water and sanitation infrastructure. The unreliability of bulk services is a big deterrent to well-functioning commerce and industry and attraction of new investment. According to Alfred Duma Local Municipality IDP (2019/2020) the number of people with access to piped water is 56.6% and other water sources which include boreholes, dam’s etc. stands at 40.7%.

4.5.2. The sample size

Berg (2007) posit that the size of the sample affects the possibility to make correct inferences and maintains that a large sample generates a high statistical power for

finding significant results, whereas a small sample produces a low statistical power in finding significant results. To get accurate data, the study used online sample size by Lohr (2010) to calculate the sample size of the study. The sample size of this study was 335 in total. Below there is a formulae used by the researcher to calculate the sample size of the population.

The sample size (n) is calculated according to the formulae: $n = [z^2 * p * (1 - p) / e^2] / [1 + (z * p * (1 - p) / e^2 * N)]$

Where: z = 1.96, a confidence level of 95%, p = 0, 5 proportion (expressed as a decimal), N = 2606, population size, e = 0, 05, where 100-95/100 margin of error.

$n = [1.96^2 * 0.5 * (1 - 0.5) / 0.05^2] / [1 + (1.96^2 * 0.5 * (1 - 0.5) / 0.05^2 * 2606)]$

$n= [3.8416 * 0.5 * (1-0.5) / 0.0025] / [1+ (3.8416* 0.5) * (1-0.5) / (0.0025 * 2606)]$

$n= [1.9208 * 0.5/ 0.0025] / [1+ 1.9208 * 0.5/6.515]$

$n= [0.9604 / 0.0025] / [1+0.9604/6.515]$

$n= [384.16] / [1+0.9604/6.515]$

$n= [384.16] / [1+0.1474]$

$n= [384.16] / [1.1474]$

$n= 384.16 / 1.1474$

$n = 384.16 / 1.1474 = 334.809$

n = 335, (nearest whole number)

The sample size =335

4.5.3. Sampling method

Neuman (2014) identifies 2 types of sampling methods, namely probability sampling and non-probability sampling methods. The probability sampling method was used in the study, which is the stratified random sampling and simple random sampling. The stratified random sampling was used to divide community household into population strata and municipality officials where the researcher uses a simple random sampling to select from those strata. The stratified random sampling assisted the researcher to divide the population on some specific characteristics for example gender and using the simple random sampling from each subgroup of the population; which ensures that the sample includes specific characteristics that are needed in this study. The municipality officials in the study, includes the Alfred Duma Local Municipality, uThukela District and

water and sanitation department units within the municipality. The researcher distributed 40 questionnaires to Alfred Duma Local Municipality, 20 uThukela District and 10 to water and sanitation units. In terms of households, the researcher divided the household population into 3 sections namely KaGimi, KwaMngadi and KaGadeni. A proportional formula [P xn/N) was used to calculate sample distribution where P=households in the community officials, n= total sample size and N=total number of household population. Using the above formula, the total sample for KaGimi was determined as {844 x 335/2606=108.4}, KwaMngadi {804 x 335/2606=103.3} and KaGadeni {888x335/2606=114.1} these calculations adds up to 335 in total. The following Table 4.1 represent the sample size distribution of population.

Table 4.1. Sample size distribution and for household and official respondent

Population Strata	Population	Sample Fraction/ Proportion (p*n/N)
KaGimi	844	108.4
KwaMngadi	800	103.3
KaGadeni	888	114.1
Municipality official respondents	70	9.0
Total	2602	335

Source: Stat SA (2011) Fieldwork, (2020)

4.6. Research instruments

4.6.1. Questionnaires

According to Wilkinson and Birmingham (2003) questionnaires are valuable tools for collecting data from a large number of respondents and Gillham (2000) defines a questionnaire as a list of carefully structured questions chosen with a view of producing reliable responses from a chosen sample. The use of questionnaires was one of the research instruments that were used to collect data from the targeted population of Ekuvukeni. The questionnaires were distributed to the members of the community within different household and Municipality officials within the Department of Water and Sanitation such as UThukela Water Board and they were structured in the way that was understandable and easy to fill in. This was done through creating an IsiZulu version of

questionnaires for members of the community in order to make it easy for those who do not understand English to participate in the study with full understanding since the questions were in English. The researcher used the self-generated questionnaires and the questions were closed ended questions. The researcher designed the questionnaire according to themes generated from the research objectives in order for the questions to be based on the achievement of the research objectives of the study. The themes within the questionnaire covered the equitable access to water, the ecological governance frameworks supporting water access, the ecological scale in distribution of water services and the role of a local municipality in equitable access to water. The numbers of questions in the questionnaire were 64 in total.

4.7. Data analysis

According to Greenstein, Roberts and Sitas (2003), data analysis is the process of bringing order, arrangement and meaning to the collected data. The researcher uses the Statistical Package for Social Sciences (SPSS) version 28.0.1 to analyse data. The SPSS assisted the researcher to code findings and analyse data in terms of graphs, tables, pie charts and percentages. The researcher also used descriptive statistics which includes measures of central tendency such as mean, median, mode and standard deviation.

SPSS helps the researcher to analyse, transform, and produce a characteristics pattern between different data variables. SPSS also assist in generating inferential statistics and determination of relationships between the variables. Maree (2016) posits that statistical inference is when the findings from the sampled data are used to generalise and draw conclusion about the particular population. Using the chi-square statistical procedure, with 95% confidence and with e =0.05, the decision rule for the hypothesis was stated as “accept the null hypothesis if the critical value (p-value) is < 0.05 and do not accept the null hypothesis if p-value is > or = 0.05”. The null hypothesis state that there is no relationship between ecological scale, decentralisation, women participation in decision making and equitable water to access within the Alfred Duma Local Municipality, whereas alternative hypothesis states that there is a relationship between

ecological scale, decentralisation, women participation in decision making and equitable water to access within the Alfred Duma Local Municipality.

The thematic analysis was also used in the study. Thematic analysis assisted the researcher to accurately determine the relationship between the concepts and compare them with computer-generated data. It also assists the researcher to develop themes and provide interpretation for data. Thematic analysis helps the researcher to ensure that the themes are effectively linked to the data and provides the opportunity to code and categorise data into themes. This allows the researcher to review the whole of the data by identifying the most vital meaning and what is the data trying to say or tell within the study. Mohammed (2012) posit that thematic analysis also provides rich, complex data and detailed data which is well-suited for the study and also provide a relationship between the variables and factors in order to create a reasonable and logical chain of data.

Furthermore, Namey et al., (2008) states that thematic analysis moves beyond counting explicit words and it focuses on identifying and describing both implicit and clear ideas. Codes developed for themes are then linked to raw data as summary markers for later analysis, which may include comparing the relative frequencies of themes or topics within a data set, looking for code co-occurrence and code relationships. The researcher organise data into themes which includes equitable access to water, the ecological governance frameworks supporting water access, the ecological scale in distribution of water services and the role of local municipality in equitable access to water. The study also used observation tool. Observation plays a very important role in gathering data from the field. Kreuger and Neuman (2006) noted that observation involves paying attention, watching, and listening carefully in the field. This study observes the water access and issues of water in the area of Ekuvukeni.

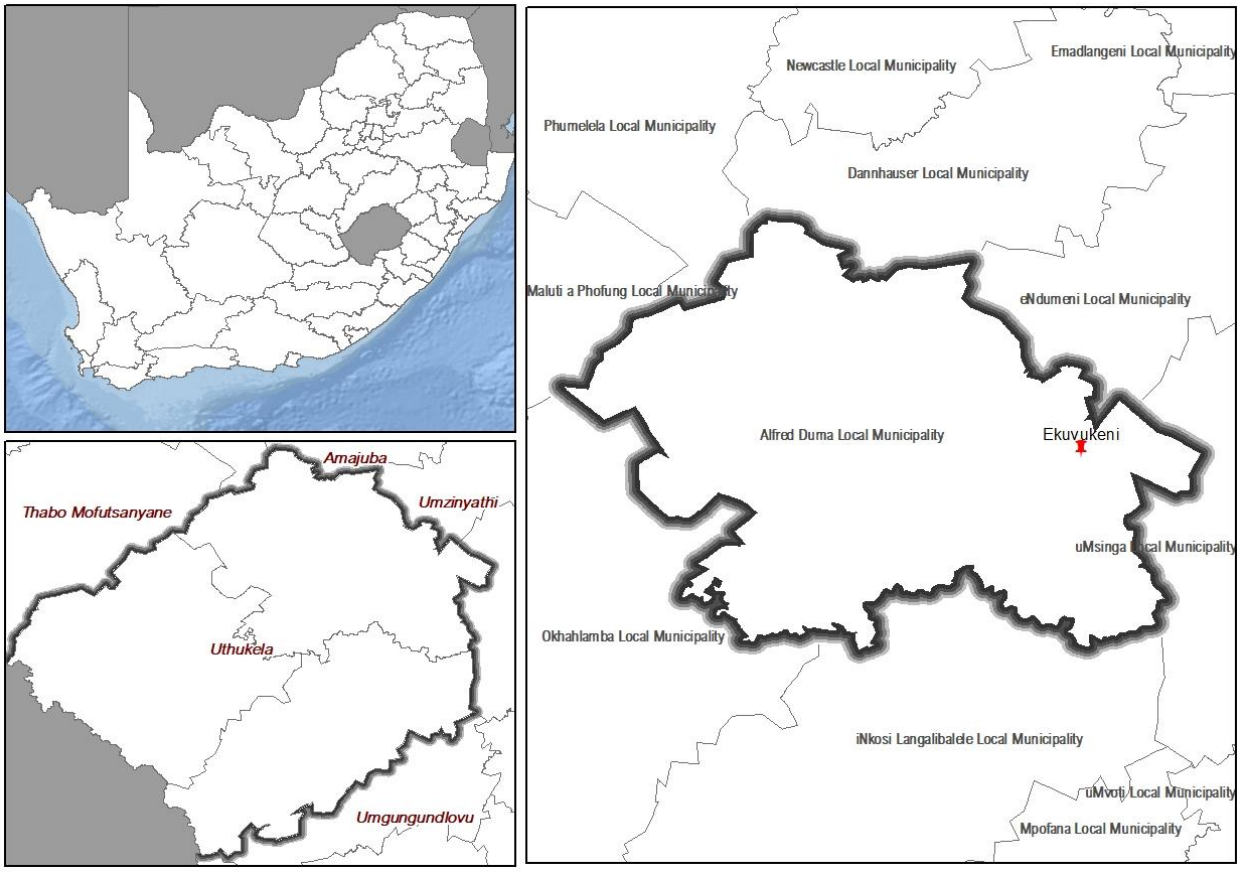
4.8. Description of the Study area

The research was conducted in Alfred Duma Local Municipality at the community of Ekuvukeni. Alfred Duma Local Municipality is under UThukela District Municipality in the KwaZulu-Natal Province of South Africa. The areas that constitute Alfred Duma Local Municipality include Ladysmith, Ezakheni, and Steadville. The water and sanitation

status in these areas are well provided, this is due to the fact that they are urban areas. Alfred Duma Local Municipality is near the uKhahlamba Local Municipality and Inkosi Langalibalele Local Municipality. The research was conducted at Ekuvukeni area which is the community located in Alfred Duma Local Municipality and is defined as ward 34. According to Alfred Duma Local Municipality IDP (2016/2017), Ekuvukeni is a small rural area that has a population of 11018 and 2606 households (Stat SA, 2016).

Ekuvukeni is ruled by Traditional Tribal Authority or chief, by the name of Sithole. In terms of language diversity, IsiZulu is the main spoken language in the area. In this area, there is a slow economic growth as a large proportion of the population depends on social grants and households also participate in subsistence farming. According to Statistics South Africa (2015), there is high unemployment rate in the municipality which is 57. 2%, while the youth unemployment rate is 66. 8%. The following Figure 4.1 present the map of the study area which was created using Geographical Information System (GIS).

Figure 4.1.: Map of the study area



Source: (Researcher, 2020)

4.9. Pilot study

Sekaran and Bougie (2010) states that a pilot study is used to test the consistency of internal data and the reliability of the measurement scales for the variables used in the questionnaire and to test the goodness of data. In this study, the pilot study ensures that the respondents understand the questions, make required data available, and avoid misinterpretations. This was done by distributing 50 questionnaires in the area of the

study to test if the questionnaire provides the answers that are needed by the researcher, which ensures the reliability and validity of the questionnaires. The pre-test of the instruments took place at the community of Somsoek in order to ensure that the people in the community understand the questions which make easier or the community and municipality are able to answer them during data collection. After the pilot study, the researcher changed and breaks down some questions into simpler form for people to understand the questions. The researcher changed some few questions and deleted some repeated questions, even though the pilot study shows that the questionnaire was reliable and valid as many people were able to respond to and fill questions in the questionnaire.

4.10. Validity and reliability

4.10.1 Validity of the study

According to Maree (2016), validation is considered to be an interpretive understanding of the truth whereby for a qualitative research presentation of a solid descriptive data is made to ensure that the research leads the reader to an understandable meaning of the experience under the study. To ensure the validity of this study the researcher used content validity where an expert was used to check if the questionnaire addressed the research objectives. All the steps of research process were followed to ensure that the study is valid and reliable in terms of literature and the result obtained meet all the requirements of social science research. The questionnaires constructed were guided by the research objectives and questions. During the pilot study, the questionnaires were tested before they were used into a large scale of population, to see if the study obtained the required result.

4.10.2. Reliability of the study

Maree (2016) defines reliability as the degree to which a measuring instruments yield repeatable and reliable results. According to Maree (2016) there are 4 types of reliability namely: equivalent form reliability, test-retest reliability, split-half reliability and internal reliability. The study used the internal reliability and the measure of reliability in this study was tested using Cronbach Alpha, where the Cronbach Alpha of 0.7 provides accuracy to the interpretation of data and increase internal consistency which estimates the reliability of questionnaires. Sekaran and Bougie (2010) posits that the acceptable

range for Cronbanch Alpha value is 0.60 and above, the higher values than that show reliability of an instrument. Cronbach alpha for this study was 0.849 which shows that the instrument was reliable. A total of 50 questionnaires were pre-tested to 50 respondents in order to test for the reliability of the instruments. The study considered the Cronbach's alpha reliability coefficient between the ranges of 0 and 1. Therefore, the closer the Cronbach's alpha coefficient is to 1.0 the greater the study considered the internal consistency of the items in the scale. In this study, the researcher was guided by George and Mallery (2003) who provides the following rules of thumb for reliability coefficients: "alpha > 0.9 (Excellent), alpha > 0.8 (Good), alpha > 0.7 (Acceptable), alpha > 0.6 (Questionable), alpha > 0.5 (Poor), and alpha < 0.5 (Unacceptable)" (George & Malley, 2003).

Therefore, the Cronbach's alpha value of 0.849 for all the items was considered to be generally acceptable and within the best standard practice for data reliability. Approximately, analysis of the individual Cronbach alpha values (items 1-50) revealed a mean (124.86), variance (101.756) and SD (10.087) with a range of alpha values between 0.703 to 0.986. The result is an indication that the instruments were "acceptable" and showed internal consistency of the items in the scale, hence, was suitable to be utilised for a large-scale population or sampled population.

4.11. Limitations and delimitation of the study

4.11.1. Limitations of the study

According to Creswell (2003) every study has a set of limitations or potential weaknesses within the study identified by the researcher. The study was limited due to time; the study did not sample the entire households in the area of Ekuvukeni and the study was also limited only to Alfred Duma Local Municipality so in that sense it cannot be generalized. Inadequate access to water is not the problem in KZN but a lot of provinces are facing it. The study area is mainly rural and has a high poverty and unemployment rate. This limit the study as household of the community was available at the rate I expected, although the data collected is statistically significant. The political instability and limited functions by local municipalities in respect of water and sanitation services also limits the study. As a researcher, I had to tread carefully, due to the

political instability, political violence which characterised this region at the time of collecting data. Despite all the challenges encountered, I managed to report on the findings as accurately as possible. I managed to engage with the Mayor and officials of uMlalazi Local Municipality, a local municipality within King Cetshwayo District whose water supply and sanitation context is similar to uThukela District. I also engaged with the Research and Policy Committee of the KZN Department of Cooperative Governance and Traditional Affairs, Zululand District Municipality and officials of Alfred Duma Local Municipality. The feedback I received from these stakeholders assisted a great deal in verifying some of the findings because the data collection tool I used is a questionnaire, therefore the stakeholders managed to clarify and suggest areas for improvement. This assisted a great deal because even the pilot study was also conducted using questionnaires.

4.11.2. Delimitations of the study

Delimitations refer to what the researcher is not going to do (Leedy and Ormrod, 2005), whereas Franklin (2016) delimitations are known to be boundaries that researchers set for themselves to be able to control the range of the study. The study only focuses on Ekuvukeni community, not other communities that have challenges of inequitable access to water and inadequate sanitation in the local municipality. Equitable access to water is generally a problem in other communities within Alfred Duma Local Municipality but the study only focus at Ekuvukeni due to financial and other constraints, but also because findings of this nature are generalizable. The engagement with stakeholders indicated above, assisted with looking at other perspectives which are going to be useful when pursuing a PHD and writing up the findings of this current study.

4.12. Elimination of bias

Kumar and Yale (2016) states that elimination of bias is any factor or process that tends to deviate the results or conclusion of a trial systematically away from the truth. To avoid elimination of bias the study conducts a pilot study to check the reliability and validity of the study. The study also looks at sampling selection errors, precision in sample size determination, accuracy of statistical methods and generalisability and acceptability of the study. This was done during the time of data collection and after the data was collected. Respondents used a similar instrument to respond to the questions and I did

not conduct interviews which might to some extent influence the findings as I ask probing questions. Consulting with service providers assisted a great deal in getting certain issues which emanated from fieldwork to be confirmed and clarified.

4.13. Ethical considerations

This research was designed and conducted in accordance with the University of Zululand Policy on Research Ethics, in particular section 6.2 (University of Zululand, 2016). Ethics are associated with morality as both deal with matters of right and wrong and conforming to the given standards of conducts (Babbie and Mouton, 2010). Amdur (2003) emphasizes that it is crucial to have an informed consent in research given to human participants in order to avoid the repetition of abuses by scientists in the name of research. The attached ethical clearance certificate is a clear indication that the structures of UNIZULU approved this project after a rigorous review process by the Department of Anthropology and Development Studies, the Faculty of Arts Research and Ethics Committee (FAREC), the Higher Degrees Committee (HDC) and University of Zululand Research and Ethics Committee.

The researcher ensures that there is voluntary participation where participants were being told that participating in the study is completely voluntary and the researcher ensures that participants understood the concept and participate voluntarily. Participants were given full information about the research, what it intended to achieve for what or which institution it was undertaken. This was done through giving participants consent forms to fill before participating in the study.

Saunders and Lewis (2012) indicate that the standard of informed consent comprises the provision of the satisfactory information by the researchers to individuals regarding their participation, which may include individuals understanding any implications about their participation and be aware that their withdrawal will not cause any coercion. As a manner of addressing informed consent the researcher ensured that the purpose of the study was communicated perfectly to the respondents and the consent form was given to respondents and also considered verbally in order to give clarity to them.

The researcher also assured the respondents about confidentiality and anonymity of the information they provided through ensuring that identifying information was not made available to anyone who is not directly involved in the study and no name of a respondent was published as there is no space provided in the questionnaire for respondents to write their names. This is supported by Bryman and Bell (2011) who suggest that there are certain measures that have to be taken to ensure anonymity of the information they provided, which includes the respondents not giving their names and personal details while participating in the study. Avoiding harm is also considered to be one of the human basic rights; therefore, participants were not being harmed or injured by the research undertaken. It becomes the duty of the researcher to ensure that they take all risks into considerations when conducting their studies (Bacon-Shone, 2013).

4.14. Conclusion

The chapter elaborated more on an overview of the research methodology that was employed in the process of gathering and analysing data. The quantitative research approach that underpins the study is explained in details. In collecting the data, the researcher used questionnaires which are written in both IsiZulu and English. The SPSS was used to analyse data and organise data in terms of graphs, tables and charts. The chapter also provides the outline of how the researcher calculated sample size of the study. The next chapter present the data presentation of findings, analyses and interpretation of the data collected.

CHAPTER FIVE: DATA PRESENTATION, ANALYSIS AND INTERPRETATION

5.1. Introduction

This chapter outlines the data presentation, analysis and interpretation of data with the purpose of addressing the objectives of the study. In order to provide answers to the research questions, the research questionnaire was organised into sections that explored the research questions. A sample size of 335 was drawn from the community household and the officials of the municipality. Descriptive statistics such as frequency, percentages, mean item score, pie charts were used for descriptive purposes. The researcher also employed the Chi-square to determine the statistical significant difference between variables. The findings of the study were analysed through the Statistical Package for Social Sciences (SPSS). This chapter is divided into section A to E. Section A covers the background characteristics of respondents, section B covers the equitable access to water, section C presents the ecological governance framework that supports access to water in local areas, section D presents ecological scale in the distribution of water supply and section E which presents the role of the municipality in equitable access to water.

5.2. SECTION A: BACKGROUND CHARACTERISTICS OF THE RESPONDENTS

This section represents and discusses the demographic characteristics of respondents in Alfred Duma Local Municipality (ADLM) with details to equitable access to water and sanitation services. The demographic characteristics include gender, age, educational qualifications, employment status and income status. Demographic data was generated from the earlier discussed research instrument. The demographic profiles illustrate the variety of the respondents in terms of age, gender, educational levels, employment status and monthly income of the respondents.

5.2.1. Age

The research sought to know the gender of respondents as it is shown in Table 5.2.1. This was important for this study to show the presentation of respondent's age as well.

Table 5.2.1. Age of the respondents

Age range	Frequency	Percent (%)
18 – 25	112	33.4
26 – 35	114	34.0

36 – 44	66	19.7
45 – 59	35	10.4
60 and Above	8	2.4
Total	335	100

Source: Fieldwork, (2020)

From Table 5.2.1, the results indicate that 33.4% of the respondents reported to be in the age group 18-25 years old, 34.0% were between 26-35 years old and 19.7% were between 36-44 years old. The results also indicate that 10.4% of respondents are between 45-59 years old and only 2.4% of the respondents were between 60 years and above. These findings suggest that a large group of respondents who participated in the study were between 18-35 years old and were millennials. The result indicates that very young respondents are shouldering the responsibility of a household. The result also implies that 18-25 and 26-35 years are considered the most energetic with human resource capacities and potential which involves the development of water resources in rural communities. While most of the adults are not really involved in the development of water resources, because they are illiterate and their participation in access to water is confined to planning construction phase and later in operation and maintenance.

5.2.2 Gender and Education status

Table 5.2.2 represents the gender and education status of the respondents. The result indicates that 63.6% of the respondents were females and 36.4% were males. There was a need to determine the gender of the respondents in order to enable the researcher to make demographic implications concerning the respondents. The results thus indicate that females are much more users of water and responsible for water than males, although both individuals need water in their daily life. This is because women tend to be more important than men in water access as women are responsible for water provision in their homes and are hindered by their social roles and positions.

According to the Alfred Duma IDP (2019/20) it has the highest number of households in the UThukela District, thus indicates that most households are female headed households that have large numbers of people. Therefore, this is why the 63.3% who participated in the study are females. Drawing from Principle 4 of IWRM, the findings

agree that women should play a crucial role in the provision, management and preservation of water provision (Solanes & Villarreal, 2008). The results also show that 28.1% had high school certificates, 12.2% had bachelor's degree, 11.3% had diplomas, 7.5% of the females had a primary school certificate and lastly 4.5% had attained postgraduate certificates which make the total of 63.6% of females based on their educational levels.

Table 5.2.2.: Gender and educational levels of the respondents

		Educational qualification					
Gender		Primary school certificate	High school certificate	Diploma	Bachelor's degree	Post graduate degree	Total
Male	N	6	55	26	28	7	122
	% of Total	1.8%	16.4%	7.8%	8.4%	2.1%	36.4%
Female	N	25	94	38	41	15	213
	% of Total	7.5%	28.1%	11.3%	12.2%	4.5%	63.6%
Total	N	31	149	64	69	22	335
	% of Total	9.3%	44.5%	19.1%	20.6%	6.6%	100.0%

Source: Fieldwork, (2020)

These findings suggest that even though there are respondents who decided to further their studies from diplomas to degree and postgraduate level, the majority of respondents have high school certificates in both male and female categories. It can be concluded from the above Table 3 that a large number of respondents were progressive in education but they are still far away from higher education which is important today to create knowledge in society. Alfred Duma Local Municipality (2019/2020) suggests that education is one of the most fundamental factors to development which raises people's productivity, technological advances and promotes entrepreneurship. In addition, Alfred Duma has a population with low literacy and education levels with about 75% of the population are not having access to matric certificates (Alfred Duma Local Municipality, 2019/2020). Therefore, low levels of education can hinder the economic growth of a municipality and the population in general especially in the Fourth Industrial Revolution era by which we live in. Emler (1999) also notes that education gives people stronger inclination to speak out for change and be able to speak up in their best interest which

allows people to manage water resources and without basic literacy people are unable to participate effectively in levels of societal organisation. Therefore, educated and well informed society promotes good participation in water resources.

5.2.3. Employment status and Income status

As illustrated in Table 5.2.3., the results indicated that 56% of the respondents were unemployed, 40% were employed and 4% were partly employed. According to Statistics South Africa (2015), the unemployment rate in the Alfred Duma Local Municipality is high labelled as 57.2%, while the youth unemployment rate is 66. 8%. In terms of monthly income, 63% of the respondents earn income between R0-R7200, about 21% earn income between R7201-R16500, and 15% earn income between R16501-R33400 monthly.

Table 5.2.3: Employment status and monthly income of the respondents

	Employment status							
	Employed		Unemployed		Partly-employed		Total	
Monthly income	N	%	N	%	N	%	n	%
R0 – R7, 200	27	8	181	54	3	1	211	63
R7, 201 – R16, 500	55	16	6	1.8	10	3	71	21
R16, 501 – R33, 400	50	15	1	0,2	0	0	51	15
R33, 401 – R57, 400	2	1	0	0	0	0	2	0.6
Total	134	40	188	56	13	4	335	100

Source: Fieldwork, (2020)

These findings show that the majority of 63% respondents earns between R0-R7200 because most of them are not employed. There are very few respondents (15%) that earn from R16501-R33400 on monthly basis. Only 0.6% respondents earn between R33401-R57400 as illustrated in Table 4. In terms of employment and income, the results indicate that there is still a problem of unemployment within the municipality as the high numbers of households are not working and they are from low income group. This suggests that the community household cannot pay for water services as they have no income. This is supported also by Alfred Duma Local Municipality (2019/2020) that the unemployment rate in the municipality indicates that only 18% is employed in the formal economic sector, 42% are unskilled workers and 31% are semi-skilled

workers (Alfred Duma Local Municipality, 2019/2020). This indicates that most people in the Alfred Duma Municipality are relying on the informal economy as a means of income. The low level of skilled labour in the municipality is directly linked to the low levels of education in the municipality which make it difficult to employ most people in the formal economy.

5.3. SECTION B: EQUITABLE ACCESS TO WATER IN RURAL AREAS

This section represents the results based on the equitable access to water in rural communities. Equitable access to water aims at ensuring equitable access to water through acknowledging the fundamental rights of all people to basic water and correct the historical situation and injustices of the past through providing equal access to services.

5.3.1. Water as central to development and essential to all forms of life

According to the Table 5.4, the results indicate that 57.3% of the respondent strongly agrees, 40% of the respondent agrees, 2.1% of the respondents were not sure and 0.6% of the respondent strongly disagree. The findings suggest that the majority of the respondents strongly agree that water is central to development and it is essential to all forms of life in the world. Whereas few respondents were not sure and strongly disagree. In the context of Ekuvukeni community, the respondents regard water as central to development as within the community they have small business which needs water for their businesses to run. This includes businesses such as car wash, saloons, hardware building and fast-foods. This indicates that without water, the economic development of the community will not be possible and this will bring no income for the households.

Therefore, water is a social good, essential to transformation and development in the nation. The results indicate that water has a special impact not only in the protection of life and in the fulfilment of economic growth. This is supported by Pink (2016) who acknowledges that safe drinking water is essential for equitable and sustainable human development and this become an increasing global problem focus as governments, NGOs, civil society, and citizens struggle to manage water security. Therefore,

equitable access to water is important in rural communities as water is fundamental for human survival and should be treated as social, environmental and cultural good.

Table 5.4: Gender and water is central to development and essential to all forms of life in the world

Gender		Water is central to development and essential to all forms of life in the world.				Total
		Strongly disagree	Not sure	Agree	Strongly agree	
Male	N	0	3	41	78	122
	% of Total	0.0%	0.9%	12.2%	23.3%	36.4%
Female	N	2	4	93	114	213
	% of Total	0.6%	1.2%	27.8%	34.0%	63.6%
Total	N	2	7	134	192	335
	% of Total	0.6%	2.1%	40.0%	57.3%	100.0%

Source: Fieldwork, (2020)

Todaro and Smith (2003) argue that without water life would be impossible as all people have certain basic needs. The basic needs include food, shelter, protection and health, if any of these basic needs is absent or critically short of supply, then a condition of absolute underdevelopment exists. Therefore, water plays a vital role in all aspects of life and it is acknowledged worldwide as the most essential of all-natural resource (Blingnault & de Wet, 2004).

5.3.2. Lack of clean water and improved sanitation retards development

According to Table 5.5, the results indicate that 51.9% respondents strongly agree and 45.7% respondents agree while 2.4% respondents were not sure. Most respondents who answered the question had high school certificate 44.5% followed by 20.6% respondents who had bachelor's degree and 6.6% respondents had postgraduate degrees. Only 9.3% respondents have primary school certificates and 19.1% respondents have diplomas. In the context of Alfred Duma Local Municipality, Ekuvukeni community, the unavailability of water contributed to a lack of cleanliness in homes and toilets in the community and the inadequate amount of water leads to homes not cleaned regularly. This resulted in bad smell, while some households use detergents to get rid of the smell and most households could not afford to buy detergents. The sources of water available in the community also include dams, boreholes and piped water. The quality of water found from these sources is not in a

good condition to drink. From the results it can also be observed that lack of clean water is also observed by educated people, this suggest that educating people about water and sanitation is important in rural communities as there are respondents who were not sure.

Table 5.5: Education and perceptions on lack of clean drinking water and improved sanitation retards development

Educational qualification		Lack of clean drinking water and improved sanitation brings misery, hardship and retards the development of people subjected to it			
		Not sure	Agree	Strongly agree	Total
Primary school certificate	N	1	15	15	31
	% of Total	0.3%	4.5%	4.5%	9.3%
High school certificate	N	6	77	66	149
	% of Total	1.8%	23.0%	19.7%	44.5%
Diploma	N	1	28	35	64
	% of Total	0.3%	8.4%	10.4%	19.1%
Bachelors' degree	N	0	24	45	69
	% of Total	0.0%	7.2%	13.4%	20.6%
Post graduate degree	N	0	9	13	22
	% of Total	0.0%	2.7%	3.9%	6.6%
Total	N	8	153	174	335
	% of Total	2.4%	45.7%	51.9%	100.0%

Source: Fieldwork, (2020)

Therefore, finding indicates that education and perceptions on lack of clean drinking water and improved sanitation retards development as many respondents strongly agree. This is also supported by Hemson, et al. (2008) who postulated that the lack of clean drinking water and improved sanitation brings misery, hardship and retards the development of people subjected to it. The provision of water and sanitation is essential in improving the living conditions of the poor in many countries. Van Kopen et al., (2017) also states that the lack of access to safe and good quality water contributes to unending poverty, through the poor health and high proportion of household expenditure necessary for water supply in many poor communities.

5.3.3. Importance of managing water resources to promote sustainable economic development

Based on Table 5.6 the results show that 43.9% respondents strongly agree, 52.2% respondents agree and 4.8% respondents were not sure. This suggests that the majority of respondents agree that it is important to manage available water resources. This suggests that it is important for water resources to be managed in order to eradicate poverty and promote sustainable economic and social development. The uThukela Water technical team notes that there is insufficient future bulk water supply, various water schemes that are non-functioning and water losses are estimated at 40-60%. Old asbestos pipes are still in use and need to be replaced, pointing to the need for an operations and maintenance plan. In the context of ADLM of high rates of aging infrastructural services which are the results of water theft and vandalism and have been reported to disrupt service delivery to take place and lack of resources for fixing of strategic infrastructure to be able to implement municipal catalytic project (Alfred Duma Local Municipality, 2019/2020). The findings indicate that there is no maintenance for water infrastructure which lead to water resources not being managed as it is estimated that about 40-60% of water losses which results in unsustainable economic development in the municipality.

Table 5.6: Age range and perceptions that it is vital that South Africa's limited water resources are managed and used to promote sustainable economic and social development.

Age		South Africa should manage limited water resources.			Total
		Not sure	Agree	Strongly agree	
18 – 25	N	4	64	44	112
	% of Total	1.2%	19.1%	13.1%	33.4%
26 – 35	N	6	49	59	114
	% of Total	1.8%	14.6%	17.6%	34.0%
36 – 44	N	3	33	30	66
	% of Total	0.9%	9.9%	9.0%	19.7%
45 – 59	Count	3	23	9	35
	% of Total	0.9%	6.9%	2.7%	10.4%
60 and Above	Count	0	6	2	8
	% of Total	0.0%	1.8%	0.6%	2.4%
Total	N	16	175	144	335

% of Total	4.8%	52.2%	43.0%	100.0%

Source: Fieldwork, (2020)

The results also agree on Table 5.13 that South Africa is a water scarce country, therefore water resources should be protected and managed as there are available limited resources. The results are also supported by Dublin's principle 1 which states that the fresh water is finite and vulnerable. It emphasises the crucial sustainable use and development of water resources through linking economic development with protection of natural ecosystem (Solanes and Gonzalez-Villarreal, 2008).

5.3.4. SDGs aim to achieve universal and equitable access to safe and affordable drinking water

Based on Table 5.7, it is observed that 49.0% of the respondents agree and 30.4% respondents strongly agree that Sustainable Development Goals (SDGs) aims to achieve universal and equitable access to safe and affordable drinking water. Meanwhile, 20% of the respondents were not sure and only 0.6% respondents disagree that SDGs aims to achieve equitable access to and affordable safe drinking water. In case of the Ekuvukeni community, the majority of the population do not know and do not understand the role of SDGs as many people in the households are not educated and not aware of the policies implemented to ensure access to safe and affordable drinking water, even though the majority of respondents agree but this does not mean the community does understand the SDGs.

By 2030 the SDGs aim to achieve universal and equitable access to safe and affordable drinking water for all and support the participation of local communities in improving water and sanitation management (United Nations, 2016). Government developed the NDP to respond quickly to South African's objectives and ensure that inclusive economic growth was the main agenda for development. The NDP emphasise that local government is to play a crucial role in ensuring the accomplishment of the vision 2030 as stipulated by the SDGs. The plan requires the local government to be service delivery oriented and the SDGs balance the three dimensions of sustainable development including the social, economic and environment.

Table 5.7: SDGs aims to achieve universal and equitable access to safe and affordable drinking water

Response categories	Frequency	Percent (%)

Strong disagree	0	0
Disagree	2	0.6
Not sure	67	20.0
Agree	164	49.0
Strongly agree	102	30.4
Total	335	100.0

Source: Fieldwork, (2020)

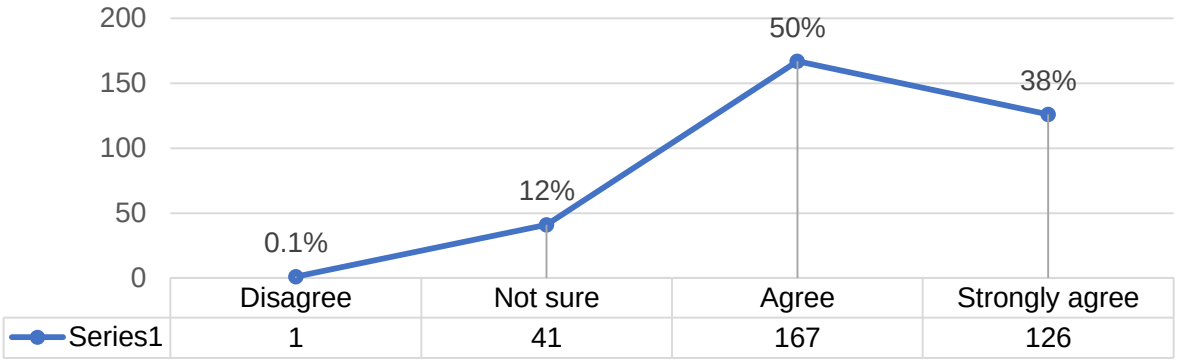
Goal 6 of SDGs aim to ensure the availability and sustainable management of water and sanitation for all, in terms of water access at uThukela District Municipality, 17% of the population are getting piped water inside the dwelling, 32.2% households had piped water inside the yard, 13.4% from a community stand pipe and a total number of 9.5% from a borehole outside the yard. Water supply backlog in 2016 was 17% (UThukela District Municipality, 2019/2020). In terms of sanitation in uThukela District 50% use a pit toilet, 23% use flush toilets and 18% use chemical toilets. There are a number of rural areas that lack access to appropriate sanitation facilities. The appropriate sanitation services backlog as at the end of December 2016 was 18%, which translates to 28829 households who do not have appropriate sanitation services. These findings show that the district still have people who have no access to water and this should be achieved by 2030.

5.3.5. Water access is essential to elevate people out of poverty

According to Figure 5.1, the result indicates that 50% of the respondents agree and 38% strongly agree that water access is important to elevate people out of poverty. Meanwhile, only 12% of the respondents were not sure and only 0.1% of the respondents disagree. These findings suggest that the majority of the respondents approve that without water, life will be impossible because people have certain basic needs for their survival. The respondents regard access to water as fundamentally important to elevate communities out of poverty. In the context of uThukela District there are 62.7% of the population living in poverty in uThukela District (UThukela District Municipality, 2019). Within the district context, the most poverty affected areas are found in some parts of UKhahlamba (68.6%), Inkosi Langalibalele (65.5%) and Alfred Duma (58.7%). The majority of people living in poverty are from the black rural communities.

In terms of Ekuvukeni community, people practise farming and run small businesses to survive and earn income through water access as there is high unemployment rate and many households depends on social grants, therefore if there is access to water in the community it elevates people out of poverty. This is also supported by Koolwal and Van de Walle (2013) who postulates that water access is essential to elevate people out of poverty through realising the creative energy of women and children, enabling small businesses to run and providing domestic work that is needed for dignity and social networking of household members.

Figure 5.1: Water access is essential to elevate people out of poverty



Source: Fieldwork, (2020)

Access to water directly impacts daily life and human survival. Water access provides social power, energy generation, healthy bodies, sustainable livelihoods, transformed landscapes, wealth and the existence of life itself (Goff & Crow, 2014). WHO (2017) suggest that water management is a fundamental factor in the global battle to remove life-threatening poverty and build secure and wealthy lives of people living in the world. Synder et al. (2018) maintains that the gaps in equitable access to water are huge due to poverty and unavailability of proper infrastructure. The Alfred Duma Local municipality (2019) also suggest that inequality is set to increase over the years, as rich to continue get richer and the poor still becoming poorer. This means that poor communities within the Alfred Duma Local municipality will suffer from lack of water access than urban areas.

5.3.6. Water as life sustaining basic human needs

Based on Table 5.8. it is observed that 55.5% respondents strongly agree, and 42.7% respondents agree that without water life will be impossible because people have certain basic needs for their survival and the life sustaining basic human needs. Only 1.8% of the respondents who were not sure about the statement. This suggest that water is the basic human need and needs to focus on enough availability and quality drinking water that is required for human existence because without water, plants and animals cannot live. In the background of Ekuvukeni, it is noted that 6kl of water per household per month are inadequate as the community use water for so many things which includes irrigation, bathing, cooking, drinking, washing and business operations available in the community. The DWA has recognized an international expert advice that civil society should receive 6kl of free basic water on local governance in South Africa and 6kl of water per month is not sufficient and should be increased to 12kl per household per month which was specified by government in 1994 in the RDP as the medium-term goal (DWA, 2008). This is also asserted in the Constitution of Republic of South Africa Act 108 of 1996 which emphasise water as basic human needs.

Table 5.8: Without water life will be impossible because people have certain basic needs for their survival and the life sustaining basic human needs

Response categories	Frequency	Percent (%)
Strongly disagree	0	0
disagree	0	0
Not sure	6	1.8
Agree	143	42.7
Strongly agree	186	55.5
Total	335	100

Source: Fieldwork, (2020)

These findings suggest that too many respondents strongly agree that water is vital to life and all forms of social, environmental, and economic development. Singh (2017) suggest that water is fundamental to people's life as people use water for different things, such as agriculture, energy generation, industry, livestock, waste disposal, fisheries, domestic consumption, recreation and mining. Within the uThukela District Municipality water is used for various reasons including agriculture, manufacturing, and tourism (uThukela District Municipality, 2020).

5.3.7. Water is the plentiful resource at which government must supply at no cost

As illustrated in Table 5.9, the results indicate that 48.1% of the respondents strongly agree and 46.3% respondents agree, while 5.4% respondents were not sure and 0.3% respondents disagree that water is an abundant resource which government must supply at no cost to citizens. Based on the findings, the results suggest that many people regard water as a basic human right where government should supply it at no cost. This means that rural people should be provided with affordable water and water service provider must supply water at no cost as rural communities cannot pay for water services. In this case the findings show that Alfred Duma Local Municipality community cannot pay for water services due to low scale of the economy in the municipality as people depends on informal economy such as street trading; this means that most people enter the informal economy not by choice in the municipality but out of a need to survive. There are also high unemployment and poverty rates in the municipality. Government also provides free basic services in the community including free basic water, RDP houses, electricity and no fee school in the area of Ekuvukeni.

Table 5.9: Rural communities regard water as a plentiful resource which the government must supply at no cost

Response categories	Frequency	Percent (%)
Strongly disagree	0	0
Disagree	1	0.3
Not sure	18	5.4
Agree	155	46.3
Strongly agree	161	48.1
Total	335	100

Source: Fieldwork, (2020)

Water bills are paid by people living in urban areas as people in rural areas cannot afford to pay for water services due to high unemployment rate. This suggest that water is a plentiful resource which the government must supply at no cost as people cannot afford to pay for water, this is why the community regard it as plentiful resource as they depend on government service delivery. Water should be totally free as it is a basic human right and the minimum for daily use should be available whenever they need it as they are unable to pay for water services. The results are also supported by Livingston (2019) who argues that if water is treated as an economic good it only favours economic growth and this deprive people of water as basic human right. This

study maintains that water should be treated as a basic human right and it is supported by the Constitution of South Africa that everyone has a right to water and water should be available without costs. This is also supported by Thabethe (2011) who concludes that many South Africans especially in rural areas do not have access to basic services and they cannot pay for services as poverty is the main issue in rural communities.

5.4. Challenges of Equitable Access to Water in Rural Areas

5.4.1. Challenges of inequitable access to water

As illustrated in Table 5.10, it indicates that 51.6% respondents strongly agree and 37.3% respondents strongly agree that there are many challenges of equitable access to water. Meanwhile, 10.1% respondents disagree and 0.9% respondents were not sure about challenges facing their community. The results indicate that the majority of respondents strongly agree that there are many challenges of access to water in their community. Equity emphasise that disadvantages and marginalised groups socially, economically and environmentally should be given the priority, this includes indigent households, women and female headed households including people living with disability. Alfred Duma Local Municipality (2019/2020) shows that they are having challenges of inequitable access to basic services and development mostly remains one of the most observable spatial footprints of the apartheid past. The areas within the urban areas of ADLM are well provided with basic services while the quality of services in rural areas including indigent households remains poorer and services' backlog is very high.

The Municipality received 4500 applications from indigent households and due to time constraints and system challenges the municipality has managed to approve only 965 applications (Alfred Duma Local Municipality, 2019/2020). Therefore, this results in inequitable, and unequal service delivery within the municipality where indigent households are neglected. This is supported by WHO (2019) who postulated that inequitable access to water brings challenges to disadvantaged and marginalised groups socially, economically and environmentally if water access is not reaching all

groups to have the opportunity for meaningful participation in water and equitable benefit from water access.

Table 5.10: Monthly income and perceptions on challenges of inequitable access to water and sanitation in rural areas

Monthly income		Challenges of inequitable access to water and sanitation in rural areas				Total
		Disagree	Not sure	Agree	Strongly agree	
R0 – R7, 200	Count	3	28	100	80	211
	% of Total	0.9%	8.4%	29.9%	23.9%	63.0%
R7, 201 – R16, 500	Count	0	3	45	23	71
	% of Total	0.0%	0.9%	13.4%	6.9%	21.2%
R16, 501 – R33, 400	Count	0	3	27	21	51
	% of Total	0.0%	0.9%	8.1%	6.3%	15.2%
R33, 401 – R57, 400	Count	0	0	1	1	2
	% of Total	0.0%	0.0%	0.3%	0.3%	0.6%
Total	Count	3	34	173	125	335
	% of Total	0.9%	10.1%	51.6%	37.3%	100.0%

Source: Fieldwork, (2020)

It can also be noted that 63% respondents (earns between R0-R7200 and 15.2% respondents who earns between R16500-R33400 are middle income earners. The findings suggest that many people are unemployed and if people were employed they will have the means to pay for water services instead of relying on external subsidies from the government as rural communities regard water as a plentiful resource which the government must supply at no cost. This depicts bad financial implications for rural communities as they cannot afford to pay for water services which bring challenges in equitable access to water in Ekuvukeni community. This is also supported by Saner et al., (2015) who notes that there is still a struggle for low income households where there is competing uses of water and there is no access to affordable drinking water. For this reason, many countries have prioritised the position of water allocation, by giving greater load to the water sector that shows a growing trend towards treating water as a basic human right.

5.4.2. Problems that delay water service provision in rural areas

Based on Table 5.11 the results indicate that there are 28.7% respondents who agree, 20.6% respondents disagreed and 20.3% respondents strongly agree that the faraway of rural areas from urban areas brings problem to the water service provision as construction of water and wastewater treatment and reticulation is economically unviable. It can be also observed that 19.4% respondents were not sure and 11.0% respondents strongly disagree. The results indicate that the majority of respondents agree that there are problems that delay water supply in rural areas. Alfred Duma Local Municipality (2019/2020) indicates that there is high rate of aging infrastructural services which are the results of water theft and vandalism and have been reported to disrupt service delivery to take place in surrounding communities. It can also be noted that there is unequal service delivery that is more urban bias at the negligent of rural communities. The municipality partnered with uMngeni Water to address water backlogs as the maintenance and refurbishment costs of water and wastewater works are currently unaffordable to uThukela District Municipality due to financial constraints.

Table 5.11: Problems that delay water service provision in rural areas

Response categories	Frequency	Percent (%)
Strongly disagree	37	11.0
Disagree	69	20.6
Not sure	65	19.4
Agree	96	28.7
Strongly agree	68	20.3
Total	335	100

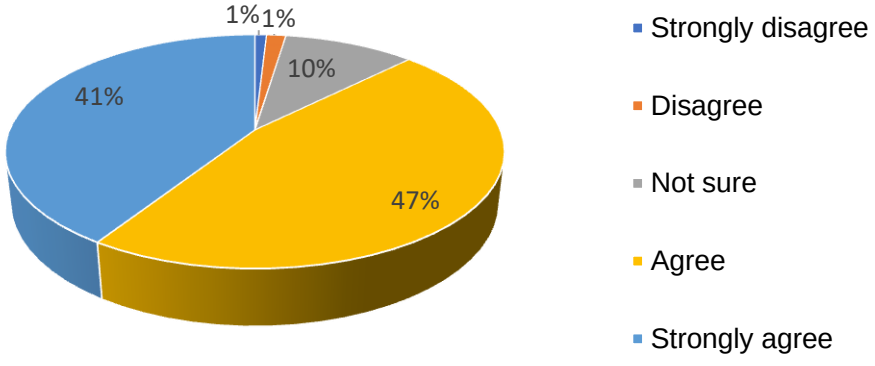
Source: Fieldwork, (2020)

The municipality budgeted R 2052000.00 to Ekuvukeni Regional Bulk Water Supply in upgrading and maintaining the Oliphantskoop water treatment plant to supply water to surrounding communities including Ekuvukeni. There are also challenges in water reservoir which need to be upgraded and maintained to ensure delivery of water services in the community. The results are supported by McConkey and Wilsenach (2010) posit that the main challenge that delays water provision in rural areas is that rural areas are far away from the urban areas, which makes it difficult to reticulate water to household and treatment of water at the purification plant is economically unworkable.

5.4.3. Poverty and lack of skills hinders equitable access to water

In Figure 5.2, the results show that 47% respondents strongly agree and 41% respondents agree. It also shows that 10% of the respondents were not sure and 1% of respondents strongly disagree while only 2% respondents disagree. The findings suggest that the majority of respondents agree that equitable access to water and sanitation is delayed by lack of skilled and experienced staff in local municipalities. The Alfred Duma Local Municipality IDP (2019/2020) also indicates that there is a challenge of migration of skilled and competent labour with the municipality which pose a challenge to delivering of equitable access to water in communities. The Municipal transformation and organisational development is committed in establishing effective systems that will enable them to deliver services effectively and efficiency, and this include amongst other things the retaining and attracting qualified, experienced and dedicated staff within the water department. This is also supported by Simukonda, Farmani & Butler (2018) that water management is poor because people are lacking skills in a use of technology in developing countries. Lack of the necessary managerial skills and technical knowledge affect the delivery of water services.

Figure 5.2: Equitable access to water and sanitation is hindered by poverty, lack of skilled and experienced staff in the municipalities at the local and district level



Source: Fieldwork, (2020)

Perreto et al., (2006) postulated that equitable access to water and sanitation is delayed by poverty and the lack of skilled and experienced people in the municipalities at the local level and district level. The results also indicate that in line with the above

mentioned, local governments also face massive challenges in implementing their constitutional mandates of provision of water access to communities because of the lack of capacity in the form of skills and human resources to deliver water services in communities (Kings, 2014).

5.4.4. Lack of economic development

Table 5.12 represents the lack of economic development and non-attraction of investments to provide employment. The result indicates that 48.7% of respondents agree and 33.1% respondents strongly agree. Furthermore, 4.8% of respondents disagree while 1.2% of respondents strongly disagree that the lack of economic development affects access to water. The result suggests that many respondents regards water as a key driver of economic development even though Alfred Duma Local Municipality states that there is less economic growth and high employment rate in the municipality which lead to lack of economic development taking place within the local communities. The uThukela economy is largely driven by the tertiary sector with the community services (23%), finance (13%), transport (12%) and trade (14%) sectors.

Alfred Duma Local Municipality is the economic hub of uThukela District Municipality and dominates the spatial economy of the district. Economic development is not level across the district with large inequalities across local municipalities. The sectors of the economy include agriculture in rural areas, manufacturing is concentrated in the municipality and tourism. Goswami and Bisht (2017) realise that water is a key driver of sustainable economic growth and economic development. Water provides for agriculture, industries and humans, which all contributes to an increase in socio-economic development of the country as water is a source of life and prosperity.

Table 5.12: Lack of economic development and non-attraction of investments to provide employment

Response categories	Frequency	Percent (%)
Strongly disagree	4	1.2
Disagree	16	4.8
Not sure	41	12.2
Agree	163	48.7
Strongly agree	111	33.1
Total	335	100.0

Source: Fieldwork, (2020)

The findings also confirm those of Moloi (2004) that the lack of economic development and non-attraction of investments to provide employment contributes to unsustainable development of water supply in rural settings. The district has lack of coordination of local economic development initiatives and agriculture and tourism potential not fully exploited where there is lack of marketing of the tourism destination and investment destination. Rural communities are facing a number of challenges of developing themselves economically which means they lack income to pay for water services due to unemployment opportunities and lack of development in rural communities. The findings indicate inadequate access to water which lead to poverty status of people living in the community becoming worse, this is because water is vital to economic development and agricultural activities taking place in communities cannot occur due to lack of access to adequate water, this limit economic growth to take place in the community.

5.4.5. Water scarcity in South Africa

Table 5.13 represents the water scarcity picture in South Africa. The results indicated that 32.2% of respondents strongly agree, 48.1% of respondents agree and 13.4% of respondents were not sure about water scarcity. Whereas 5.7% of respondents disagree and 0.6% of respondents strongly disagree. These results indicate that it is understandable why some areas in South Africa have constrained water resources and consequently have challenges regarding the equitable access to freshwater to rural communities. Cardone and Fonseca (2003) posit that water scarcity is manufactured through institutions that disadvantage the poor and political processes. In addition, when it comes to clean water, the arrangement in many countries is that the poor pay more and get less and endure the effect of the human development costs associated with scarcity.

Nojiyeza (2014) notes the water governance models that are utilised in a country are related to economic scarcity, whereby most countries experience water shortages and the shortages are based on the promoted paradigm of IWRM. The legal implementation of IWRM is enforced through international organisations, expert consultations, loan

conditionality and economic as well as political pressures (Dezalay and Garth 2002). Oki & Quiche (2020) argue that water scarcity is associated with inadequate infrastructure development, poor management as well as inequitable water allocation and access across economic stages.

Table 5.13: Gender and perceptions of water scarcity in South Africa: **Access to safe drinking water tends to improve with economic growth**

Gender		South Africa is a water secured country					
		Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Total
Male	N	0	6	15	60	41	122
	% of Total	0.0%	1.8%	4.5%	17.9%	12.2%	36.4%
Female	N	2	13	30	101	67	213
	% of Total	0.6%	3.9%	9.0%	30.1%	20.0%	63.6%
Total	N	2	19	45	161	108	335
	% of Total	0.6%	5.7%	13.4%	48.1%	32.2%	100.0 %

Source: Fieldwork, (2020)

The other challenge faced by South Africa is water scarcity and there is an irregular distribution of rainfall over the country, with humid sub-tropical conditions in the east and dry desert conditions in the west (DWAF, 1998). As a result, water availability is expected to be the single greatest and most critical to development constraint facing South Africa.

5.4.6. Importance of educating communities on water and sanitation

As illustrated in Table 5.14, it represents the importance of educating communities about managing water and sanitation. The results imply that 44.8% of respondents agree followed by 43.3% of respondents strongly agree and 11.9% respondents who were not sure about the importance of educating communities on water and sanitation. The high number of respondents was millennials who range from the age group of 26-36 and from 18-25 with 33.4% of respondents. This indicates that the majority of respondents were youth and agree with the perceptions that educating communities will improve water and sanitation in their local areas. In the context of ADLM, it has developed the ward committee system including the water committee. A ward

committee encourage the community to participate in water challenges to make the council aware of the needs and concerns of community and keep people informed of the activities in the municipality. The water committee also teach people about managing water resources and how to ensure clean water and sanitation.

Table 5.14: Age and perception about importance of educating communities on water and sanitation

		Important to educate communities about managing water and sanitation.			
Age range		Not sure	Agree	Strongly agree	Total
18 – 25	N	21	48	43	112
	% of Total	6.3%	14.3%	12.8%	33.4%
26 – 35	N	13	54	47	114
	% within Age	11.4%	47.4%	41.2%	100.0%
	% of Total	3.9%	16.1%	14.0%	34.0%
36 – 44	N	6	30	30	66
	% of Total	1.8%	9.0%	9.0%	19.7%
45 – 59	N	0	17	18	35
	% of Total	0.0%	5.1%	5.4%	10.4%
60 and above	N	0	1	7	8
	% of Total	0.0%	0.3%	2.1%	2.4%
Total	N	40	150	145	335
	% of Total	11.9%	44.8%	43.3%	100.0%

Source: Fieldwork, (2020)

Access to safe and reliable water, sanitation and hygiene is a critical precondition for providing safe communities an environment that supports equal opportunities for quality education and healthy development for rural communities. Teaching communities about water and sanitation will help communities to strengthen health education and implement policies that will promote health, well-being and community development (WHO, UNICEF & UNESCO, 2019).

5.5. SECTION C: ECOLOGICAL GOVERNANCE FRAMEWORK AND WATER ACCESS IN LOCAL AREAS

This section presents the ecological governance framework that supports access to water in local areas. To address objective 2, the following statements were addressed to respondents.

5.5.1. Free Basic Water Policy (FBW)

From Table 5.15, the results indicate that a total of 49.0% of respondents agree, 29.9% of respondents were not sure and only 21.2% of respondents agree that Free Basic Water (FBW) policy was planned to ensure that no one is denied access to water supply because people cannot pay for water. It is the responsibility of the municipality to implement and properly understand and implement the Free Basic Water Policy. The municipality developed the indigent policy to identify households to benefits from free basic water. The indigent policy suggests that each household that is registered as indigent should receive a credit on their water bill for the amount of free basic water and indigents are commonly identified based on their monthly household income (uThukela District Municipality, 2017). UThukela District municipality (2017) suggest that the approved indigent registered households shall receive fully subsidised water and sanitation of 6kl per month, including the basic charges for such supply provided that; the consumption exceeds 6kl per month the municipality shall be entitled to restrict water supply to the property or to bill the excess consumption used at a normal rate (uThukela District Municipality Indigent Policy, 2017). The Municipality received 4500 and only approves 965 applications due to system challenges and time constraints. This suggests that a small portion of indigent household receive free basic water as the municipality approve 965 applications out of 4500.

Table 5.15: Educational level and knowledge on free basic water policy which provides a minimum quantity of portable water of 25 litre per person per day or 6 kilolitres per household per month

		Educational qualification					
Free basic water policy provides 6Kl of water per household per month		Primary school certificate	High school certificate	Diploma	Bachelors' degree	Post graduate degree	Total
Not sure	n	5	34	16	10	6	71
	% of Total	3.6%	12.8%	3.9%	7.8%	1.8%	29.9%
Agree	n	14	72	35	33	10	164
	% of Total	4.2%	21.5%	10.4%	9.9%	3.0%	49.0%
Strongly agree	n	12	43	13	26	6	100
	% of Total	1.5%	10.1%	4.8%	3.0%	1.8%	21.2%
Total	n	31	149	64	69	22	335
	% of Total	9.3%	44.5%	19.1%	20.6%	6.6%	100.0%

Source: Fieldwork, (2020)

Rober (2015) suggests that the municipal's inability to provide the community with water services has been identified as one of the short falls of Free Basic Water Policy and that the municipality in rural areas finds it very difficult to adopts and implement the FBW. Muller, (2008) notes that the FBW policy and its implementation have been criticized by civil society for failing to reach all the poor, where water provided is insufficient and the FBW policy is reaching the non-poor than the poor. The findings suggest that the majority of respondents have knowledge on Free Basic Water Policy. Calfucoy et al., (2009) notes that there are policy implementations which move away from service delivery practices which need to take place at communities and it has been indicated that municipalities provide FBW to most citizens who are financially stable than the indigent that needs it. Sutherland et al., (2015) notices that EThekwini municipality is already providing 9kl of water to all residents regardless of the socio-economic status of the beneficiary. The respondent's level of education also indicates that they have knowledge about Free Basic Water Policy where about 44.5% of respondents have high school certificate, 20.6% respondents have bachelor's degree and 6.6% respondents have postgraduate degrees. This means that respondents do have knowledge and ideas on FBW as they have bachelor degree and proceeded to postgraduate studies.

5.5.2. Constitution of the Republic of South Africa Act 18 of (1996)

According to Table 5.16 below, the results show that 60% respondents strongly agree that according to the Republic of South Africa (1996) everyone has the right to have access to water, while 36.1% of respondents also agree that the Constitution of South Africa, make a provision for the right to water. Only 3.9 % of respondents reported to be not sure about the constitutional obligation of recognising and realising the right to water. These findings suggest that a greater portion of respondents understand the constitution of South Africa and water as their basic human right. The Constitution of South Africa, Act 108 of 1996 Section 27(1) of the Bill of Rights in the Constitution of the Republic of South Africa (1996) determines that everyone has the right to have access to sufficient water.

Table 5.16: Constitution of the Republic of South Africa (1996) determines that everyone has the right to have access to sufficient water.

Response categories	Frequency	Percent (%)

Strongly disagree	0	0
Disagree	0	0
Not sure	13	3.9
Agree	121	36.1
Strongly agree	201	60.0
Total	335	100.0

Source: Fieldwork, (2020)

Mounting researching shows that almost South Africans do not have adequate water and sanitation and these shortfalls are against with what is indicated in the constitution of South Africa. Government should ensure that a local municipality plays a role in delivering equitable access to water in communities. The Constitution of South Africa (1996) provides everyone with the right to sufficient water within available resources and this is reflected in the country's Free Basic Water Policy (2001). However, free basic water and sanitation are not provided equally or evenly across South Africa. Sutherland et al. (2014) posits that civil society groups and some community members argue that the municipality does not adequately support the right to water enshrined in the South African Constitution.

Following the eThekwini Municipality's example in 2001 of providing 9kl of water to their household regardless of their beneficiary status, the South African government develop a policy to provide 6,000 litres of free water per household per month to poor citizens, this form a part of the government's poverty alleviation strategy and the social wage including providing electricity and housing (DWAF, 2008). Sutherland (2014) posits that EThekwini has indicated that it was possible to cross-subsidize water provision and make it financially feasible to provide a basic supply of water, free of charge. Therefore, UThukela District Municipality should provide free basic water of 6kl to household and should also increase the amount of water for progressive realisation of the right to water and incremental value to it.

5.5.3. Knowledge on Water supply and sanitation policy

Table 5.17 presents the water supply and sanitation policy which proposes that poor communities who are not able to afford clean drinking water and improved sanitation should be provided with these services. The findings indicate that 53.3% of respondents were not sure, 24.5% of respondents strongly agree and 22.4% of respondents agree

with the provisions of water supply and sanitation policy. This is also indicated by 19.1% of respondents who has diplomas and 20.6% of respondents who have bachelor's degrees and 6.6% who have postgraduate's degrees. This indicates that the majority of the respondents do not have knowledge about the water supply and sanitation policy of 1994 that states that communities should be provided with clean drinking water and improved sanitation. This may be affected by the level of education in the municipality as many people have low literacy and education levels which could limit knowledge on water and sanitation policy.

Table 5.17: Education levels and awareness regarding the Water Supply and Sanitation Policy which proposes that poor communities who are not able to afford clean drinking water and improved sanitation services.

		Educational qualification					
Water Supply and Sanitation subsidy for poor communities		Primary school certificate	High school certificate	Diploma	Bachelors' degree	Post graduate degree	Total
Not sure	n	10	34	13	12	10	178
	% of Total	4.8%	22.1%	10.7%	12.5%	3.0%	53.1%
Agree	n	16	74	36	42	6	75
	% of Total	3.0%	10.1%	3.9%	3.6%	1.8%	22.4%
Strongly agree	n	5	41	15	15	6	82
	% of Total	1.5%	12.2%	4.5%	4.5%	1.8%	24.5%
Total	n	31	149	64	69	22	335
	% of Total	9.3%	44.5%	19.1%	20.6%	6.6%	100.0%

Source: Fieldwork, (2020)

The water supply and sanitation polices acknowledge access to clean drinking water and improved sanitation provision. The national and provincial governments have the responsibility to strengthen and support the capacity of local government to provide these services to communities. This can meet basic needs of poor communities as many poor people cannot afford to pay for water.

5.5.4. Knowledge on Water Services Act (108 of 1997)

Table 5.18 represents the Water Services Act (108 of 1997). It is evident from Table 5.15 that 50.7% of respondents were not sure, 24.8% of respondents strongly agree and 24.5% of respondents agree about their knowledge of the Water Services Act (108 of 1997). The majority of the respondents are unaware of the legislation regulating the water access and provision to South Africa. This is evident from the responses drawn

from the above statement. The result indicates that respondents were not sure about the Water Service Act (Act 108 0f 1997). This suggests that without a common understanding within the community it is difficult to manage the access to water supply efficiently, effectively and economically. The findings also suggest that the community of Ekuvukeni do not know about the Water Services Act which incorporate the duties of UThukela District Municipality as WSA and uThukela Water and Umgeni Water as WSPs.

The aim of this Act is to ensure that the right to basic water and sanitation services is satisfied in local communities. It also outlines the rights and duties of consumers and allows the Minister of Water Affairs and Forestry to establish national goals, norms and standards to ensure sufficient and uninterrupted water supply. The Act suggest that basic water supply and sanitation services should be provided to a community, but in the context of the municipality it shows that 50% use a pit toilet, 23% use flush toilets and 18% use chemical toilets (uThukela District Municipality, 2017). There are a number of rural areas that lack access to appropriate sanitation facilities. The appropriate sanitation services backlog was 18% households who do not have appropriate sanitation services and 17% do not have water supply.

Table 5.18: Water Services Act (108 of 1997) prescribes the legislative duties of municipalities as Water Service Authorities (WSA) to supply sufficient water and an environment not harmful to human health.

Response categories	Frequency	Percent (%)
Strongly disagree	0	0
Disagree	0	0
Not sure	170	50.7
Agree	82	24.5
Strongly agree	83	24.8
Total	335	100.0

Source: Fieldwork (2020)

The results also indicate that the majority of the residents are not familiar with Water Services Act (108 of 1997) that governs the supply of safe drinking water. The respondents of who agree may represent the municipal officials. The Act aims at the protection of water resources from being exploited and ensures that every citizen has

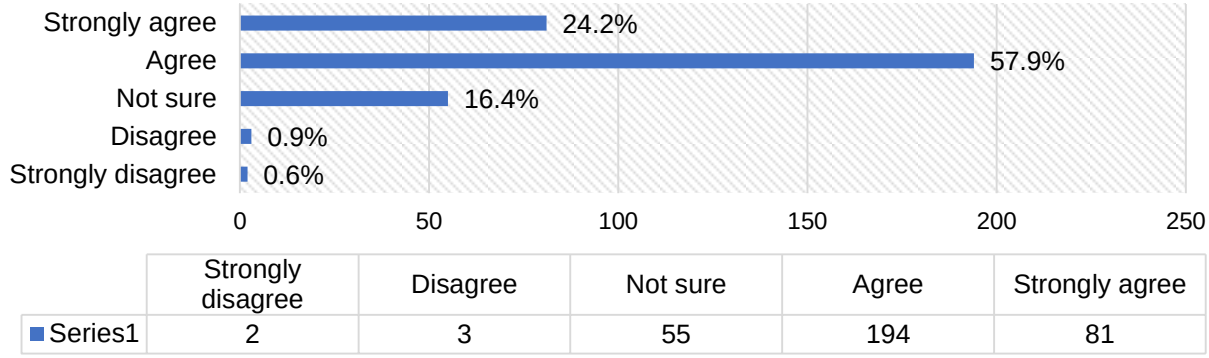
an equitable access to water and integrate the management of surface water and ground water to foster sustainable use of ground water and surface water (Burger, 2005). The next section looks into knowledge on water governance including IWRM.

5.6. Integrated Water Resource Management (IWRM)

5.6.1. Water Resource Management as key foundation to agricultural sector, energy sectors and other sectors.

From Figure 5.3 it can be observed that 57.9% of respondents agree and 24.2% of respondents strongly agree while 16.4% of respondents were not sure. The results also indicate that 0.9% of respondents disagree and 0.6% of respondents strongly disagree that water resource management is the key to agricultural sector, urban infrastructure, energy sectors, health care and other functions in the society. The findings suggest that the majority of respondents agree to the fact that water resource plays an importance role in agricultural sector, urban infrastructure, energy sectors, health care and other functions in the society. GWP (2000) cited in Marcotte, MacDonald & Nemeth (2020) postulate that IWRM promotes management of water, coordinate development and land related resources in order to increase the social and economic welfare in an equitable manner without compromising the sustainability of vital ecosystems.

Figure 5.3:Water resource management play an important role in providing the foundation of agricultural sector, urban infrastructure, energy sectors, health care and other functions of society



	Strongly disagree	Disagree	Not sure	Agree	Strongly agree
Series1	2	3	55	194	81

Source: Fieldwork, (2020)

5.6.2. Importance of sustainable water resource

Table 5.19 presents the gender and perceptions that it is crucial to sustainably use and develop water resources. The results show that 58.5% of respondents agree and 40%

of respondents strongly agree while 1.2% of respondents were not sure and 0.3% of respondents disagree. The findings suggest that the majority of respondents agree that it is vital to sustain and manage water resources. This is supported by Brundtland reports that it is important to ensure that the development meet the needs of presents without compromising the ability of future generations to meet their own needs (Engelenburg, Slobbe & Hellegers, 2019). This suggests that it is important to sustain and manage available water resources for future generations. It is vital to sustain available water resources for future use. Marcotte, MacDonald and Nemeth (2020) argue that it necessary to have integrated participatory approach in managing water in order to ensure sustainable way for future human and environmental needs and equitable access to water for all users.

Table 5.19: Gender and perceptions that it is crucial to sustainably use and develop water resources

Gender		Crucial to sustainably use and develop water resources				Total
		Disagree	Not sure	Agree	Strongly agree	
Male	n	1	3	63	55	122
	% of Total	0.3%	0.9%	18.8%	16.4%	36.4%
Female	n	0	1	133	79	213
	% of Total	0.0%	0.3%	39.7%	23.6%	63.6%
Total	n	1	4	196	134	335
	% of Total	0.3%	1.2%	58.5%	40.0%	100.0%

Source: Fieldwork, (2020)

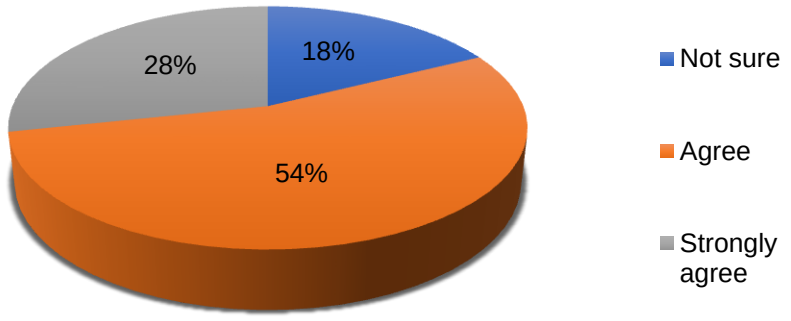
ECA (1999) noted that gender issues remain critical for IWRM and need to be realised in a sustainable manner. Inadequate access to water and sanitation adds hugely burdens to women's work and affects their health and that of their children. Moriarty (2003) in Nojiyeza (2014) posits that equity issues in gender must be addressed throughout the project cycle that represents a change in emphasis and increasing the need of interest focusing on the role of women from the original Dublin declaration. Therefore, it is crucial to sustainable use water resources as women's and girls' become freed from daily chores of fetching water.

5.6.3. The role of Integrated Water Resource Management (IWRM)

According to Figure 5.4, the results indicate that 54% of respondents agree, 28% of the respondents strongly agree and only 18% of respondents were not sure. The result indicates that a large number of respondents support the fact that the level of decision

making should be taken by all stakeholders and participatory approach should involve all people, planners and policy makers in water projects. According to Global Water Partnership (2000), IWRM assists in developing and managing water resources in a sustainable and balanced way by considering social, economic and environmental interest. The DWAF (2004) suggest that IWRM should promote management of water and coordinate development to increase the social and economic welfare in an equitable manner without compromising the sustainability of vital ecosystems.

Figure 5.4:IWRM should take place at lowest level where decision making is taken by all stakeholders and participatory approach involve all people, planners and policy makers in water projects



Source: Fieldwork, (2020)

Biswas (2004) suggest that IWRM must be able to responds to the needs and demands of a growing diversity of municipal institutions, nation, NGOs and private sector. Biswas (2005) cited in Nojiyeza (2014) argues that IWRM does not provide any real guidance to the water professionals as to how the concept can be used as it uses many of the currently popular words to make its existing water planning, management, and decision-making processes, efficient and equitable. In addition, Manzungu (2016) postulated that IWRM lacks quantification of what establishes social welfare and economic welfare, it does not give clarity on sustainability, equity and ecosystems. Therefore, IWRM in a large point it can be noted that is it not practical to implement and function at any level of government and even more difficult in decentralised local government structures.

5.6.4. Importance of participatory approach in decentralisation

As illustrated in Table 5.20, it presents the income and perceptions on participatory approach in societies, the results show that 45.4% of respondents strongly agree and 45.1% of respondents agree, while 9.6% of respondents were not sure about the importance of participatory approach in societies. In terms of levels of income, the results indicate that 63% of respondents earn an income of R0-R7200. This show that the levels of income affect people's participation in water supply as the community has less capability to fund the major water projects and the community members are not able to pay for water charges. The municipality has developed the ward committee including the water committee and representatives' forum. In the ward committee, it is where the community and community organisation participate and contribute to issues of improving service delivery. Ward committee also encourage participation in the community to make the council aware of the needs and concerns of community and keep people informed of the activities in the municipality. The municipality also established the representative forum that represents the interest of residents, at the level of the district and local municipality in the participation of IDP process (UThukela District Municipality, 2019/2020).

Table 5.20: Monthly income and perceptions that participatory approach is important in societies

Income		Participation in water projects			Total
		Not sure	Agree	Strongly agree	
R0 – R7, 200	Count	17	99	95	211
	% of Total	5.1%	29.6%	28.4%	63.0%
R7, 201 – R16, 500	Count	9	28	34	71
	% of Total	2.7%	8.4%	10.1%	21.2%
R16, 501 – R33, 400	Count	5	23	23	51
	% of Total	1.5%	6.9%	6.9%	15.2%
R33, 401 – R57, 400	Count	1	1	0	2
	% of Total	0.3%	0.3%	0.0%	0.6%
Total	Count	32	151	152	335
	% of Total	9.6%	45.1%	45.4%	100.0%

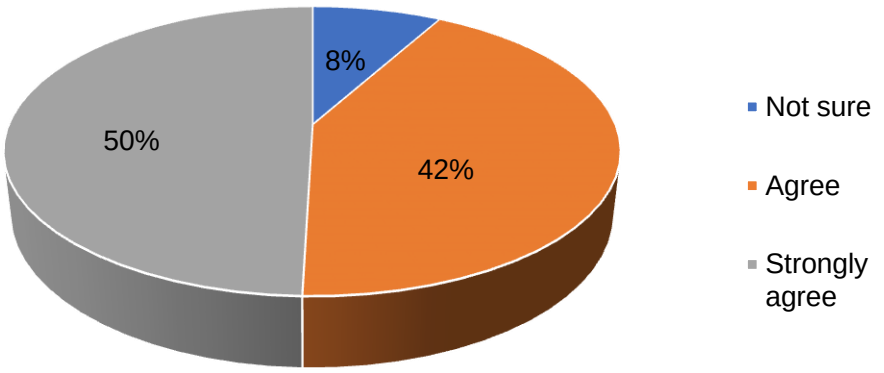
Source: Fieldwork, (2020)

Sultana (2009) states that it is vital for civil societies to participate in projects in order to enhance equity, efficiency and greater ownership towards projects which increases better knowledge on water resource management and greater ecological sustainability. The findings suggest that the respondents strongly agree that participatory approach is vital to communities in order to promote effective water resource management. Participatory approach is all about active involvement of people (Jacobs, Rivett & Chemisto (2018). Rural communities should be involved in water projects because during interaction people they learn about issues discussed in water projects and this enable them to discover new common grounds and enhance social interaction skills. This is supported by Dublin's principle 2 of IWRM, it suggests that management and water development should be based on the decision making and participatory approach should be taken by all stakeholders including people, planers and policy makers (Solanes & Gonzalez-Villarreal, 2008). The municipality also established the Water Services Development Plans (WSDP's) that is compiled to address backlogs in basic water and sanitation services according to the new legislation, the Water Services Act (Act No. 108 of 1997). Therefore, it is important to involve a community to water management to satisfy community basic needs.

5.6.5. The role of women in decision making process in water resource management

As shown in Figure 5.5., the study represents the respondents on decision making process based on water resource management. The result implied that half of the respondents strongly agree (50%), while 42% of the respondents agree and 8% of the respondents were not sure about women participation in water management. The findings suggest that half of the respondents suggest that they have no voice in decision making process in rural communities which deprive them from water resource management. The findings are supported by the Sustainable Development Goals 5 which purposes to promote women empowerment and gender equity. Most women in rural communities have no voice in decision making process and this deprive them from water resource management as it is indicated in the findings.

Figure 5.5: Most women in rural communities have no voice in decision making process and this deprive them from water resource management



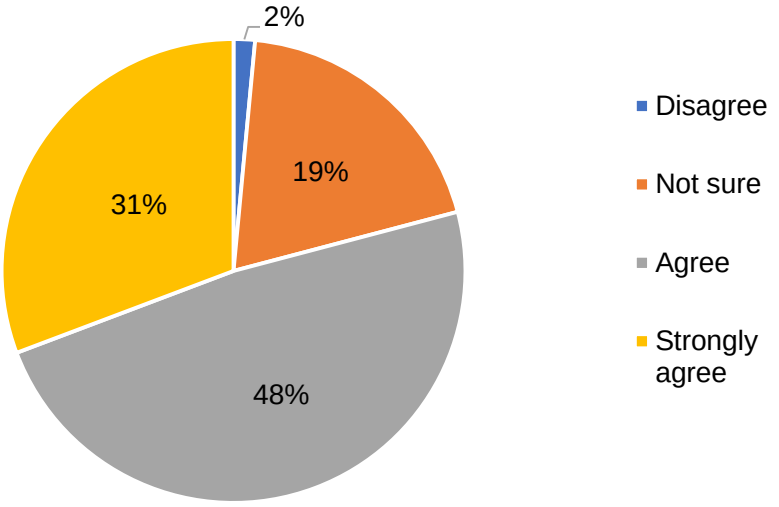
Source: Fieldwork, (2020)

Harris et al., (2017) also notes that woman and men often have differentiated relationships to water access, uses, knowledge, experiences and governance, therefore women should play a role in water resource management as there are primarily responsible for water provision, especially for domestic needs. The findings also correlate with The Dublin's Principle 4 of IWRM which acknowledges that women should be involved in decision making process and implementation at all levels of water issues, this increases the role of women in water resource management and promote women empowerment (Solanes and Gonzalez-Villarreal, 2008). Jacobs, Rivett & Chemist (2018) believed that introducing the voice of citizen within the framework of decision making would enable the people to participate and ensure accountability and transparency in the decision-making process. Therefore, many women feel disempowered and marginalised in the process of decision making and tend to be more vulnerable to equitable access to water. Whereas women play a vital role in water management as there are key agents in obtaining water for their families and communities, this empower women and give them confidence to increase their role in water management.

5.6.6. Water governance

As illustrated in Figure 5.6, it represents the water governance as a pillar of water management. The results indicate that 48% of respondents agree and 31% of respondents strongly agree while 19% of respondents were not sure about governance as a main pillar of water resource management and 2% of respondents disagree. This result implies that most respondents come to an understanding that water governance is the main pillar of water management. In the context of uThukela District Municipality working in partnership with Umgeni Water Board to address water supply backlogs and ensure sustainable supply of bulk potable water as Umgeni water has sufficient capacity to maintain, refurbish, upgrade and build new wastewater infrastructure. UThukela District Municipality has the department of water and sanitation which plays a role in ensuring the delivery of water and sanitation services in the context of three municipalities including Alfred Duma Local Municipality, UKhahlamba Local Municipality and Langalibalele Local Municipality. Water governance must be in the centre of water management as it ensures that the needs of interest are presented in the fair and in a transparent manner through ensuring the participation of poor in decision making and enhance the role of the community in water management. The municipality has developed the water committee which aims to encourage community participation and make the council alerts of the needs and concerns of community and keep people informed of the activities in the municipality, this includes acknowledging the community through water cuts and water bills.

Figure 5.6:Good governance is a main pillar of water management, which improves various aspects, such as building capacity, promoting decentralisation and strengthening monitoring and evaluation research and learning at all levels



Source: Fieldwork, (2020)

Medeiros and Sivapalan (2020) recognizes that water governance is still problematic as knowledge is poorly accessible and the participation of society in water resource management and is one of major issues in achieving sustainability and water management. Rogers and Hall (2015) postulate that water governance involves a range of social, economic, political and administrative systems that are positioned to develop and manage water resources through the delivery of water at different levels of society. Di Baldassarre et al., (2019) also note that water governance is one of the major issues in achieving sustainability and water management. Furthermore, governance process assists in project transparency and accountability and improves equitable access to water for poor especially.

5.6.7. Importance of decentralisation in local areas

Table 5.21, represents the results on decentralisation that emphasise that local area should participate in water supply and management. The results indicate that 55.2% of the respondents strongly agree and 30.7% strongly agree, while 14.0% of the respondents were not sure about decentralisation as important for local participation in water supply. The result indicates that the decentralisation must be in the centre of sustainable water resource management as many respondents strongly agree. ADLM is

facing challenges of poor communication, understanding the roles and responsibilities between local municipality, district municipality, municipal internal sector department's councillors and officials (Alfred Duma Local Municipality, 2019/2020).

The findings suggest that local areas must be recognised and be considered when it comes to water management to ensure that local concerns are explained and understood to overcome challenges of water access faced by community and the municipalities. The study also notes that poor communities suffered most from either lack of or inefficiency in water service delivery and mismanagement of rural water governance. Jacobs et al., (2018) posits that decentralisation emphasise that it is important for local experiences to be taken into account and communities be involved in decision making and make concrete arrangements for consistent water supply.

Table 5.21: Decentralisation is important for local participation in water supply

		Educational qualification					
Decentralisation		Primary school certificate	High school certificate	Diploma	Bachelors' degree	Post graduate degree	Total
Not sure	N	9	13	14	9	2	47
	% of Total	2.7%	3.9%	4.2%	2.7%	0.6%	14.0%
Agree	N	17	84	32	42	10	185
	% of Total	5.1%	25.1%	9.6%	12.5%	3.0%	55.2%
Strongly agree	N	5	52	18	18	10	103
	% of Total	1.5%	15.5%	5.4%	5.4%	3.0%	30.7%
Total	N	31	149	64	69	22	335
	% of Total	9.3%	44.5%	19.1%	20.6%	6.6%	100.0%

Source: Fieldwork, (2020)

Decentralisation educate people to become full citizens, improve service delivery, bring government closer to people and allow government to better understand people's needs. Olum (2014) suggest that in achieving equitable access to water in rural communities, it is imperative to decentralise the provision of water supply and sanitation services. The finding of the study also agrees with Bazaanah (2020) that decentralisation approach should be perceived as governance corridor which recognises the vitality of sustainable water resource governance and efficiency utilization for sustainable development of the rural communities.

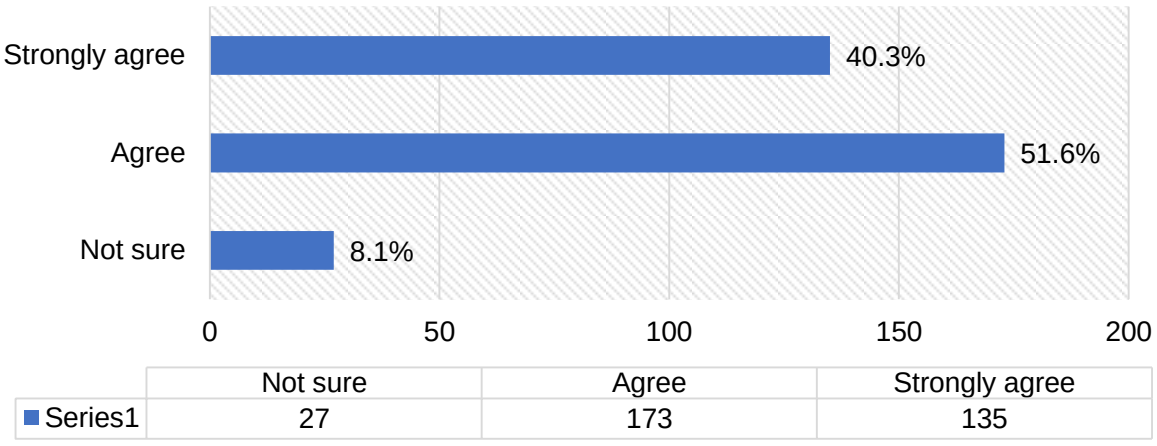
5.7. SECTION D: ECOLOGICAL SCALE IN THE DISTRIBUTION OF WATER SUPPLY

To address the research objective 3, the following statements were addressed to respondents. This section presents ecological scale in the distribution of water supply. The following statements were asked during data collection process.

5.7.1. Water as backbone of the economy in the world

Figure 5.7 represents water as a backbone of the economy in many countries. The result shows that 51.6% of the respondents agree and 40.3% of the respondents strongly agree, while only 8.1% of the respondents were not sure about water as a backbone of the economy. The findings indicate that the majority of respondents agree that water is the backbone of the economy. Singh (2017) notes that the economy would not grow if enough water supply systems did not exist, ecosystem and industries would collapse and not function if it is not for water. In 2018, uThukela District contributed 3.7% to the Provincial GDP through the sectors of agriculture, manufacturing and tourism. Therefore, lack of water hinders the growth of the economy as these sectors will not run without water which will affects the economic growth of the municipality. Oki and Quiocho (2020) also states that water is one of the most essential resources and is used practically for everything, this includes household domestic use, agricultural production and industrial use and water is needed for economic growth. Water in the municipality is also used for various reasons which include agriculture and industrial production, tourism development and domestic use. According the United Nations (2016) the economy is heavily dependent on water and problems of water shortages and water access limits economic growth and job creation.

Figure 5.7: Water is a backbone of the economy in very many countries of the world



Source: Fieldwork, (2020)

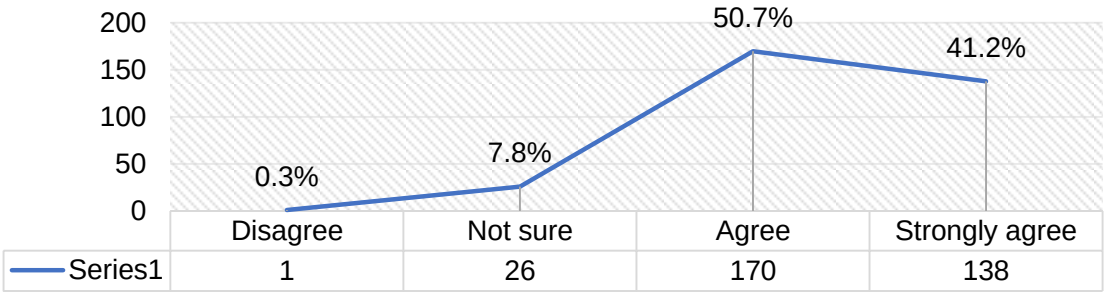
Goswami and Bisht (2017), realise that water is a key driver of sustainable economic growth and economic development. Water provides for agriculture, industries and humans, which all contributes to an increase in socio-economic development of the country as water is a source of life and prosperity.

5.7.2. Scale of the economy and provision of services in rural areas

As illustrated in Figure 5.8, it represents the result of the scale of the economy and its effects on the provision of services. The result indicates that 50.7% of the respondents agree and 41.2% of the respondents strongly agree, while 7.8% of the respondents were not sure and 0.3% of the respondents disagree about the effect of scale on the provision of services in rural communities**.** ADLM has low scale of the economy as it depends on informal economy as a means of income generation. According to Alfred Duma Local Municipality (2019/2020) it is noted that the informal economy makes a crucial impact to the social and economic life, where it contributes to job and income generation because of the relative simplicity of low requirements for education and skills. The informal economy includes the SMME sector involving wholesalers and retail trade as well and street trading is also one of the significant means of living in the district and it makes a key contribution to the social and economic life of the majority of the residents.

Alfred Duma Local Municipality (2019/2020) posit that manufacturing is mostly concentrated in Ladysmith but there are some limited industrial activities, which are located in Estcourt. The major industrial areas in ADLM include the Ezakheni industrial estate and Danskraal, whereas large manufacturing enterprises include Defy appliances, Eskom meat, Nestle, Zorbatex, Sumitomo factory tyres and Clover SA.

Figure 5.8: Scale of the economy affect the provision of services in rural areas



Source: Fieldwork, 2020

The results show that there is a relationship between the scale of the economy and provision of services. ADLM noted that economic growth in the municipality is greatly impacted by global trends which mean that in the next five years the economy in the municipality is projected to decrease by 2% growth rate (Alfred Duma, 2019/2020). The rate of the less economic growth is caused by poor planning, out migration of skilled labour, business opportunities as well as the prioritisation of social projects over economic projects. Czech (2008) posits that the issue of scale in ecological economics refers to the size of the economy relative to its containing sustaining ecosystem. The ecological economics lay emphasis on the circular exchange between firms and households and the economy with all its firms, individuals and government sectors is shown to exist within its containing, sustaining ecosystem. Therefore, this suggests that the scale of the economy affect the provision of water and sanitation services.

5.7.3. Lack of funds to supports the provision of services.

Based on Table 5.22, the result shows that 39.7% of the respondents strongly agree, 50.1% of the respondents agree while 0.6% of the respondents disagree. Only 9.6% of the respondents were not sure about the size of the economy which leads to inadequate funds available to support the provision of services. The findings suggest that the large

number of the respondents strongly agree that the scale or size of the economy affect the provision of services in the local municipalities. Alfred Duma Local Municipality (2019/2020) indicates that there is a lack of the budget in the municipality to support provision of services. Even though the municipality receive the equitable share and Municipal Infrastructural Grants (MIG) which they claimed it is not enough to capacitate the municipality and deliver their mandate. Many municipalities suffer from financial and institutional constraints in middle and low income countries which often lead to low labour productivity which poses challenges in providing high quality service (Saner, Yiu, Filadoro & Khusainova, 2015). Many local municipalities have bad financial resources to provide services to people.

Table 5.22: In most local municipalities the scale or size of the economy is lower, this lead to inadequate funds available to supports the provision of services

Response categories	Frequency	Percent (%)
Strongly disagree	0	0
Disagree	2	0.6
Not sure	32	9.6
Agree	168	50.1
Strongly agree	133	39.7
Total	335	100.0

Source: Fieldwork, (2020)

The economic growth of many local municipalities is very low as it is associated with high unemployment, poverty, lack of water and inadequate water and sanitation and lack of infrastructure (Sebova, 2015). This brings hardships to local municipalities as they cannot support the provision of services to local communities which affect the community of Ekuvukeni through having access to water for domestic use and running their small businesses. Municipalities should increase the supply of local infrastructure and services to address capacity constraints through structuring tariffs to moderate growth in consumption especially in water. Sebova (2015) suggest that small municipalities have bigger problems of efficiency and have insufficient funds for the provision of services in their local communities and thus can be determined through values of capital income and expenditure and the lower the economic efficiency of the small municipality affects the competitiveness of the whole economy.

5.7.4. Importance of local municipalities in resource sharing

As illustrated in Table 5.23, the result implies that 50.1% respondents agree, 41.2% respondents strongly agree and 8.7% respondents were not sure. The results indicate that a large number of respondents agree that the union of local municipalities in resource sharing agreement allow local municipalities to lessen the cost of goods and services it provides in the community. This means that local municipalities should also encourage resource sharing to increase the provision of services in local areas. COGTA (2009) suggest that local municipalities must join together to increase the economy of the municipality and increase the goods and services it provides to the community.

Table 5.23: The union of local municipalities in resource sharing agreement allow each municipality to lessen the cost of goods and services it currently provides to the community.

Response categories	Frequency	Percent (%)
Strongly disagree	0	0
Disagree	0	0
Not sure	29	8.7
Agree	168	50.1
Strongly agree	138	41.2
Total	335	100.0

Source: Fieldwork, (2020)

Dollery and Fleming (2005) emphasise that the union of local municipalities in resource sharing agreement that would allow each municipality to lessen the cost of goods and services it currently provides to the community. This reduction in cost would increase funds that could be used for new provision of services. Furthermore, COGTA (2009) suggest that local, national and provincial governments have a constitutional responsibility to ensure that those residing in those communities have access to sufficient drinking water.

5.7.5. Amalgamation of local municipalities can generate the scale of economy

As shown in Table 5.24, the results show that 55.5% of the respondents agree and 32.8% of the respondents strongly agree. Whereas 10.4% of the respondents were not sure, and 1.2% of the respondents disagree, the results indicate that the majority of respondents strongly agree that amalgamation of two or more councils providing and producing a huge range of services using different input combination and technological

process can increase and generate the scale of the economy. In the context of Alfred Duma Local Municipality, in August 2016, the Ladysmith Local Municipality and Indaka Local Municipality amalgamated to form Alfred Duma Local Municipality. This was done to increase the economy of scale within then municipalities and to create a strong local councils of uThukela District. Sebova (2015) states that the amalgamation of municipalities is effective as it allows a higher degree of using fixed asset owned by the municipality and municipalities may implement saving purchase of services and property in case of their effective inter-municipal cooperation. The importance of economies of scale in municipality cooperation grows and local government provide more and more public services.

Table 5.24: Amalgamation of two or more councils providing and producing a large range of services

Response categories	Frequency	Percent (%)
Strongly disagree	0	0
Disagree	4	1.2
Not sure	35	10.4
Agree	186	55.5
Strongly agree	110	32.8
Total	335	100.0

Source: Fieldwork, (2020)

The findings also agree with Dollery and Crase (2004) that municipal amalgamation is an effective engine for enhancing local government efficiency based on their economic case, which includes large councils, significance scale of the economy, economies of scope and reduce compliance and administrative cost.

5.7.6. Population growth and the scale of the economy in the provision of water and sanitation services

From Table 5.25, an increase in population affects the scale of the economy in the provision of water and sanitation services. The result shows that 31.3% of the respondents strongly disagree and only 0.3% of the respondents strongly disagree. However, 49.6% of the respondents agree and 5.4% of the respondents disagree and 13.4% of the respondents were not sure. The results indicate that population growth affect the scale of the economy in the provision of water services. The ADLM indicates

that there is a growing population within the municipality. This is caused by both natural increase and in-migration (IDP, 2019/2020). According to Stats SA (2011) the population of ADLM was 339 777 and Stats SA (2016) indicates a population growth of 356 247. This shows that the population of ADLM has increased by 16470 from 2011 to 2016. The municipality suggest that an increase in population growth is caused by movement of people from local areas to the city to search for urban opportunities such as employment and access to basic services. At a theoretical level, the results agree with the Malthusian view regarding the population growth that an increase in population growth reduces the available water resources, prompting an increase in the size of the population, which lead to a decline in income per capita which affect the ecological scale in the provision of water and sanitation services in rural areas as there are limited resources to support the present population.

The results are supported by Saner et al., (2015) who suggest that there are many challenges in access to water which include factors such as pollution, population growth and poor allocation and distribution of resources which place severe pressures on sufficient and equitable water supply and sanitation. Biswas (2007) also points out that due to increasing population, there will be a water shortage in future and the present trend will affect available water resources. This will affect existing water planning, management and allocation of water resources.

Table 5.25: An increase in population affects the scale of the economy in the provision of water and sanitation services

Response categories	Frequency	Percent (%)
Strongly disagree	1	0.3
Disagree	18	5.4
Not sure	45	13.4
Agree	166	49.6
Strongly agree	105	31.3
Total	335	100.0

Source: Fieldwork, (2020)

Oki and Quiocho (2020) also notes that there is a challenge between spatial distributions of population growth with relation to available water resources, as

population increases the infrastructure to manage and produce water supplies cannot cope with the progressively growing demand. This affect the available water resources as an increase in population reduces the available water resources, this affect the ecological scale in the provision of water and sanitation services in rural areas as there are limited resources to support the present population.

Singh (2017) note that the higher the standard of living, the greater the water use. In general, the world is urbanizing rapidly such that by 2050, 70% of world's population will live in urban areas and developing countries population growth increases every year and this limits access to water and sanitation. This suggests that the growing populations are competing for limited water sources. Simukonda, Farmani and Butler (2018) posit that rapid increases in water demand are caused by an increasing population in developing countries. This will affect the available water resource in the world.

5.7.7. Effect of poverty and employment ecological distribution of water

Table 5.26, represents the effect of poverty and employment on ecological distribution of services in the community. The results indicate that 43.3% of the respondents agree, 38.2% of the respondents strongly agree and 11.9% of the respondents were not sure. The results also show that 5.4% of the respondents disagree and 1.2% of the respondents strongly disagree. The results indicate that the majority of the respondents agree that poverty and employment affect the ecological distribution of services in rural areas. The Alfred Duma Local Municipality (2019/2020) reveal that the areas within the municipality are mostly rural areas where job opportunities appear to be a challenge. This is due to the high number of poor in the communities and the characteristics of the area in which most of the surrounding areas within the ADLM is rural; therefore, there are large amounts of indigent consumers. Therefore, the results show that water is crucial and communities mainly used water for agriculture, for example, water is required to produce fibre, food, timber and fuel-wood. Such use can assist to reduce poverty and increase the incomes of people who depend on water-based agriculture, including subsistence and commercial farmers (Water Research Commission, 2004).

Table 5.26: Age range and perceptions that poverty and employment affect the ecological distribution of services in rural areas Cross tabulation

Age range		Poverty and employment affect ecological distribution of services in rural areas					
		Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Total
18 – 25	n	0	6	13	53	40	112
	% of Total	0.0%	1.8%	3.9%	15.8%	11.9%	33.4%
26 – 35	n	1	5	12	53	43	114
	% of Total	0.3%	1.5%	3.6%	15.8%	12.8%	34.0%
36 – 44	n	3	5	12	19	27	66
	% of Total	0.9%	1.5%	3.6%	5.7%	8.1%	19.7%
45 – 59	n	0	2	3	13	17	35
	% of Total	0.0%	0.6%	0.9%	3.9%	5.1%	10.4%
60 and Above	n	0	0	0	7	1	8
	% of Total	0.0%	0.0%	0.0%	2.1%	0.3%	2.4%
Total	n	4	18	40	145	128	335
	% of Total	1.2%	5.4%	11.9%	43.3%	38.2%	100.0 %

Source: Fieldwork, (2020)

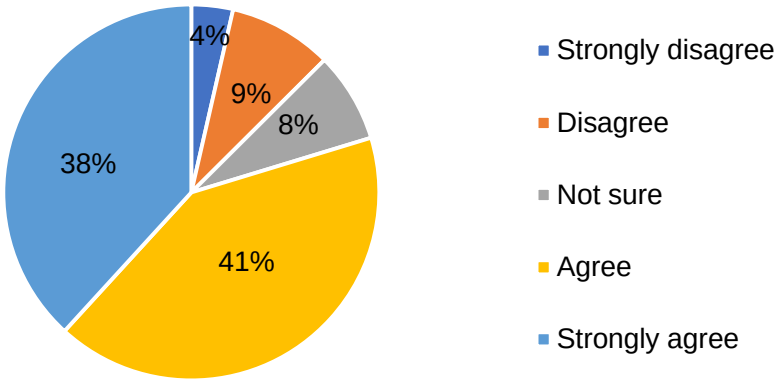
Therefore, water can help communities to fight poverty as projects grow, then employment is generated for the local community and provide income for households. As time goes by community projects can become a business that sells its product on a local, regional and even in the international markets and contribute to the local economic development and to economic growth of the country (DWAF, 2006). Therefore, water is the most vital resource in life and living organisms cannot survive without it and agriculture which is the backbone of human survival cannot succeed without the availability of water.

5.7.8. Water should be treated as a basic human right not as an economic good

Based on Figure 5.9, it represents the Pie charts of respondents on water should be treated as a basic human right. The results indicated that 41% of the respondents agree and of the 38% respondents strongly agree, while 9% of the respondents disagree and 4% of the respondents strongly disagree. It is only 8% of the respondents who were not sure. The results show that the majority of respondents approve that water should be treated as a basic human right and not as an economic good. There is a high number of poor and indigent people from the communities and the ADLM have challenges of high poverty rates and unemployment, so if water is treated as an economic good many

communities within ADLM cannot afford to pay for water services. The South African constitution safeguards citizen the rights to equitable access to water which is also supported by Free Basic Water Policy which acknowledge the fundamental rights of all people to basic water. Government is responsible to realise the right to water to the citizens. If water is treated as an economic good, the worry is that where will municipalities get the money to increase the amount of FBW they are providing from? The other key issue is national and provincial government departments, other state entities and businesses who owe municipalities' money from water bills they did not pay which affect the provision of water services.

Figure 5.9: Water resource should be treated as basic human right not as economic good



Source: Fieldwork, (2020)

The results are also supported by Saner et al., (2015) who argue that water resources should be treated as common good that cannot be commodified as access to water is a human right. Therefore, water is essential to life and is therefore a human right that cannot be governed by economics. The findings suggest that water is a fundamental human right to every people. The Constitution of the Republic of South Africa also support that everyone has the right to have access to sufficient water. United Nations (2005) argue that water is important and pricing should not prevent the poor from consuming it. Therefore, particularly in developing countries water should be free where many households receive subsidised water (Burger and Jansen, 2014).

5.7.9. If water is treated as an economic good it only favours economic growth

In Table 5.27, the results indicate that 38.5% of the respondents agree and 27.8% of the respondents strongly agree. It also indicates that 11.0% of the respondents disagree and only 8.4% of the respondents strongly disagree. Looking at the results, the findings indicates that the majority of the respondents agree that if water is treated as an economic good, it only favours economic growth which deny people from basic human rights. This study maintains that water should be treated as a basic human right and it is supported by the Constitution of South Africa that everyone has a right to water and water should be available without cost. The findings are supported by Khadzi (2010) who argue that many people in South Africa mostly in rural areas are against the water pricing policy because water should be treated as basic human rights. Livingston (2019) argues that if water is treated as an economic good it only favours economic growth and this deprive people to water as a basic human right. As the economic growth of Alfred Duma Local Municipality is very low and many people are unemployed, this shows that they cannot pay for water services.

Table 5.27: If water is treated as economic good it only favours economic growth and this deprive people to water as basic human right

Response categories	Frequency	Percent (%)
Strongly disagree	28	8.4
Disagree	37	11.0
Not sure	48	14.3
Agree	129	38.5
Strongly agree	93	27.8
Total	335	100.0

Source: Fieldwork, (2020)

5.8. SECTION E: THE ROLE OF A LOCAL MUNICIPALITY IN EQUITABLE ACCESS TO WATER

To address the research objective 4, the following questions were addressed to respondents. This section presents the role of a local municipality in equitable access to water. The following questions were asked during data collection process.

5.8.1. Gender perceptions on the role of municipalities in equitable access to water in rural areas

As illustrated by Table 5.28, the study represents the findings based on gender and perceptions that the municipality play its role in equitable access to water in rural areas. The result implied that 28.7% of the respondents disagree and 28.7% of the respondents are not sure about the role played by the municipality in equitable access to water. Nonetheless, 19.7% of the respondents strongly disagree, 17.0% of the respondents agree and 6.0% of the respondents strongly agree. The Alfred Duma Local Municipality (2019/2020) stipulates that municipalities are constitutionally responsible for the delivery of basic services to its communities as approved by national legislation, policies and directives. Although UThukela District Municipality is WSA, the municipality, UThukela Water and Umgeni Water are the WSPs, they provide water services on behalf of the WSA provided that there is a signed WSDP and agreement between a municipality and Umgeni Water in alignment with the norms and standards of water provision. The results indicate that there is a strong contrast between the respondents in a role played by the municipality in providing water to the community.

Table 5.28: Gender and perceptions that the Municipality play it role in equitable access to water

Gender		Municipality play its role in equitable access to water in rural Local					
		Strongly disagree	Disagree	Not sure	Agree	Strongly agree	Total
Male	N	19	28	35	28	12	122
	% of Total	5.7%	8.4%	10.4%	8.4%	3.6%	36.4%
Female	N	47	68	61	29	8	213
	% of Total	14.0%	20.3%	18.2%	8.7%	2.4%	63.6%
Total	N	66	96	96	57	20	335
	% of Total	19.7%	28.7%	28.7%	17.0%	6.0%	100.0 %

Source: Fieldwork, (2020)

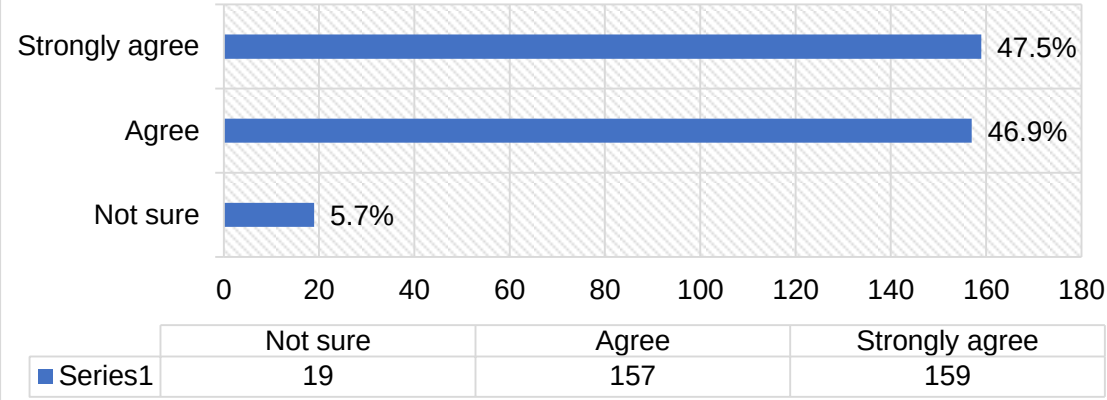
In 2003, municipalities were given the role of providing water and sanitation to communities. The results are also supported by the Alfred Duma Local Municipality (2019/2020) that there is unequal service delivery within the municipality where urban areas needs are well taken care of whereas rural areas' needs are neglected. This suggests that uThukela is not playing its role in equitable access to water. It has been

reported that service delivery is slowed by high rates of aging infrastructural services which are the results of water theft and vandalism and have been reported to disrupt service delivery to take place and insufficient resources for installation of infrastructure to be able to implement municipal catalytic project (Alfred Duma Local Municipality, 2019/2020).

5.8.2. Indigent policy

In the Figure 5.10 the views about the fact that the Municipality System Act proclaims that the municipality must develop an indigent policy that assist the poor household to access municipal services such as safe drinking water are presented. The result shows that 47.5% of the respondents strongly agree, while 46.9% of the respondents agree and only 5.7% of the respondents were not sure about the existence of indigent policies as stipulated in the Municipality System Act. The findings suggest that many of the respondents are in line with the indigent policy to uplift local communities in ensuring that communities have access to water and sanitation services. The UTDM created an indigent policy which represents an indigent support programme for providing procedures and guidelines for the subsidisation of service charges to indigent households in its area of authority and also to expand the quality of life of the communities by helping them to exit from deprivation. The cost of the social package of the registered indigent households is largely financed by national government through the local government equitable share received in terms of the annual Division of Revenue Act. According to Alfred Duma Local Municipality (2019/2020) they had implemented an Indigent Drive in all Wards under the municipality where officials visited Wards to collect indigent applications.

Figure 5.10: Municipality Systems Act proclaims that the municipalities must develop the indigent policy that assist the poor household to access municipal services, such as safe drinking water



Source: Fieldwork, (2020)

The Municipality received 4500 applications and managed to approve only 965 applications due to system challenges and time constraints the municipality has managed. These findings show that where there is a presence of municipal indigent support policy, it is not being followed and often vague in targeting indigent groups, thereby a blanket approach to free basic service delivery is exploited. Therefore, this approach shows poorly on leadership as accountability and commitment towards targeting poor and vulnerable households is avoided as the municipality as out of 4500 applications, they only approve 965 due to system challenges and time constraints. The Municipality Systems Act proclaims that the municipalities must develop an indigent policy that assists the poor households to access basic municipal services, such as safe drinking water and adequate sanitation.

5.8.3. Decision making is important for both municipality and community

According to Table 5.29, it is observed that 47.5% of the respondents strongly agree, 46.9% of the respondents agree while only 5.7% of the respondents were not sure that the role of decision making with regards to equitable access to water is important for both the municipality and the community are not sure about the decision-making process. These findings suggest that the majority of the respondents strongly agree that the role of decision making is important for both local communities and the municipality. ADLM is facing challenges of poor communication and understanding of roles and

responsibilities between a local municipality, district municipality, municipal internal sector department's councillors, officials (Alfred Duma Local Municipality, 2019/2020).

A community with a greater percentage of the population not knowing about the access to water and management of water resource is of concern. This might be due to the lack of effective communication between suppliers of water and users to the Alfred Duma Local Municipality. This means that people do not know what needs to be done and where. According to ADLM they have developed Ward committee which encourage participation in the community to make the council aware of the needs and concerns of community and keep people informed of the activities in the municipality. The municipality also established the representative forum that represents the interest of residents at the municipality in the participation of IDP process.

Table 5.29: The role of decision making with regards to equitable access to water is important for both the Municipality and the community

Response categories	Frequency	Percent (%)
Strongly disagree	0	0
Disagree	0	0
Not sure	19	5.7
Agree	157	46.9
Strongly agree	159	47.5
Total	335	100.0

Source: Fieldwork, (2020)

The results are also supported by Sultana (2009) who states that it is vital for civil societies to participate in projects in order to enhance equity, efficiency and greater ownership towards projects which increases better knowledge on water resource management and greater ecological sustainability. According to the Constitution of South Africa 1996, municipalities should involve local communities in the review and implementation of the municipality's performance (DWAF, 2008). This means that communities should be involved in water decision making and local experiences to be considered and practical arrangements for reliable water supply should be made.

5.8.4. Community expectation with regards to water provision in the community

According to Table 5.30, the respondents indicated that the municipality has not met the community expectation with regards to water provision; it is indicated that 39.1% of the respondents disagree and 24.2% of the respondents strongly disagree. The results also indicate that 9.3% of the respondents agree, 0.9% of the respondents strongly agree and 26.6% of the respondents were not sure. The results show that a large number of the respondents indicate that the municipality has not met the community's expectation regarding access to water provision in the community. This shows that many municipalities are failing to provide access to water in rural communities. This is supported by Berkowitz (2009) who states that the problem is mainly noteworthy in small municipalities taking care of rural communities and this is not a challenge for large municipalities and metropolitan areas. This has contributed to what may be defined as levels of municipal non-viability, both financially and in respect to functional performance, socio-economic vulnerability and an inability to manage infrastructure development and investment.

Table 5.30: The municipality has met the community expectation regarding access to water provision in the community

Response categories	Frequency	Percent (%)
Strongly disagree	81	24.2
Disagree	131	39.1
Not sure	89	26.6
Agree	31	9.3
Strongly agree	3	0.9
Total	335	100.0

Source: Fieldwork, (2020)

5.8.5. Alfred Duma Local Municipality/UThukela District Municipality provides 6 kls of free basic water

Table 5.31, represent whether the municipality provides 6kl of water to the households. The result indicates that 31.0% of the respondents strongly disagree and 30.7% of the respondents disagree while 27.8% of the respondents agree. Only 10.4% of the respondents agree. The majority of households strongly disagree that the municipality provides 6kls of water to the community. The findings suggest that the majority of respondents tend to be differing that the municipality do not provide 6kl of water to the community. The ADLM suggests that there is unequal service delivery that is more

urban bias at the negligent of rural communities. This shows that rural communities are neglected in service delivery. It has been indicated that municipalities provide FBW to most citizens who are financially stable than the indigent that needs it. This has resulted to unequal resource allocation between rural and urban areas and between the rich and poor social categories (McDonald and Pape 2002; Loftus, 2005 a; Loftus, 2005 b; McInnes, 2005; Greenberg, 2005).

Table 5.31: Alfred Duma Local Municipality/uThukela District Municipality provides 6kl of water to households

Response categories	Frequency	Percent (%)
Strongly disagree	104	31.0
Disagree	103	30.7
Not sure	93	27.8
Agree	35	10.4
Strongly agree	0	0
Total	335	100.0

Source: Fieldwork (2020)

The DWA is expected to make sure that everyone in the country who cannot afford to pay for water services should have equitable access to water of at least a basic level of service of 25 litres per person per day. The Free Basic Water policy suggest that municipalities should provide a subsidised six kilo-litres (6kl) of water to indigent households (DWAF, 2001) and it was introduced as one of the mechanisms to address poverty and inequality issues suffered by the marginalised people. This result shows that many people still cannot claim their fundamental right to water, whereas equitable access to water aims at ensuring that all groups have the opportunity to equitable benefits from access to water and participate in water.

5.8.6. Water quality

Table 5.32 represent the water services quality rendered by the municipality; the results show that a large number of respondents disagree and also fewer respondents agree. The results indicate that 37.9% of the respondents disagree and 28.1% of the respondents strongly disagree. It is also observed that 12.5% of the respondents agree and while 0.6% of the respondents strongly agrees. It can also be observed that only 20.9% of the respondents were not sure. These results show that the equitable access to water rendered by the municipality is not excellent and the quality of water is not in a

good condition. Hunter et al., (2010) notes that in rural communities, water is usually poor in quality, quantities and it is not easily accessible. This is because many households cannot afford the cost of minimum water supply and sanitation services, receive subsidised water and sanitation services from the government.

Table 5.32: I rate the equitable access to water services rendered by Alfred Duma/ uThukela District Municipality as excellent.

Response categories	Frequency	Percent (%)
Strongly disagree	94	28.1
Disagree	127	37.9
Not sure	70	20.9
Agree	42	12.5
Strongly agree	2	0.6
Total	335	100.0

Source: Fieldwork, (2020)

Van Koppen et al., (2017) suggest that lack of equitable access to water and good quality water contributes to unending poverty, through the economic costs of poor health and high proportion of household expenditure necessary for water supply in many poor communities. Water provided to local communities should be hygienic and unpolluted. Therefore, provision of clean water to rural communities can lessen the outbreak of water related diseases such as cholera, since people will refrain from using water drawn from contaminated rivers and streams.

5.9. HYPOTHESIS TEST OUTCOME

Finally, in this section, the researcher provides answers and discusses the test results of the hypothesis established by the study. To test the null hypothesis (H_o), the study assumed that “there is no statistically significant relationship between ecological scale, decentralisation, women participation in decision making and equitable water access within the Alfred Duma Local Municipality”. The alternative hypothesis (H_A) presumed that “there is a statistically significant relationship between ecological scale, decentralisation, women participation in decision making and equitable water access within the Alfred Duma Local Municipality”. Determining the right statistic formed part of the hypothesis test. Since the variables were categorical and rank ordered, the study adopted the Chi-square technique in determining the associations between the variables. The Chi-square was utilised because it is a nonparametric and a distribution

free technique which did not strictly require normality of the sample distribution utilised by the study. With 95% confidence interval and error margin of (e) = 0.05, the decision rule for the hypothesis test was stated as "accept (H_o) if p-values are greater than (>) 0.05 and do not accept (H_o) if p-values are less than or equal to (≤) 0.05".

Table 5.33: Relationship between ecological scale, decentralisation, women participation in decision making and equitable water access within the Alfred Duma Local Municipality

Observed (OB) and Expected (EX) scores

	Agree		Strongly agree		Not sure		Disagree		
Variables	OB	EX	OB	EX	OB	EX	OB	EX	N
Ecological scale	170	83.8	138	83.8	26	83.8	1	83.8	335
Decentralisation	185	111.7	53	111.7	47	111.7	50	111.7	335
Women participation	142	111.7	100	111.7	27	111.7	66	111.7	335
Water access	165	83.8	128	83.8	41	83.8	1	83.8	335

a. 0 cells (0.0%) have expected (EX) frequencies less than 5.

From Table 5.33, the findings showed that the least expected score (EX) was (83.8) and the highest (111.7), meaning none of the EX frequencies for the cells were less than 5, a condition which meant that the analysis did not violate the conditions associated with chi-square test. From Table 5.32, the finds showed the Chi-square (χ^2) values for the variables were; ecological scale (χ^2= 245.549[a], df = 3, p-value = 0.032, and n=335); decentralisation (χ^2= 86.281[b], df =2, p-value = 0.025 and n = 335); women participation (χ^2= 664.987[b], df = 2, p-value = 0.01 and n = 335) and equitable water access (χ^2= 205.788[a], df = 3, p-value = 0.013 and n = 335). From Table 5.32, since the p-values of the χ^2 statistics were less than critical value (i.e. alpha level of 0.05), the results meant that there exists a statistically significant relationship between the variables. Therefore, from the decision rule on the region of acceptance of the null hypothesis (H_o), the study did not accept the null hypothesis (H_o), but rather accepted the alternative hypothesis (H_A).

Table 5.34: Effects of ecological scale, decentralisation, women participation in decision making and equitable water access within the Alfred Duma Local Municipality

Test Statistics

(χ^2) statistic	Ecological scale	Decentralisation	Women participation	Water access
Chi-Square	245.549[a]	86.281[b]	98.872[b]	205.788[a]
Df	3	2	2	3
Asymp. Sig.	0.032	0.025	0.001	0.013

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 83.8.
b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 111.7.

Hence, the study proceeds to conclude based on the hypothesis test results that in the Alfred Duma Local Municipality, the ecological scale, decentralised approach to water, women participation in decision making and access to water are significantly associated with equity and human rights to potable water and sanitation delivery among the population. Therefore, to improve rights to water and sustain drinking water access, the Municipality should develop strategies for effective ecological conservation, promote decentralisation, and encourage the participation of women in policies and decision making on water in order to improve rights of the local people to have equal access to water in the communities. This is supported by Khadza (2010) who notes that good governance is a main pillar of water management, which improves various aspects, such as building capacity, promoting decentralization, research and learning at all levels and strengthening monitoring and evaluation.

Olum (2014) argues that the aim of decentralisation is to redesign the governmental system to promote efficient and effective service delivery to enhance local participation and make local economies more prosperous and equitable. Women tend to be more vulnerable to equitable access to water and sanitation than men and this is because women are hindered by their social roles and positions in water access (Figueiredo and Perkins, 2013). The findings of the study also agree with the Dublin's Principle 4 of IWRM which state that women should play a central role in the provision, management and safeguarding of access to water. This principle acknowledges that women should be involved in decision making process and implementation at all levels of water issues. Therefore, accepting alternative hypothesis was valid to the study as it emphasise the

relationship between the ecological scale, decentralisation, women participation and water access.

5.10. Conclusion

From the findings of this study, it is also evident that Alfred Duma Local Municipality needs a well-coordinated and pro-active governance and management of equitable access to water. Such governance requires that all stakeholders commit themselves towards transforming communities for the better. Proper and effective management could be helpful in ensuring that the scarce resources needed to transform communities, are utilised judiciously for the equal benefit of all in the Municipality. It would further require skilful and insightful personnel in the municipality to successfully drive the vehicle of sustainable service delivery. The following chapter presents a summary of findings and formulate a set of conclusions based on the overall research and provides recommendations that can be implemented to achieve equal access to water in rural communities.

CHAPTER SIX: SUMMARY, RECOMMENDATIONS AND CONCLUSION

6.1. Introduction

This chapter focuses on the summary, recommendations and conclusions. The summary is based on the main findings while the conclusion is based on the objectives and research questions. The chapter also provide the recommendations for addressing the equitable access to water challenges as well as providing possible solutions to enable equitable access to water to take place in rural communities. Therefore, this chapter is divided into three parts consisting of a summary of research findings in line with objectives, recommendations, suggestion for further research as well as conclusion.

6.2. Brief summary of research objectives

The study was meant to achieve a set of objectives that were linked to the research questions of the study. The study set to achieve the following objectives: To explore the equitable access to water in rural areas, to establish the ecological governance framework that supports the access to water in local areas, to investigate the ecological scale in the distribution of water supply services in rural areas and to investigate the role of local municipality in equitable access to water. Below is the summary of findings in line with the research objectives.

6.2.1. OBJECTIVE 1: To explore the equitable access to water in rural areas

Global Water Partnership (GWP) (2000) contends that equitable access to water aims at satisfying the need and rights of people and people must be in the centre of water management to ensure social equity goals of access to water. The study results reveal that water is a basic human right at which government should supply at no cost. Equitable access to water aims at ensuring that all vulnerable and marginalised groups have the opportunity for meaningful participation in water and equitable benefit from water access. However, many people still cannot claim their fundamental right to water. This brings challenges to disadvantages and marginalised groups socially, economically and environmentally. The results also indicate that Alfred Duma Local Municipality have challenges of inequitable access to basic services where vulnerable and marginalised groups still have no access to water. The results indicate that there is unequal service delivery access to basic services where urban areas are well provided with basic

services whereas in rural areas services backlog is still very high. Equitable access to water should ensure that all vulnerable and marginalised groups have the opportunity for meaningful participation in water and equitable benefit from water access, but this is not happening at ADLM.

The high rates of aging infrastructural services which are the results of water theft and vandalism have been reported to disrupt service delivery to take place in surroundings communities. Jayyousi (2007) presents an alternative argument that it is problematic to treat water just like any commodity that is priced in such a manner that only few could afford to purchase it as water has a social value, social good and human rights with. The findings also suggest that equitable access to water is also hindered by poverty and high unemployment rate which is the main issue in rural communities. This means that a community cannot pay for water services as they depend on social grants for living and the municipality have the low scale of the economy.

6.2.2. OBJECTIVE 2: To establish the ecological governance framework that supports the access to water in rural areas.

The study establishes the ecological governance that supports access to water. It was found that the ecological governance framework underpinning water services supply in South Africa was important to realise that the regulatory framework should always be the first focus on understanding of the significance of providing basic services such as water to local community. Therefore, the researcher found that it is crucial to put in place an effective framework in order to ensure that the country's water resources are protected, used efficiently, developed, managed and controlled in a sustainable and equitable manner to benefit of all people.

The findings suggest that many people do not understand the ecological governance frameworks that govern access to water, this include the Free Basic Water Policy, Water supply and sanitation policy and Water Services Act (108 of 1997). This is caused by the level of education in the municipality, which deprive people from the knowledge of ecological governance framework. Therefore, this become a problem as without the common understanding of legislation it becomes difficult to manage the access to water efficiently, effectively and economically. The findings of the study also

reveal that ADLM is facing challenges of poor communication between local municipality, district municipality, municipal internal sector department's, councillors and officials. Therefore, ADLM needs to take initiatives and be well coordinated in managing equitable access to water. This should be done in introducing the voice of citizens within the framework of decision making which would enable the people to participate and ensure accountability and transparency in the decision-making process. Medeiros & Sivapalan (2020) recognizes that water governance is still problematic as knowledge is poorly accessible and the participation of society in water resource management and is one of major issues in achieving sustainability and water management. Therefore, water governance must be in the centre of water management as it ensures that the needs and interest of the people are presented in the fair and in a transparent manner through ensuring the participation of poor in decision making and enhance the role of the community in water management. The results also suggest that women in rural communities have no voice in decision making process and this deprive them from water resource management as it is indicated in the findings. Women should be encouraged to be motivators of water resource management and they should be fully involved in operation and maintenance of water development schemes (Winter, Barchi and Dzombo, 2018). Therefore, proper governance and effective decentralisation could be helpful in ensuring that the scarce resources needed to transform communities, are utilised carefully for the equal benefit of all people in the Municipality. It is therefore unfortunate that the community and decentralisation to achieving water sustainability are ambiguous and sarcastic.

6.2.3. OBJECTIVE 3: To investigate the ecological scale in the distribution of water supply in rural areas

The study investigates the ecological scale in the distribution of water supply in the rural areas. Water is a backbone of the economy where the economy is heavily dependent on water and problems of water shortages and water access limits economic growth and job creation. The study shows that the scale or size of the economy affects the provision of services in the local municipalities. The economic growth of Alfred Duma Local Municipality is very low as it is associated with high unemployment, poverty, lack of water and inadequate water and sanitation and lack of infrastructure. This brings

hardships to the municipality as they cannot support the provision of services to local communities.

Municipalities need to increase the supply of local infrastructure and services to address the capacity constraints as well as structuring tariffs to moderate growth in consumption especially in water. Dollery and Crase (2004) posits that municipal amalgamation is an effective engine for enhancing local government efficiency based on their economic case, which includes large councils, significant scale of the economy, reduce administrative and compliance cost and economies of scope. The results suggest that if a municipality can amalgamate and work together, they can achieve a large volume of activities. The increase in population growth also reduces the available water resources which affect the ecological scale in the provision of water services in rural areas as there are limited resources to support the present population. It is, therefore unfortunate that the scale of the economy at Alfred Duma Local Municipality is very low and it cannot provide adequate services to community.

6.2.4. OBJECTIVE 4: To investigate the role of local municipality in equitable access to water.

The study investigates the role of local municipality in equitable access to water. The researcher found that the municipality has challenges of understanding of roles and responsibilities between local municipality, district municipality, municipal internal sector departments and councillors. The researcher also found that there is a challenge of migration of skilled and competent labour from the municipality which pose a challenge in delivering equitable access to water in communities.

The national and provincial governments have the responsibility to ensure that they assist local municipalities in ensuring that communities have access to equitable access to water, in doing so they would be fulfilling the constitutional mandate which is to redress the injustices of the past. It has been indicated that municipalities provide FBW to most citizens who are financially stable than the indigent that needs it. There is unequal service delivery within the municipality where urban areas needs are well taken care of, whereas rural areas' needs are neglected. Small municipalities are particularly

affected by water management systems and dysfunctional institutions (Clifford-Holmes, Palmer, De Wet, and Slinger, 2016; COGTA, 2009). Mjoli, Sykes and Jooste (2009), notes that no municipalities in South Africa have yet achieved a situation where all the indigent in their areas of jurisdiction have gained access to basic services. This suggests that ADLM is not playing its role in equitable access to water and the municipality has failed in providing free basic water supply as many rural people still struggling in receiving adequate water supply.

The municipality should remember that water sustains different aspects of life in the communities which includes food production, tourism and running businesses, therefore water is the crucial natural resources. The municipality should remember that in supplying water to their communities that water sustains various aspects of life including tourism, agriculture, and alleviation of poverty. Therefore, it is important that in delivering water to the communities the government both locally and nationally take into consideration that water is needed for more mere drinking or domestic purposes. It is vital for the local municipality to establish a shared vision to act responsibly in finding a possible solution to managing and conserving the water resources and build a relationship with all stakeholders.

6.3. RECOMMENDATIONS

Based on the above-mentioned major findings, the following recommendations are made in order to improve the equitable access to water in Alfred Duma Local Municipality:

- To improve unequal service delivery access to basic services at the municipality where urban areas are well provided with basic services whereas rural areas' services backlog is still very high. The municipality must ensure that equitable access to water reach all the vulnerable and marginalised groups have the opportunity for meaningful participation in water and equitable benefit from water access. This can be done through increasing subsidies in providing reconstruction and development programme (RDP) house as they come up with flush toilets and house connections.

- To improve equitable access to water in local areas, equity in water should also be promoted to ensure effective water resource management. The municipality should also increase the free basic water allocation from 6kl to 9kl in line with the constitution that requires municipalities to take reasonable legislative measures, within the available resources to achieve the progressive realisation of the right of access to sufficient water as access to water and sanitation to communities.
- The municipality need to improve the infrastructure in the community and possibly extend the water reticulation supply to the community. The current water infrastructure is old and is unable to cope with the increasing access to water and water supply demands which are likely to exceed the current supply. The municipality should conduct maintenance and routine cleaning of water services and reservoirs to ensure that the supply of water is safe to prevent the outbreak of waterborne diseases.
- The municipality should introduce water awareness campaigns to teach the residents of Ekuvukeni on how to respect and care for the infrastructure and how to use the water wisely. Awareness campaigns should also be put in place to ensure effective way of communication between the public and the municipality.
- To improve ecological governance framework, proper governance and effective decentralisation could be helpful in ensuring that the scarce resources needed to transform communities, are utilised carefully for the equal benefit of all people in the Municipality. Therefore, improving water rights water and sustain equitable access to water; the Municipality should develop strategies for effective ecological conservation and promote decentralisation.
- The Alfred Duma Local Municipality should ensure that the community are aware of the legislation that governs water management as it forms part of the water service delivery. Therefore, all the stakeholders, role-players and public society should have a clear understanding and make the community members aware that it is their constitutional right to access equitable access

to water. The municipality should establish a public relations department as part of the IDP process or water committees per project implemented in the area.

- The Municipality should encourage the participation of women in decision making process in water resource management. This increases the role of women in water resource management and promotes women empowerment.
- Women should be encouraged to take action to increase access to safe water and appropriate sanitation. Women's networks and collaborations are some of the main players who assist to make the right to water a reality for everyone at all levels.
- A municipality should develop a proper water resource services management strategy that is all comprehensive and should be implemented. This should clearly define the roles that need to be played by the different role-players. It should include actions that need to be followed to effective ways of monitoring the implementation of the management strategy and approaches to evaluate the progress at different intervals.

6.4. Suggestion for future research

This research opened doors for future research. It identified the challenges faced by municipalities in terms of equitable access to water and its impact on the service delivery plan. The following motivations for further research are identified to improve the capacity of South African local municipalities to deal with equitable access to water challenges:

- Water governance approaches and decentralisation practises need to be further researched; this includes participation from local people which contributes to the effective service delivery process in communities.
- The research only focuses on equitable access to water in rural areas for further research should compare the access to water in both rural and urban areas.

6.5. Conclusion

Water is a unique natural resource, since it is essential for the survival of all forms of life. Access to water is a fundamental need for the poor, and therefore should be an essential component of efforts to alleviate poverty. The study concludes that there is a statistically significant relationship between the variables of ecological, decentralisation, women and equitable water. Equitable access to water aims at ensuring that all groups have the opportunity for meaningful participation in water and equitable benefit from water access. The result suggests that many women feel disempowered and marginalised in the process of decision making. Women inclusion in governance must be in the centre of water management as it ensures that the needs and interest of the poor are presented in the fair and in a transparent manner.

The study concludes that the FBW policy and its implementation have been criticized by rural communities for failing to reach all the poor and the municipal inability to provide the community with water services has been identified as one of the short fall of Free Basic Water Policy. The study further concludes that water is a basic human right and a backbone of the economy and also concludes that it is important for local experiences to be considered and involved communities in decision making and make practical arrangements for water supply. This must be done through the empowerment of woman in decision making process. The ecological scale, decentralised approach to water, women participation in decision making and access to water are significantly associated with equity and human rights to potable water and sanitation delivery among the population.

REFERENCES

Abrahams, Y., Mhlongo, S., & Napo, V., (2011). A gendered analysis of water and sanitation services policies and programmes in South Africa: 2006-2010, *Gender and Development*, 25(2), 71-79

African Development Bank, (2009). *Handbook on Stakeholder Consultation and Participation in ADB Operations*. Abidjan: African Development Bank.

African Ministerial Council on Water (2000) *Africa Water Facility-Instrument for the Establishment of the African Water Facility Special Fund*. Accra: Africa Water Task Force.

Aladuwaka, S. & Momsen, J. (2010), Sustainable development, water resources management and women's empowerment: the Wanaraniya Water Project in Sri Lanka*, Gender & Development*, 18(1), 43-58

Alfred Duma Local Municipality (2019/2020) Integrated Development Plan (IDP), IDP Review Alfred Duma Local Municipality

Alfred Duma Local Municipality (2017) Integrated Development Plan (IDP) Review

Amdur, R., (2003) *Informed Consent Feedback evaluation tool*, Institutional Review Board and Function, Jones and Bartlets

Babbie, E. & Mouton, J. (2010), *The Practice of Social Research*. 10th Ed, Republic of South Africa, Oxford University Press Southern Africa, Cape Town.

Bacon-Shone, (2013), *Introduction to Quantitative Research Methods.* Hong Kong: Graduate School, the University of Hong Kong.

Bailey, D. (2012), *Ethical Leadership and Political Culture in Local Government Free Basic Services in Rural Kwazulu-Natal*, The Built Environment Support Group (BESG)

Bakker, K. (2007), The “Commons” Versus the “Commodity”: Alter-globalization, anti-privatization and the human right to water in the global south*. Antipode*, 39(3), 430-455.

Bazaanah, P., (2020), Political Ecology of Water Resource Governance in Ghana: Towards Sustainable Pathway for Decentralization and Participatory Water Supply in Rural Communities of the Savannah Region, *International Journal of Political Science and Development,* 8(6), 252-279

Berkowitz, P., Dugard, J., Smith, L and Tissington, K. (2009), South Africa is rethinking its decentralized water services, International research council (IRC), [Online] Available: http://www.irc.nl/page/50400

Biermann, F., Kanie, N., & Kim, R.E., (2017), Global governance by goal setting: the novel approach of the UN Sustainable Development Goals, *Current opinion in environmental sustainability*, 26(27), 26-31

Biswas A.K., (2008). Integrated Water Resources Management: Is It Working? *Water Resources Development*, 24(1), 5-22

Biswas, A.K. &Tortajada, C. (2008), Future Water Governance: Problems and Perspectives. Water Resource Development, 2(2), 129-139

Blumberg, B., Cooper, D.R., & Schindler, P.S., (2005), *Business Research Methods*, McGraw-Hill Education

Bond, P., Ruiters, G. And McDonald, D.A. (2003). "Water Privatization in Southern Africa: The State of Debate," *ESR Review*, 4(4), 11-13.

Breuer, A., Janetschek, H., & Malerba, D. (2019). *Translating Sustainable Development Goal (SDG) Interdependencies into policy advice: Sustainability*. Bonn, Germany: MDPI German Development Institute (DIE).

Bryman A. (2004), The Debate about Quantitative and Qualitative Research: A Question of Method or Epistemology? *The British Journal of Sociology*, 35(1), 75-92.

Bryman, A., & Bell, E., (2011) *Business Research Methods*, New York, NY: Oxford University Press.

Bustamante, R., (2004) *The water war: Resistance against privatisation of water in Cochabamba*, Bolivia

Calfucoy, Cibulka, Davison, Hinds and Park (2009), *Improving Free Basic Water Provision in South Africa. Prepared for Financial and Fiscal Commission*, The Republic of South Africa. Board of Regents of the University of Wisconsin System: Retrievedfrom:http://www.lafollette.wisc.edu/publications/workshops.htmlpublications@lafollette.wisc.edu (accessed 15 March 2019).

Carson, D., Gilmore, A., Perry, C., and Gronhaug, K. (2001), *Qualitative marketing research.* London: Sage.

Chiplunkur, A., Babel, M.S., & Rivas, A.A., (2012), Good practises in urban water management: Bangkok, Thailand, *Asian Development Bank*, 29(1) 9-34

Clifford-Holmes, J. K., Slinger, J. H., De Wet, C., & Palmer, C. G. (2017). Modelling in the “Muddled middle”: A case study of water service delivery in post-apartheid South Africa. In C. Garcia-Diaz & C. Olaya (Eds.), Social Systems Engineering: The Design of Complexity. Hoboken, NJ: Wiley

COGTA. (2009). State of Local Government in South Africa. Working document. Pretoria: Department of Cooperative Governance and Traditional Affairs

Cohen, G.L., Garcia, J., Apfel, N., & Master, A., (2006) Reducing the racial achievement gap: A Social Psychological Intervention, *Science*, 313(57), 1307-10

Coles, A., & Wallace, T., (2005), Gender, Water and development, *Journal of Biosocial Science*, 39(5), 34-40

Collis, J., & Hussey, R., (2014). *Business Research: A Practical guide for undergraduate and postgraduate students*, 4ed, Palgrave Macmillan

Collste, D., Pedercini, M., & Cornell S.E. (2017), Policy coherence to achieve the SDGs using integrated simulation models to assess effective policies. Sustain sci 12(6)

Conley, A.H., & Niekerk, P.V., (2000) Sustainable Management of International Waters: The Orange River Case, *Water Policy*, 2(1), 131-149

Conteh, S., Dettman, M., Dugard, K., Langford, M. & Tissington, T. (2008). *Water Services Fault Lines:* A*n Assessment of South Africa’s Water and Sanitation Provision Across 15 Municipalities.* COHRE, CALS and NCHR.

Constanza, R. J. Cumberland, Daly, H.E., Goodland, R., & Norgaard. R., (1997). *An introduction to ecological economics*. St. Lucie Press, Boca Raton, Florida.

Creswell, J.W. (2014). *Research design: Qualitative, quantitative and mixed methods approaches*, 2nd ed. Thousand Oaks: Sage

Czech, B. (2008). Prospects for reconciling the conflict between economic growth and biodiversity conservation with technological progress. *Conservation in Biology*, 22(6), 35-50

Daly, H.E., (1992). Allocation, Distribution and Scale: Towards an economics that is efficient, just and sustainable. *Ecological Economics*. 6, 185-193.

Daly, H.E., and J. Farley. (2003), *Ecological economics: principles and applications*. Island Press, Washington, DC

Dawson, C., (2007). Practical guide to research methods: A user guide to mastering research techniques and projects, 2nd Ed, Oxford: How to Books.

De Coning, C.B., & Sherwill, T., (2004). *An assessment of the water policy process in South Africa (1994-2003)*, Water Research Commission, South Africa

De la Harpe, J., Ferreira, J., & Potter, A., (2013). Water management institution overview. Pretoria Department of Water Affairs and Forestry

De Vos, A.S. (2002*). Combined quantitative and qualitative approach, Research at grassroots: for social sciences and human services professions*, 2nd ed. Pretoria: Van Schaik Publishers

Deedat, H., (2011), The gendered analysis of free basic water services in South Africa: *An activist's perspective Agenda*, 25(2), 80-86

Deedat, H., Hollingworth, B., Malzbender, D., Earle, A., Mokorosi, P., (2009). *Review of regulatory aspects of the water services sector,* Water Research Commission, African Centre for Water Research.

Deller, S.C., Nelson, C.S., & Walzer, N., (1992). Measuring managerial efficiency in rural governance, Public productivity management review, 15(3), 355-370

Denzin, N.K., & Lincoln, Y.S. (2000). *Introduction: the discipline and practice of qualitative research*, Handbook of qualitative research 2nd ed, Thousand oaks, CA: Sage

Department of Water Affairs and Forestry, Republic of South Africa. (2008). Water allocation reform strategy. Pretoria: Chief Directorate Water Use, Department of Water Affairs and Forestry, Republic of South Africa.

Department of Water Affairs and Forestry, (2004). Olifants water management area internal strategic perspective. Version 1 Pretoria: Directorate: National Water Resource Planning, Department of Water Affairs and Forestry, Republic of South Africa.

Department of Water Affairs. Republic of South Africa. (2013). National water resource strategy second edition: Water for an equitable and sustainable future. Pretoria: Department of Water Affairs, Republic of South Africa.

Department of Water and Forestry (DWAF, 2007), Establishment of a pricing strategy for water. Use charges in terms of Section 56(1) of the National water Act, 1998.

Di Baldassarre, G., Sivapalan, M., Rusca, M., Cudennec, C., & Sanderson, M.R. (2019). Challenges in addressing Sustainable Development Goals, *Water Resource Journal*, 55 (23), 6325-6355

Dollery, B.E. and Crase L. (2004). “Is Bigger Local Government Better? An Evaluation of the case for Australian Municipal Amalgamation Programs”, *Urban and Research*, 22(3), 265-276

Dollery, B.E. and Fleming, E. (2005). A conceptual; note on scale economies, size of the economy and scope economies in Australian local government, Schools of economics, university of New England

Domosh, M., & Seager, J., (2001). *Putting Women in Place: Feminist Geographers Make Sense of the World*, Newyork and London, the Guilford press

Easterby-Smith, M., Thorpe, R. & Lowe, A. (2003). *Management Research: An Introduction*, London: Sage Publications.

Emler, N. (1999). Politics: *The Education Effects*. Taylor and Francis, LTD, 1(1), 251-273

Erasibo Ltd. (2005). Guidelines for the Implementation of the National Indigent Policy by Municipality(draft)http://fbs.dplg.gov.za/fbs/site/docs/DocumentLibrary/I Guidelines.pdf?PHPSESSID=dd245e1e43caadb037d2946bfb74cd74 Retrieved May 15, 2019.

Fasoli, E. (2018). The possibilities for Non-governmental Organizations promoting environmental protection to claim damages in relation to the environment in France, Italy, the Netherlands and Portugal. *Review of European Community and International Environmental Law*, 20(26), 30-37.

Figueiredo, P., & Perkins, P.E. (2013). Women and water management in times of climate change: participatory and inclusive processes, *Journal of water resources*, 60(3), 188-194.

Filho, S. K., Tripathi, J.B., Guerra, A.R., Wilson, E., Mura, P., Sharif, S.P. & Wijesinghe, S.N.R., (2019). *Beyond the third moment? Mapping the state of qualitative tourism research*, Current Issues in Tourism.

Folke, C., and Kaberger, T., (1991). Recent trends in linking the natural environment and the economy, Linking the natural environment and the economy: Essays from the Eco-Eco Group, 273-300.

Fox, N.J., (2008) *Post-positivism* IN: Given, L.M. (ed) The SAGE Encyclopaedia of Qualitative Methods. London Sage

Fraenkel, J.R., Wallen, N.E., & Hyun, H., (2014). *How to Design and Evaluate Quantitative Research in Education*, 8ed, McGraw-Hill Education

Franklin, D., (2016), *Research Methods in the Social Sciences*, 4th Ed. New York: St. Martin's Press.

Free Basic Water (2002). Implementation Strategy Document version 2. Department of Water Affairs and Forestry.

Garcia-Valinas, M.A., & Miquel-Florensa, J., (2013) Water service quality in Tanzania: Access and management, *International Journal of Water Resource Development*, 29(3), 34-45

George, D., and Mallery, P. (2003), SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th ed.). Boston: Allyn & Bacon.

Gillham, B., (2000) Developing a questionnaire, London: Continuum Books

Giordano, M. & Shah, T., (2014) From IWRM back to integrated water resources management, *International Journal of Water Resources Development*, 30(3), 364-376

Gleick, P.H., & Palaniappan, M., (2010) Peak water limits to freshwater withdrawals and use, *National Academy of Sciences*, 107(25), 45-56

Gliem, J.A., and Gliem, R.R. (2003*). Calculating, interpreting, and reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales.* Presented at the Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, The Ohio State University, Columbus, OH, October 8-10, 2003.

Global Water Partnership (2000). *Integrated Water Resource Management,* Stockholm, Sweden

Goff, M. & Crow, D., (2014), What is water equity? The unfortunate consequences of a global focus on 'drinking water', *Water International*, 39(2), 159 171.

Goswami, K.B. & Bisht, P.S. (2017). The role of water resources in socio economic development. *International Journal for Research in Applied Science & Engineering Technology*, 887(12), 2321-9653.

Greenberg, S., (2005). The Rise and Fall of Water Privatization in Rural South Africa: A Critical Evaluation of the ANC's First Term of Office, 1994-1999. The Age of Commodity: Water Privatization in Southern Africa. Earth Scan, London Sterling, VA.

Greenstein R., Roberts, B., & Sitas A., (2003). Research Methods Training Manual, University of the Witwatersrand

Greenwood, D.T., & Holt, R.P.F., (2008), Institutional and Ecological Economics: The Role of Technology and Institutions in Economic Development, *Journal of Economic Issues*, 42(2), 445-452

Grigg, N.S., (2014). Integrated water resource management: Unified process or debate forum. *International Journal of Water Resources Development*, 30, 409-422.

Guo, F. (2017). The spirit and characteristic of the general provisions of civil law. *Law and Economics*, 3(5), 16-54.

GWP-TAC. (2000), Integrated Water Resources Management. TAC Background Paper No. 4. Stockholm, Sweden: GWP.

Hahn, R.W. (2000), The Impact of Economics on Environmental Policy. *Journal of Environmental Economics and Management*, 39, 375-399.

Hamberto, P., (2011), Social Equity and Integrated Resources Management, *Global Water Partnership*, 3(15), 5-83

Harris, D. Kleiber, J. Goldin, A. Darkwah & Morinville, C., (2017), Intersections Of Gender and Water: Comparative approaches to everyday gendered negotiations of water access in underserved areas of Accra, Ghana and Cape Town, *South Africa, Journal of Gender Studies*, 26(5), 561-582.

Hellegers, P., & Leflaive, X., (2015), Water allocation reform: What makes it so difficult? *Water International*, 40(2), 273-285

Hellegers, P., & Leflaive, X., (2015) Water allocation reform: what makes it so difficult? *Water International*, 40(2), 273-285

Heller, P., (2001), Moving the state: The politics of democratic decentralisation in kerala, South Africa and Porto, *Politics and Society*, 29(1), 131-163

Henderson, A.K., (2011), Post-Positivism and The Pragmatics of Leisure Research, *Leisure sciences*, 33(4), 341-346

Heyns, C., (2001). A struggle approach to human rights. In: Soeteman A. (eds) Pluralism and Law. Springer, Dordrecht

Hossain, M.Z. (2015), Water: The most precious resource of our life, *Global Journal of Advanced Research*, 2(9), 1436-1445

Hove J, D'Ambruoso L, Mabetha D, Peter Byass, P., Kahn, K., Khosa, S., Witter, S., (2019). 'Water is life': developing community participation for clean water in rural South Africa, *BMJ Global Health*, 3(4), 96-105

Human Rights Commission (2018) monitoring and implementation of the commission's recommendations from its 2014 report on access to water and sanitation, South Africa

Hunter, P.R., MacDonald, A.M., Carter R.C., (2010). *Water supply and Health*. PLoS Med 7(11): Health policy and practice, university of East Anglia, United Kingdom

Hussey, J. & Hussey, R. (1997), Business Research. Palgrave: Basingstoke

Jacobs, C., Rivett, U., & Chemisto, M. (2018), Developing capacity through co-design: the case of two municipalities in rural South Africa, *Information Technology for Development*, 25(2), 204-226

Jayyousi, O.A., (2007) Water as a Human Right: Towards Civil Society Globalization, *International Journal of Water Resources Development*, 23(2), 329-339

Jeffrey, P., & M., Gearey. (2006). "Integrated Water Resources Management: Lost on the Road from Ambition to Realization." *Water Science & Technology*, 43(1), 1-8.

Joe de Beer, (2017), *Non-Financial Census of Municipalities 2017 Service delivery data from municipalities*, Statistics South Africa

Kahinda, J.M., Taigbenu, A.E., & Boroto, J.R., (2007), Domestic rainwater harvesting to improve water supply in rural south Africa, *Physics And Chemistry Of The Earth*, 32(1), 105-1057

Kanyane, M. and Koma, S. (2014). Developmental Local Government in South Africa: Issues of Consideration. Reach Publishers, Wandsbeck: South Africa.

Kennen, J.G., Stein, E.D., & Webb, J.A., (2018). Evaluating and managing environmental water regimes in water scarce and uncertain future, fresh water biology, 63(8), 1-5

Khadza, A.K., (2010). the Emergence of Water as a 'Human Right' on the World Stage: Challenges and Opportunities, *International Journal of Water Resources Development*, 26(1), 37-49

Kim, S., (2003) Research Paradigms in organisational learning and performance: Competing modes of inquiry, information technology, *Learning and Performance Journal*, 21(1), 9-18

Kings, S., (2014). South Africa may need to turn to private sector to solve its water crisis. Mail and Guardian. Published on: 29/07/2014, Pg.1-4.

Koolwal, G., & van de Walle, D. (2013), Accesses to water, Women's Work and Child Outcomes, *Economic Development Cultural Change*, 61(2), 369-405

Kumar, S., & Yale, S., (2016), Identifying and Eliminating Bias in Interventional Research Studies- A quality indicator, *International Journal of Contemporary Medical Research*, 3(6), 1644-1648

Lange & G., & Hassan, R. (2006), Introduction to water issues and water accounting in Southern Africa, *Economics Of Water Management In Southern Africa*, 1-11

Leedy, P.D., & Ormrod, J.E., (2005), *Practical research planning and design*, Prentice Hall, Upper Saddle River, NJ.

Livingston, M.L., (2019) Evaluating Changes in Water Institutions: Methodological Issues at the Micro and Meso levels. Water Policy, 7(3),21-34.

Lloyd, G.J., McCarron, P., and Stacey, L. (2005) Integrated Water Resources Management: How has IWRM helped exert sustainable water resource management in the Rufiji River Basin in Tanzania? Centre for Environmental Assessment, Department of Environment, Technology and Social Studies, Roskilde: University of Roskilde.

Lohr, S.L., (2010) *Sampling design and Analysis*, 2nd ed., Cengage, Chapman/ Hall Press

Humby, T., and Grandbois, M., (2010), The Human Right to Water in South Africa and the Mazibuko Decisions. *Human Rights Journal*, 51(3-4), 521-540.

Lovren, V.O., & Willats, J., (2019), Using the sustainable development goals towards a better understanding of sustainability challenges, *International Journal of Sustainable Development & World Ecology*, 26(2), 179-190

Luh, J., Baum, R., & Bartram, J., (2013). Equity in water and sanitation: Developing an index to measure progressive realisation of the human rights. *International Journal Hygiene Environmental Health,* 216(6), 662-1

MacDonald, A.D., & Ruiters, G., (2005). *The age of commodity: Water privatization in southern Africa,* Routlegde

Madi, T.C., (2016). Service Delivery and Equitable Distribution of Water and Sanitation Services in the Newcastle Local Municipality. Master's thesis. University of the Free State.

Malobela, I.P., & Sinha, P., (2011). Management of water resources in South Africa: A review*, African Journal of Environmental Science and Technology*, 5(12), 993-1002

Malthus, T.R., (1798). *An Essay on the Principle of Population*. J. Johnson, in St. Paulís Church-Yard, London, UK.

Manzungu, E., (2016). The Theory and Practice of Governance of Water Resources in Zimbabwe. Zambezia, 191-212.

Marcotte, D., MacDonald, RJ. & Nemeth, MW. (2020), Participatory water management modelling in the Athabasca River Basin, *Canadian Water Resources Journal*, 45(2), 109-124

Maree, K. (2016). *First steps in research*, 2ed, Pretoria: Van Schaik.

Marsh, D., and Furlong, E., (2002), 'Ontology and epistemology in political science' London

McConkey, G. & Wilsenach, J., eds. (2010), *The Sustainable Water Resource Handbook,* South Africa Volume 1 The Essential Guide. Cape Town: Alive2green.

McDonald, D.A. and Pape, J. (2002). *Cost Recovery and Crisis of Service Delivery in South Africa*, HSRC Publishers, South Africa: Cape Town.

McDonnell, R.A. (2008). Challenges for Integrated Water Resources Management: How Do We Provide the Knowledge to Support Truly Integrated Thinking? *International Journal of Water Resources Development*, 24(1), 131-143.

McInnes, P., (2005). *Entrenching Inequalities: The Impact of Corporatization on Water Injustices in Pretoria*, The Age of Commodity: Water Privatization in Southern Africa. Earth Scan, London - Sterling, VA.

Medeiros, P., & Sivapalan, M., (2020). A hard-path to soft-path solutions: Slow-fast dynamics of human adaptation to droughts in a water scarce environment, *Hydrological science journal, (2)15,* 2150-*3435.*

Meissner, R., & Stuart-Hill, S., (2017). Establishment of catchment management agencies in South Africa with reference to the Flussgebiet Elbe: some practical considerations, Freshwater Governance for the 21st century, *Global issues in water policy*, 6, 234-345

Mensah, J., (2019). Sustainable Development: Meaning, history, principles, pillars, and implications for human action: Literature review, *Cogent Social Sciences*, 5(1), 44-57

Meyer, W.N. (2007). *The economics of water. Water for life, sanitation for dignity*, Van Schaik Publishers, Pretoria.

Mitchell, S., Bellette, K. & Richardson, S. (2015). 'Integrated' approaches to water and natural resources management in South Australia, *International Journal of Water Resources Development*, 31(4), 718-731

Mjoli, N., Sykes, G., & Jooste, T., (2009). *Towards the realisation of free basic sanitation: Evaluation, Review and Recommendations*, Hlathi Development Services, Water Research Commission, South Africa

Mohammed, I., (2012). Thematic Analysis: A Critical Review of Its Process and Evaluation, *West East Journal of Social Sciences*, 1(1), 39-45

Molden, D., (2020). Scarcity of water or scarcity of management? *International Journal of Water Resources Development*, 36(3), 258-268

Moloi, D. (2004). The Cholera Outbreak: A 2000-2002 case study of the source outbreak In Madlebe Tribal Authority Areas, uThungulu Region, KwaZulu-Natal.
Moriarty, P., (2003) Integrated Water Resources Management. Delft: International Water and Sanitation Centre.

Mouton, J., & Barbie, E. (2004). *The practice of social research*. Open University Press.

Muller, M. (2008). Free Basic Water- a sustainable instrument for a sustainable future in South, *Environment and Urbanization*, 20(6), 112-156

Mulreany, J.P., & Sapsin, J.W., (2006). Water privatization and public health in Latin America, *Journal of Public Health*, 19(1), 23-31

Munda, G., (1997) Environmental Economics, Ecological Economics, and the Concept of Sustainable Development, *Environmental Values,* 6, 213-33

Namey, E., Guest, G., Thairu, L., & Johnson, L., (2008). Data Reduction Techniques for Large Qualitative Data Sets. In: Handbook for team-based qualitative research. Rowman Altamira.

Nastiti, A., Komarulzaman, A., & Sudradjat, A. (2018). The prospect of the domestic water equity indicators in Indonesia: A Review, *IOP Conference Series Earth and Environmental Science*, 106(1), 1-6

Neuman, W.L., (2014). *Social Research Methods: Qualitative and Quantitative Approaches*. Harlow: Pearson.

Nickson, A.Y., Vargas, C., (2001) “The limitations of water regulation: the failure of the Cochabamba concession in Bolivia.” School of Public Policy, The University of Birmingham, England.

Nkuna, Z.W. (2012). Water governance challenges for rural water supply: A case study of two local municipalities in South Africa. Master’s mini-dissertation, Faculty of Natural and Agricultural Sciences; University of Pretoria, Pretoria.

Nojiyeza, I.S., (2014). Integrated Water Resources Management and the Manufactured Scarcity of Water in Africa, Doctor of Philosophy, University of KwaZulu-Natal

Nzimakwe, T.L., (2009). Water and sanitation provision through public-private partnerships: challenges for municipalities, *African Journals*, 39(1), 33-45

Oki, T., & Quiocho, E.R., (2020) Economically Challenged And Water Scarce: Identification of global populations most vulnerable to water crises, *International Journal of Water Resources Development*, 36:2-3, 416-428,

Overton, D.M., Smith, J., Dalton, S., Barchiesi, M.C., Acreman, J.C. & Kirby, J.M., (2014) Implementing environmental flows in integrated water resources management and the ecosystem approach, *Hydrological Sciences Journal*, 59(3), 860-877

Page, B., and Bakker, K. (2005). Water governance and water users in a privatised water industry: participation in policy-making and in water services provision: a case study of England and Wales. *International Journal of Water*, 3(1), 38-60.

Palmer, C. G., & Munnik, V., (2018). Practising adaptive IWRM. Integrated Water Resources Management (IWRM) in South Africa. Report No. 2248/1/18. Pretoria: Water Research Commission.

Panhwar, A.H., Ansari, S., & Shah, A.A., (2017). Post-positivism: An effective paradigm for social and educational research, *Research Gate*, 11(2), 253-256.

Perman, R., Ma, Y., McGivray, J., & Common, M., (2003). Natural Resources and Environmental Economics, 3rd ed, Pearson education LTD

Pink, R.M., (2016). Water Rights in China and India: A Human Security Perspective, Asian Affairs: *An American Review*, 43(2), 19-35

Punch, K.F., (2005). *Introduction to Social Research: Quantitative and Qualitative* Approaches, London: Sage

Plush, T. (2015). We've raised their voice. Is anyone listening? Participatory video practitioners and valued citizen voice in international development contexts. PhD thesis, University of Queensland.

Republic of South Africa. (1996). *The Constitution of the Republic of South Africa Act 1996 (Act 108 of 1996),* Pretoria: Government Printer.

Roa-García, M.C. (2014). Equity, efficiency and sustainability in water allocation in the Andes: Trade-offs in a full world. *Water Alternatives* 7(2), 298-319.

Rober, C. (2015). *Rural Development putting the last first*. Routledge Taylor & Francis Group. New York.

Rogers, P., & Hall, A.W., (2003). Effective water governance: TEC Background Papers No. 7: Stockholm, Global Water Partnership, Technical Committee, *Resources Development*, 26(1), 37-49

Rostow, W. W., & Rostow, W. W. (1978). *The world economy: History & Prospect Austin*: University of Texas Press.

RSA (Republic of South Africa). 2000b. Municipality Systems Act (Act 32 of 2000). Pretoria: Government Printer.

RSA (Republic of South Africa). 2001. White Paper on Basic Household Sanitation. Pretoria: Government Printer.

SALGA. 2006. Handbook for Municipal Councillors. SALGA AND GTZ South Africa, March 2006.

Saner, R., Yiu, L., Filadoro, M., & Khusainova, V., (2015). Access to water in developing countries: four options for provision and regulation in the water sector, *Asia Pacific Journal of Public Administration*, 37(3), 193-206

Saunders, M.N.K., & Lewis, P., (2012). Understanding research philosophy and approaches to theory development, 6ed, Pearson Edition Limited

Schein, J., (2005) The Role of NGOs in Addressing Water Access in Israel and the Palestinian Authority. *Sustainable Development Law & Policy*, 19-22.

Seekings, J and N Nattrass (2005), Class, Race and Inequality in South Africa, Yale University Press

Seetal, A. R. (2005). Progress with water allocation reform in South Africa. OECD Workshop on Agriculture and Water: Sustainability, Markets and Policies, Session 5. Adelaide, South 284 P. Hellegers and X. Leflaive Australia

Sekaran, U., and Bougie, R.G., (2013). *Research methods for business: A Skill Building Approach*, 6ed, Wiley, New York

Sen, A.K. (2001). *Commodities and capabilities*, Oxford and New York: Oxford University Press.

Simukonda, K., Farmani, R., & Butler, D. (2018). Intermittent water supply systems: Causal factors, problems and solution options, *Urban Water Journal*, 15(5), 488-500.

Singh, V.P. (2017). Challenges in meeting water security and resilience, *Water International*, 42(4), 349-359

Skenjana, N., Ngamlana, N., Mabhula, T., Mgwebi, G., Sokupa, T., Kimemia, P. and Corplan, A. (2010). Understanding the Impact of Corruption on Service Delivery In LocalGovernment.Retrievedfrom:https://www.ggln.org.za/media/k2/attachments/SoLG.2010-Afesis-corplan.pdf (accessed 15 June 2018).

Soderbaum, P., (1990). Neoclassical and Institutional Approaches to Environmental Economics. *Journal of Economic Issues*, 24(2), 481-492.

Solanes, M., & Gonzalez-Villareal, F., (2008). The Dublin's Principles for water as reflected in a comparative assessment of institutional and legal arrangements for water resource management, *Global Water Partnership*, 12(3), 9-37.

Solanes, M., & Jouravlev, A., (2006). Water governance for development and sustainability, United Nations Publications

South Africa (Republic). 1996. The Constitution of the Republic of South Africa Act 1996 (Act 108 of 1996), (Constitution, 1996) Pretoria: Government Printer.

South Africa (SA). 1997. Water Services Act 108 of 1997. Pretoria: Government Printer.

South Africa, DPLG (Department of Provincial and Local Government). 2005. *Framework for a Municipal Indigent Policy, September 2005.*

South Africa, DWAF (Department of Water Affairs and Forestry). 2001a. *Water Services Act 1997: Regulations Relating to Compulsory National Standards and Measures to Conserve Water.* Government Gazette No.22355, 8 June. http://www.info.gov.za/view/DownloadFileAction?id=70766 Retrieved October 15, 2019.

South Africa. *Municipal Systems Act*. Pretoria: Act No. 32 of 2000.

South Africa. *Water Services Act*. Pretoria: Act No. 108 of 1997.

Spahn, A. (2018). "The first generation to end poverty and the last to save the planet?" Western individualism, human rights and the value of nature in the ethics of global sustainable development. *Sustainability,* 10, 18-53.

Statistics South Africa (2011). General Household Survey, Version 2. Pretoria, Republic of South Africa.

Statistics South Africa (2016). Community Household Survey, Pretoria, South Africa

Sultana, F., (2009). Fluid lives: Subjectivities, Gender and Water in Rural Bangladesh, *A Journal of Feminist Geography*, 16(4), 427- 444.

Sutherland, C., Hordijk, M., Lewis, B., Meyer, C., & Buthelezi, S., (2014). Water and sanitation provision in eThekwini Municipality: A spatially differentiated approach, *International Institute for Environment and Development*, 26(2), 469-488.

Sweetman, C., & Medland, L., (2017). Introduction: Gender and Water, Sanitation and Hygiene, *Gender & Development*, 25(2), 153-166

Szabo, A., (2015). Supplement to the value of free basic water: Analysing South Africa's Free Basic Water Policy, *Econometrica*, 83(5), 1013-1961

Taylor, S. J., (2016). *A review of sustainable development principles*: Centre for environmental studies. South Africa: University of Pretoria.

Thabethe, P.D., (2011): An evaluation of water and sanitation provision by uThukela water in selected districts, Public Administration and Business Management, University of KwaZulu-Natal

Tissington, K. (2011). Basic Sanitation in South Africa: A Guide to Legislation, Policy and Practice. SERI.

Tissington, K., Dettmann, M., Langford, M., Dugard, J., and Conteh, S., (2008), "Water services fault lines. An assessment of South Africa's water and sanitation provision across15 municipalities", CALS, COHRE, University of Oslo

Todaro, P.M., & Smith, C.S., (2013*). Economic Development*, 8th Edition. Addison Wesley, Boston.

Tortajada, C., (2007) Reaching the Poorest: The Rural Water Supply in Morocco. Atizapan: Third World Centre for Water Management.

Tsvietkova, A., (2011), Ukrainian National Environmental NGO "MAMA-86", Coordinator of Water Issue Group of European ECO-Forum Co-leader of Water Working Group of WEC

Turner, J.R., (2013). *General Population in research*, Turner J.R (eds) Springer, NewYork

Udas, P.B., & Zwarteveen, M.Z., (2014). Can water professionals meet gender goals? A case study of the department of irrigation in Nepal, *Gender and Development*, 18(1), 87-97

Umgeni Water (2017). *Corporate Stakeholder Management Unit*, Umgeni Water, Pietermaritzburg, 3201, Republic of South Africa

Underwood, D.A. (1999). An Introduction to Ecological Economics, *Journal of Economic Issues*, 33(1), 196-198.

UNICEF and WHO. (2012). Progress on Drinking Water and Sanitation: 2012 Update. New York: WHO Library Cataloguing-in-Publication. Retrieved: 02 May 2019 (13: 42).

United Nation General Assembly (2016). Transforming our world: the 2030 Agenda for Sustainable Development, 21 October 2019, A/RES/70/1, available at: https://www.refworld.org/docid/57b6e3e44.html (accessed 20 March 2020)

United Nations (2015). Department of Economic and Social Affairs, The United Nations Sustainable Development Summit for the adoption of the Agenda 2030 and the sustainable development goals, New York, 25-27 September, Retrieved from: https://sustainabledevelopment.un.org/partnerships (accessed 18 January 2019).

United Nations Human Rights Council (UNHRC) (2014). Resolution on the Human Rights to Safe Drinking Water and Sanitation. Geneva: UNHRC. A/HRC.RES/27/7

United Nations-Water (2015). Eliminating Discrimination and Inequalities in Access to Water and Sanitation.UN-Water.www.unwater.org/publications/eliminating-discrimination-inequalities-access-water-sanitation/.

University of Zululand (2016). Research proposal guide, R1 P2 DVC Research and Innovation, Senate approved on 17 April 2013, Ref: S625/13

UThukela District Municipality (2009). *District Growth and Development Plan*, Cooperative Government and Traditional Affairs (COGTA), South Africa

UThukela District Municipality (2019/2020), *Integrated Development Plan Review*, the Office of the Municipal Manager: IDP Unit

Van Der Mescht, J., & Van Jaarsveld M, (2012) Addressing operations and maintenance challenges in smaller municipalities. Port Elizabeth; 2012.

Van Kopen, B., Nhamo, L., Cai, X., Shikwambane, S., Tshikolomo, K., Matlala, B., & Manyama, D., (2017). Small irrigation scheme in the Limpopo province, South Africa, International Water Management Institute

Van Koppen, B., & Schreiner, B., (2014). Moving beyond integrated water resource management: developmental water management in South Africa, International*, Journal of Water Resources Development*, 30(3), 543-558

Varis, O. (2007) Right to Water: The Millennium Development Goals and Water in the MENA Region, *International Journal of Water Resources Development*, 23(2), 243-266

Wackemagel, M., & Rees, W.E., (1997). Perceptual and structural barriers to investing in natural capital: Economics from an ecological footprint perspective, Ecological *Economics*, 20, 3-24

Weaver, M.J.T., O'Keeffe, J, Hamer, H., & Palmer, C.G., (2017). Water service delivery challenges in a small South African municipality: Identifying and exploring key elements and relationships in a complex social-ecological system, *Water South African Journal*, 43(3), 45-67

Welman, J., Kruger, S., & Mitchell, B., (2005). *Research Methodology*, 3rd ed, Oxford University Press, Cape Town, South Africa

Wichelns, D., (2015). Virtual water and water footprints add little insight to the analysis of sustainability, efficiency, or equity, *Water Alternatives*, 8(3), 396-414

Wilkinson, D., & Birmingham, P., (2003). *Using research instruments: A guide for Reseachers*, Taylor and Francis Group, London and New York

Willis, G., (2015). Income distribution and income shares: wealth and income distributions explained using generalised Lotka-Volterra SFC ABM models, *International Review of Applied Economics*, 29(6), 816-842

Winter, S., Barchi, F., & Dzombo, M.N., (2018). Drivers of women's sanitation practices in informal settlements in sub-Saharan Africa: a qualitative study in Mathare Valley, Kenya*, International Journal of Environmental Health Research*, 28(6), 609-625.

Workman, C.L., (2019). Perceptions of drinking water cleanliness and health-seeking behaviours: A qualitative assessment of household water safety in Lesotho, Africa, *Global Public Health*, 12(6), 34-56

WHO (2017). *Global costs of drinking water supply and sanitation intervention to reach SDG target and universal coverage*. Geneva: World Health Organization Document Production Service.

WHO (2019). *A guide to equitable water safety planning: ensuring no one is left behind*. Geneva: World Health Organisation, Licence CC BY-NC-SA 3.0 IGO

WSDP (Water Service Development Plan). 2009. uThukela Municipality-WSDP Review. UThukela District Municipality. Nov 2009.

Yan, F., Daming, H., & Haosheng, B., (2004). Analysis on Equitable and Reasonable Allocation Models of Water Resources in the Lancang-Mekong River Basin, *Water International*, 29(1), 114-118

Yazdi, H.S., Shakouri, B., Salehi, H., & Fashandi, A. (2017). Sustainable Development and Ecological Economics, *Energy Sources, Economics and Policy*, 12(8), 740-748

LIST OF ANNEXURES

Annexure A: Research questionnaire (English and IsiZulu)

UNIVERSITY OF ZULULAND
RESEARCH QUESTIONNAIRES

Masters in Development Studies
Department of Anthropology and Development Studies

Title: Equitable access to water at Alfred duma local municipality

Candidate: Nokuphila Ndimande
Student Number: 2015022284
Supervisor: DR. I.S Nojiyeza

Dear Respondent,

I am a post-graduate student at the University of Zululand pursuing Masters of Arts in Development Studies. I am conducting a research project on **EQUITABLE ACCESS TO WATER AT ALFRED DUMA LOCAL MUNICIPALITY, KWAZULU-NATAL.** You are, therefore, kindly requested to take some of your treasured time to provide some information by way of answering this questionnaire.

Please indicate by putting a cross sign [X] or a tick sign [√] next to the correct answer.

SECTION A

1. BIOGRAPHIC INFORMATION OF THE RESPONDENT

1.1. Age

18 – 25	
26 – 35	
36 – 44	
45 – 59	
60 and above	

1.2. Gender

Male	
Female	
Other	

1.3. Educational Qualification

Primary school certificate	
High school certificate	
Diploma	
Bachelor degree	
Post graduate degree	

1.4. Employment status

Employed	
Unemployed	
Partly-employed	
Other	

1.5. Monthly income

R0 – R7, 200	
R7, 201 – R16, 500	
R16, 501 – R33, 400	
R33, 401 – R57, 400	
R57, 400 and above	

SECTION B

2 .WATER AND SANITATION: A GLOBAL PERSPECTIVE

2.1. Water is central to development and essential to all forms of life in the world.

Strongly Disagree	**Disagree**	**Not sure**	**agree**	**Strongly agree**

2.2. The lack of clean drinking water and improved sanitation brings misery, hardship and retards the development of people subjected to it

Strongly Disagree	**Disagree**	**Not sure**	**agree**	**Strongly agree**

2.3. It is vital that South Africa's limited water resources are managed and used to assure the eradication of poverty and to promote sustainable economic and social development.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

2.4. The provision of water and sanitation is essential in improving the living conditions of the poor in many countries.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

2.5. The Sustainable Development Goals (SDGs) by 2030 aim to achieve universal and equitable access to safe and affordable drinking water for all, achieve access to adequate and equitable sanitation and hygiene for all and strengthen the participation of local communities in improving water and sanitation management.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

SECTION C

3. EQUITABLE ACCESS TO WATER AND WATER AS BASIC HUMAN RIGHT

3.1. There is equitable access to water in the community

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

3.2. Water access is essential to elevate people out of poverty through realising the creative energy of women and children, enabling small businesses to run and providing domestic work that is needed for dignity and social networking of household members.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

3.3. Without water life will be impossible because people have certain basic needs for their survival and the life sustaining basic human needs include food, shelter, health and protection.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

3.4. Rural communities regard water as a plentiful resource which the government must supply at no cost

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

Challenges of inequitable access to water in rural areas

3.5. The challenges of inequitable access to water and sanitation in rural areas bring consequences in agriculture and food security, educational attainment, socio-economic complications and health problems

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

3.6. The main problem that delays water service provision in rural areas is that rural areas are far from the urban areas, which makes the construction of water and wastewater reticulation economically unviable.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

3.7. Equitable access to water and sanitation is hindered by poverty and the lack of skilled and experienced staff in the municipalities at the local and district level

Strongly Disagree	disagree	Not sure	agree	Strongly disagree

3.8. The rural communities that contributes to the unsustainable development of water supply systems is the lack of economic development and non-attraction of investments to provide employment

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

3.9. South Africa is the water scarcity country and there is an uneven distribution of rainfall over the country which affects provision of water services.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

3.10. It is importance to educate communities about managing water and sanitation properly so as to prevent its contamination.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

SECTION D

4. THE ECOLOGICAL GOVERNANCE FRAMEWORK THAT SUPPORTING THE ACCESS TO WATER IN LOCAL AREAS

4.1. A free basic water policy provides a minimum quantity of portable water of 25 litre per person per day or 6 kilolitres per household per month

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.2. The Constitution of the Republic of South Africa (1996) determines that everyone has the right to have access to sufficient water.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.3.The Water Supply and Sanitation Policy further proposes that poor communities who are not able to afford clean drinking water and improved sanitation services, be subsidized to meet minimum services through government grants

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.4. The Water Services Act (108 of 1997) prescribes the legislative duties of municipalities as Water Service Authorities (WSA) to supply sufficient water and an environment not harmful to human health.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

Integrated Water Resource Management (IWRM)

4.5. The concepts of Integrated Water Resource Management (IWRM) is importance in water resources

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.6. Water resource management play an important role in providing the foundation of agricultural sector, urban infrastructure, energy sectors, health care and other functions of society.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.7. IWRM is responsible for establishment of water policy and laws which use basin as the scale of management, water pricing allocation, establish water rights and participation in decision making

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.8. It is crucial to sustainable use and development of water resources through linking economic development with protection of natural ecosystem

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.9. IWRM should take place at lowest level where decision making is taken by all stakeholders and participatory approach involve all people, planners and policy makers in water projects

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.10. Participatory approach in societies is important because it ensures that water projects are explained and understood which promote effective integrated water resource management

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.11. Most women in rural communities have no voice in decision making process and this deprive them from water resource management

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.12. Good governance is a main pillar of water management, which improves various aspects, such as promoting decentralization, building capacity, and strengthening and monitoring evaluation, research and learning at all levels

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

4.13. Decentralisation emphasise that it is important for local experiences to be taken into account and for communities to be involved in decision making and practical arrangements for reliable water supply

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

SECTION E

5. ECOLOGICAL SCALE IN THE DISTRIBUTION OF WATER SUPPLY AND SANITATION SERVICES

5.1. Water is a backbone of the economy in very many countries of the world

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

5.2. Scale of the economy affect the provision of services in rural areas

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

5.3. In most local municipalities the scale or size of the economy is lower, this lead to inadequate funds available to supports the provision of services

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

5.4. Financial constraint limits the volume and range of water services that a municipality can provide.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

5.5. The union of local municipalities in resource sharing agreement allow each municipality to lessen the cost of goods and services it currently provides to the community.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

5.6. The amalgamation of two or more councils providing and producing a large range of services using different input combination and technological process can increase and generate the scale of the economy.

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

5.7. An increase in population affects the scale of economy in provision of water and sanitation services

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

5.8. Poverty and employment affect the ecological distribution of services in rural areas

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

5.9. Water resource should be treated as basic human right not as economic good

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

5.10. If water is treated as economic good it only favours economic growth and this deprive people to water as basic human right

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

SECTION F

6. THE ROLE OF LOCAL MUNICIPALITY IN EQUITABLE ACCESS TO WATER AND SANITATION SERVICES

6.1. Municipality play it role in equitable access to water in rural Local

Strongly Disagree	Disagree	Not sure	agree	Strongly agree

6.2. The Municipality Systems Act proclaims that the municipalities must develop an indigent policy that assists the poor households to access basic municipal services, such as safe drinking water and adequate sanitation

Strongly Disagree	disagree	Not sure	agree	Strongly disagree

6.3. The role of decision making in regard to equitable access to water is important for both Municipality and the community

Strongly Disagree	disagree	Not sure	agree	Strongly disagree

6.4. Alfred Duma Local Municipalities have challenges in providing equitable access to water and sanitation in the community

Strongly Disagree	**disagree**	**Not sure**	**agree**	**Strongly disagree**

6.5. The municipality has met the community expectation regarding access to water provision in the community

Strongly Disagree	**Disagree**	**Not sure**	**agree**	**Strongly agree**

6.6. Alfred Duma local Municipality provides 6kl of water to households

Strongly Disagree	**Disagree**	**Not sure**	**agree**	**Strongly agree**

ISIZULU QUESTIONNAIRE

UNIVERSITY OF ZULULAND

RESEARCH QUESTIONNAIRE

Masters in Development Studies

Department of Anthropology and Development Studies

Title: Equitable access to water at Alfred Duma Local Municipality

Candidate: Nokuphila Ndimande

Student Number: 201502284

Supervisor: DR. I.S Nojiyeza

Mphenduli othandekayo

Ngingumfundi e university of Zululand, ngenza I Masters kwi Development Studies. Ngenza ucwaningo lokutholwa kwamanzi angalingani endaweni zasemakhaya kumaspala I Alfred Duma, KwaZulu-Natal. Uyacelwa ukuba uthathe isikhathi sakho esiyigugu ukunikezangolwazi ngokuphendula imibuzo.

Sicela ubeke uphawu eduze nempendulo yakho [X] noma [√]

Isigaba A : Okumayelana nabaphenduli

1. Isilinganiso seminyaka

18 – 25	
26 – 35	
36 – 44	
45 – 59	
61 +	

2. Ubulili

Ngingowesifazane	
Ngingowesilisa	

3. Izinga lemfundo yakho

Angfundile	
Imfundo yamabanga aphansi	
Imfundo yamabanga aphakeme	
Imfundo ephakeme	

4. Okuphathelene nomsebenzi

Ngiyasebenzza	
Angisebenzi	
ngiyaziusebenza	
Okunye	

5. Imali oyithola ngenyanga

R0 – R7, 200	
R7, 201 – R16, 500	
R16, 501 – R33, 400	
R33, 401 – R57, 400	
R57, 400 kuyaphezulu	

ISIGABHA B
2 . AMANZI NOKUHLAZIYELWA: ISIHLOKO SE-GLOBAL

2.1. Amanzi aphakathi nentuthuko futhi abalulekile kuzo zonke izinhlobo zokuphila emhlabeni.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

2.2. Ukuntuleka kwamanzi okuphuza ahlanzekile kanye nokuthuthwa kwendle okulethekayo kuletha usizi, ubunzima kanye nokubuyisa ukuthuthuka kwabantu abaphansi kwalo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

2.3.Kubalulekile ukuthi izinsiza zamanzi ezilinganiselwe zaseNingizimu Afrika ziphathwe futhi zisetshenziselwe ukuqinisekisa ukuqedwa kobuphofu kanye nokukhuthaza ukuthuthuka kwezomnotho nokuzinza okuqhubekayo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

2.4.ISustainable Development Goals (SDGs), ngonyaka ka-2030 ihlose ukufezekisa ukufinyeleleka ngokulinganayo kwamanzi okuphuza futhi angabizi kubo bonke, kufinyelele ekutholeni inhlanzeko kubo bonke futhi kuqiniswe ukuthi imiphakathi ibambe iqhaza ekongweni kwamanzi nokuthuthwa kwendle.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

ISIGABA C
3. UKUTHOLAKALA KWAMANZI ALINGANAYO NJENGELUNGELO LABANTU

3.1. Amanzi atholakala ngokulinganayo emphakathini.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

3.2. Ukutholakala kwamanzi kubalulekile ukukhipha abantu ebuphofini ngokuthola amandla okudala abesifazane nezingane, ukunika amandla amabhizinisi amancane ukugijima nokunikezela ngemisebenzi yasekhaya edingekayo ukuze kunikezwe isithunzi kanye nokuxhumana kwamalungu omndeni.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

3.3. Ngaphandle kwamanzi impilo ngeke ibe khona ngoba abantu banezidingo ezithile eziyisisekelo zokusinda kwabo futhi impilo esekela izidingo eziyisisekelo zabantu ifaka ukudla, indawo yokuhlala, impilo nokuvikelwa.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

3.4. Imiphakathi yasemakhaya ibheka amanzi njengomthombo omningi uhulumeni okufanele awunikeze mahhala.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

3.5. Amanzi wumthombo obalulekile wemvelo obamba iqhaza elibalulekile ekufezeni izidingo eziyisisekelo zokuphila namanzi kanye nokukhucululwa kwendle kuyizidingo zokwakha impilo enhle nekhwalithi yempilo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

3.6. Ukutholakala kwamanzi alinganayo kubalulekile endaweni zasemakhaya njengoba amanzi eyigugu ekuphileni kwabantu

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

Izinselelo zokufinyelela kwamanzi ngokungalingani ezindaweni zasemakhaya

3.7. Izinqinamba zokungafinyeleleki kahle kwamanzi nokuthuthwa kwendle ezindaweni zasemakhaya ziletha imiphumela engemihle kwezolimo nokuvikeleka kokudla, ukutholakala kwezemfundo, izinkinga zenhlalo yezomnotho nezinkinga zempilo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

3.8. Inkinga enkulu ebambezela ukuhlinzekwa kwezinsiza zamanzi ezindaweni zasemakhaya ukuthi izindawo zasemakhaya zikude kakhulu nezindawo zasemadolobheni, okwenza ukuthi ukwakhiwa kwamanzi kubuye kungaphazamiseki ngokwezomnotho.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

3.9. Imiphakathi yasemakhaya ebamba iqhaza ekuthuthukisweni okungagcineki kwezinhlelo zokuhlinzekwa kwamanzi ukushoda kwezentuthuko yezomnotho nokungavikeleki kokutshalwa kwezimali ukuhlinzeka ngemisebenzi.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

3.10. INingizimu Afrika iyizwe elindlala yamanzi futhi kukhona ukwabiwa okungalingani kwemvula ezweni lonke okuthinta ukuhlinzekwa kwezinsiza zamanzi.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

3.11. Kubalulekile ukufundisa imiphakathi ngokuphatha amanzi nokuhanjiswa kwendle ngendlela efanele ukuvikela ukungcoliswa kwayo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

ISIGABA D

4. UHLAKA LOKULAWULA KWEMVELO OLUSEKELA UKUFINYELEKA KWAMANZI EZINDAWENI ZASEMAKHAYA

4.1. Umgomo wamanzi osisekelo wamahhala owamukelwe ukuthi wonke umuntu unelungelo lokuthola ukutholakala kwamanzi okuyisisekelo nokukhucululwa kwendle nezinyathelo ezifanele kufanele zithathwe ukufezekisa leli lungelo.

Angivumelani kakhulu	Angivumelani	Anginaso isiqiniseko	Ngiyavuma	ngivuma kakhulu

4.2. Umgomo wamanzi osisekelo samahhala uhlinzeka ngamanani amancane aphathekayo wamalitha angama-25 umuntu ngamunye ngosuku Noma amakhilogremu ayi-6 endlini ngayinye ngenyanga.

Angivumelani kakhulu	Angivumelani	Anginaso isiqiniseko	Ngiyavuma	ngivuma kakhulu

4.3. Umthethosisekelo weRiphabhulikhi yaseNingizimu Afrika (1996) unquma ukuthi wonke umuntu unelungelo lokuthola amanzi anele.

Angivumelani kakhulu	Angivumelani	Anginaso isiqiniseko	Ngiyavuma	ngivuma kakhulu

4.4. UMthetho Wezinsizakalo Zamanzi (108 ka 1997) ubeka imisebenzi yomthetho kamasipala njengeziphathimandla zamanzi (WSA) ukuhlinzeka ngamanzi anele kanye nendawo engenabungozi empilweni yabantu.

Angivumelani kakhulu	Angivumelani	Anginaso isiqiniseko	Ngiyavuma	ngivuma kakhulu

Integrated Water Resource Management (IWRM) Ukuphathwa Kwemithombo Yamanzi Ehlanganisiwe (IWRM)

4.5. Imibono ye-Integrated Water Resource Management (IWRM) ibalulekile ekuphathweni kwemithombo yamanzi.

Angivumelani kakhulu	Angivumelani	Anginaso isiqiniseko	Ngiyavuma	ngivuma kakhulu

4.6. I-IWRM inesibopho sokusungulwa kwenqubomgomo yamanzi nemithetho esebenzisa umcengezi njengesilinganiso sokuphathwa, ukwabiwa kwamanani wamanzi, ukusungula amalungelo amanzi kanye nokuzibandakanya ekwenzeni izinqumo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

4.7. Kubalulekile ekusebenziseni okuzinzileyo nentuthuko yemithombo yamanzi ngokuxhumanisa ukuthuthukiswa komnotho nokuvikelwa kwendalo yemvelo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

4.8. I-IWRM kumele yenzeke emazingeni aphansi lapho izinqumo zithathwa yibo bonke ababambe iqhaza futhi indlela yokubamba iqhaza ibandakanya bonke abantu, abahleli kanye nabenzi bezinqubomgomo kumaphrojekthi wamanzi.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

4.9. Indlela yokubamba iqhaza emiphakathini ibalulekile ngoba iqinisekisa ukuthi amaphrojekthi wamanzi ayachazwa futhi aqondwe athuthukisa ukuphathwa kwemithombo yamanzi okuhlangene okusebenzayo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

4.10. Iningi labesifazane emiphakathini yasemakhaya alinalo izwi enqubweni yokwenza izinqumo futhi lokhu kubaphazamisa ekuphathweni kwemithombo yamanzi.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

4.11. Izinsizakusebenza kufanele zabelwe ngendlela efanelekile njengoba amanzi eba insiza enqabile yabasebenzisi abancintisanayo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

4.12. Ukubusa okuhle kuyinsika eyinhloko yokuphathwa kwamanzi, ethuthukisa imikhakha ehlukahlukene, njengokuqhakambisa ukwabiwa kwezindawo zokuhlala, ukwakha amandla, ukuqinisa nokubheka ukuhlola, ucwaningo nokufunda kuwo wonke amazinga.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

4.13. I-Decentralization igcizelela ukuthi kubalulekile ukuthi amava endawo abhekwe futhi imiphakathi ibandakanyeke ekwenziweni kwezinqumo kanye namalungiselelo asebenzayo wokuhlinzekwa kwamanzi okuthembekile.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

ISIGABA E

5. IZINGA LEMVELO EKUSATSHALALISWENI KWEZINSIZAKALO ZAMANZI NOKUTHUTHWA KWENDLE EZINDAWEN ZASEMAKHAYA

5.1. Amanzi angumgogodla womnotho emazweni amaningi omhlaba.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

5.2. Izinga lomunotho liphazamisa ukwabiwa kwamanzi ngendlela

Strongly Disagree	**Disagree**	**Not sure**	**agree**	**Strongly agree**

5.3. Komasipala abaningi bendawo ubukhulu Noma ubungako bomnotho buphansi, lokhu kuholela ekutheni kube nemali enganele yokuxhasa ukuhlinzekwa kwezinsizakalo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

5.4. Izinkinga zezezimali zikhawulela ubungako kanye nezinsizakalo zamanzi ezinganikezwa ngumasipala.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

5.5. Inyunyana yomasipala bendawo esivumelwaneni sokwabelana ngezinsizakalo ivumela umasipala ngamunye ukuba anciphise izindleko zezimpahla nezinsizakalo zamanzi ezinikeza umphakathi njengamanje.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

5.6. Ukuhlanganiswa kwemikhandlu emibili Noma eminingi enikela futhi ikhiqiza uhla olukhulu lwezinsizakalo zamanzi isebenzisa inhlanganisela yokufakwayo ehlukile kanye nenqubo yezobuchwepheshe kungakhuphula futhi kukhiphe isilinganiso somnoth

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

5.7. Ukwanda kwabantu kuthinta isilinganiso somnotho ekuhlinzekweni kwezinsizakalo zamanzi nokuthuthwa kwendle.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

5.8. Ukungeniswa kwemali kanye nokusatshalaliswa kwengcebo kuthinta ukufinyeleleka kwamanzi, ukufinyeleleka, ikhwalithi nenani.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

5.9. Ubuphofu nokuqashwa kuthinta ukusatshalaliswa kwemvelo kwemisebenzi yamanzi ezindaweni zasemakhaya.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

5.10. Umthombo wamanzi kufanele uphathwe njengelungelo labantu eliyisisekelo hhayi njengezomnotho.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

5.11. Uma amanzi aphathwa njengokuhle ngokwezomnotho kuthanda kuphela ukukhula komnotho futhi lokhu kunciphisa abantu ukuthi bathole amanzi njengelungelo lomuntu eliyisisekelo.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

ISIGABA F

6. INDIMA EDLALWA UMASIPALA EKULETHENI KWAMANZI ALINGANAYO KANYE NOKUNAKEKELWA KWENDLE.

6.1. UMasipala udlala indima yawo ekutholeni amanzi ngokulingana emiphakathini yasemakhaya.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

6.2. UMthetho Wezinhlelo Zikamasipala umemezela ukuthi omasipala kumele bathuthukise inqubomgomo yabampofu esiza imindeni ehlwempu ukuthola izinsizakalo eziyisisekelo zikamasipala, njengamanzi

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

6.3. Indima yokwenza izinqumo maqondana nokufinyelela ngokulinganayo kwamanzi ibalulekile kumasipala nomphakathi.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

6.4. Omasipala abaningi banezinselelo ekunikezeni ukufinyelela okulinganayo kwamanzi nokuthuthwa kwendle emphakathini.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

6.5. Umasipala uhlangabezane nokulindelwe ngumphakathi maqondana nokufinyelela ekuhlinzekweni kwamanzi.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

6.6. UMasipala waseKhaya i-Alfred Duma / uMasipala wesiFunda UThukela uhlinzeka ngamakhaya ama-6kl.

Angivumelani kakhulu	**Angivumelani**	**Anginaso isiqiniseko**	**Ngiyavuma**	**ngivuma kakhulu**

Annexure B: Consent form

PARTICIPANT INFORMED CONSENT DECLARATION

University of Zululand

INFORMED CONSENT DECLARATION

(Participant)

Project Title: Equitable access to water atAlfred Duma local municipality

My name is **Nokuphila Ndimande**, a student at University of Zululand, Department of Anthropology and Development Studies. The study firstly aim to investigate the

ecological governance framework that support equitable access to water at Alfred Duma Local Municipality, to investigate the role of local Municipality in equitable access to water and to investigate the ecological scale in the distribution of water and sanitation services.

Please note that:

- The information that you provide will be used for scholarly research only.
- Your participation is entirely voluntary. You have a choice to participate, not to participate or stop participating in the research. You will not be penalized for taking such an action. Participants have the right to withdrawal without any negative consequences.
- The questionnaire will be presented anonymously. Neither your name nor identity will be disclosed in any form in the study.
- If you agree to participate please sign the declaration attached to this statement (a separate sheet will be provided for signatures)
- The results to this research will be useful in generating knowledge on the status and challenges of equitable access to water.
- Any further questions that you might have concerning the research or your participation you can contact me at 0798649017 or email me at philandimande50@gmail.com

Please complete the section below if you are willing to participate in the study.

Thank you for your contribution to this research.

DECLARATION OF CONSENT TO PARTICIPATE IN THE STUDY

I, ……,have read the above information / confirm that the above information has been explained to me in a language that I understand and I am aware of this document's contents. I have asked all questions that I wished to ask and these have been answered to my satisfaction. I fully understand what is expected of me during the research. I have not been pressurised in any way and I voluntarily agree to participate in the above mentioned project.

…… ……

Participant's signature

Annexure C: Ethical Clearance

UNIVERSITY OF ZULULAND
RESEARCH ETHICS COMMITTEE
(Reg No: UZREC 171110-030)

RESEARCH & INNOVATION
Website: http://www.unizulu.ac.za
Private Bag X1001
KwaDlangezwa 3886
Tel: 035 902 6731
Fax: 035 902 6222
Email: LundallN@unizulu.ac.za

ETHICAL CLEARANCE CERTIFICATE

Certificate Number	**UZREC 171110-030 PGM 2020/76**							
Project Title	**Equitable access to water at Alfred Duma Local Municipality**							
Principal Researcher/ Investigator	N Ndimande							
Supervisor and Co-supervisor	Dr I.S Nojiyeza							
Department	Development Studies							
Faculty	Arts							
Type of Risk	Medium Risk – Data collection from people							
Nature of Project	Honours/4th Year		**Master's**	x	Doctoral		Departmental	

The University of Zululand's Research Ethics Committee (UZREC) hereby gives ethical approval in respect of the undertakings contained in the above-mentioned project. The Researcher may therefore commence with data collection as from the date of this Certificate, using the certificate number indicated above.

Special conditions:

(1) This certificate is valid for 1 year from the date of issue.
(2) Principal researcher must provide an annual report to the UZREC in the prescribed format [due date-27 October 2021]
(3) Principal researcher must submit a report at the end of project in respect of ethical compliance.
(4) The UZREC must be informed immediately of any material change in the conditions or undertakings mentioned in the documents that were presented to the meeting.

The UZREC wishes the researcher well in conducting research.

Professor Mashupye R. Kgaphola
University Research Ethics Committee
Deputy Vice-Chancellor: Research & Innovation

27 October 2020

CHAIRPERSON
UNIVERSITY OF ZULULAND RESEARCH ETHICS COMMITTEE (UZREC)
REG NO: UZREC 171110-30
27-10-2020
RESEARCH & INNOVATION OFFICE