THE CULTURAL INFLUENCES OF BLACK NGUNI CULTURE ON WATER CONSUMPTION AND HOW THEY CAN ASSIST THE WATER CRISIS WITHIN THE CITY OF CAPE TOWN

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Abstract

Water resources are subject to increasing stress in many urban areas. Managing water consumption and supply are key issues for the sustainable development of cities. The development within the social and cultural background of consumers, have minor research attention given the impacts that the ethnic and cultural diversity of a population may have on water consumption. This thesis aimed to explore the ethnic and cultural correlates of water use, bridging the information gap regarding water use in cities. This is important since cultural mindsets and behaviour is a driver in group behaviour. The study employed Quantitative and qualitative research techniques to analysis water use and conservation attitudes and behaviours among the Black community within Cape Town. With identification that disparities exist across the ethnic groups in pro-environmental water attitudes, behaviours and daily water use practices with influence of ethnic factors on pro-conservational behaviours and water consumption being significant. Even greater than socio-demographic factors including household size and income, diverse understanding of water issues in English and ethnic backgrounds, the different habits, routines and considerations relating to water use across ethnic groups, are important in understanding the ethnic effects on water use. Results highlighted the importance of including ethnicity and cultural sensitivity issues into the process of decision making regarding environmental management. Adding significance to understanding water consumption by ethnic groups, and important implications for water planning and management regarding cultural sensitivity.

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1. INTRODUCTION

The concept of sustainable development, widespread in the nineties, developed from increasing the awareness of adverse effects created by high technological development on our planet (Akiwumi, 1998). There continues to be much debate over a precise definition for sustainable development. However, this generally encompass the idea of conserving the resources of the earth for the benefit of future generations (Akiwumi, 1998). African countries like many others are failing to meet these goals. Africa has acquired a legacy of environmental degradation and poor policy on natural resource management namely issues of deforestation, air pollution, water pollution, energy and loss of bio-diversity (HelpSaveNature, 2018). Water is at the core of sustainable development and is critical for socio-economic development, healthy ecosystems and for human survival itself (Un.org, 2018).

Cape Town experienced a severe drought in more than a century. The City was set to run out of its water supply in April and has exercised remarkably impressive methods to decrease water usage over the last 3 years (2015, 2016, 2017) (de Villiers, 2018). Comparatively, when the "Millennium Drought" hit the city of Melbourne, it took the Australian city 12 years to do the same (de Villiers, 2018).

Some implementation plans the City of Cape Town has exercised include a combination of tight new restrictions; significant tariff increases; a deliberate drop in water pressure, and residents' compliance with water-saving measures (News24, 2018). Water supply to three agricultural irrigation boards was cut entirely and farmers of the Groenland Water Users Association donated 10 billion (10 000 million) litres of water from its Eikenhof dam to the city and augmentation began to come on stream by the targeted dates(News24, 2018).

This study is set to explore the influences of culture on water consumption with particular focus and research on the African Nguni cultural influences given the current water crisis in Cape Town. It will further explore if water consumption practices can be implemented within the city as an effective plan to re-brand Day Zero and have a long term water management solution. This will be conducted by exploring theories which stem from the basis of the study, namely the sustainability of water, culture and its influences, African Nguni Culture, Cultural Traits, Ethnicity, Domestic water use and a look into the theory of Oppositional Culture Theory. This will be achieved through research of the understanding of how Black Nguni Cultural Influences have come to affect the perceptions of Black Nguni students on the water crisis. As well as research of the marketing strategies around Day Zero and thus utilise these finding to find ways in which Day Zero can be re-branded.

1.1 Rationale

Culture can be defined as set of shared symbols, beliefs, and customs that shape individual and group behaviour (Goodenough, 1999). It provides guidelines for speaking, doing, interpreting, and evaluating one's actions and reactions in life (Goodenough, 1999). Shared among an identifiable segment of a population (Rohner, 1984) and Influenced by individual characteristics like gender and age (Goodenough, 1981). It can be socially constructed and learned and not genetically transmitted (Institute on Medicine, 2002). From this many authors and philosophers have come with a definition of what influences our culture and identified there are many aspects that contribute to it.

We can see that culture influences how people perceive and interpret their environment. It influences how people structure their Influences, how people structure their community, and social life determines what is perceived as a priority in the community which serves as both an enabler and barrier to acceptance of new ideas and interventions. Taking into consideration the above definitions it can then be seen the way water is consumed has links to cultural influences. The study is exploring how water was consumed and is currently consumed in rural areas/home lands and how those ways have culturally influenced the way black Nguni African students consume water today. Water in these rural areas is usually a rare commodity hence the great realisation of the importance of the commodity (Jagals, 2012). There is insufficient infrastructure to have running water and this results in more effective ways like using a single cup of water to brush teeth or utilising one bucket of water to flush a toilet, to prolong its availability. Water is collected from rivers, dams or communal taps that provide water for an entire village (Jagals, 2012). The understanding of these methods will help see perceptions on water and whether these practises have been passed down culturally. Thus leading to their perceptions on Day Zero which could in turn help see what ways the marketing strategy around Day Zero could have either been improved, kept the same or even possibly prove its effectiveness. This stemming from a look into the changed perceptions around Day Zero given the shift in date throughout the year (News 24, 2018).

Therefore, the study will explore how the marketing strategy around Day Zero has been extensively used to persuade the perceptions of individuals into saving water and finding more efficient ways to consume water. As well as look into their key strategies of implementation and see effects on black Nguni African students within the city.

1.2 Problem Statement

Historically Black Africans in South Africa have had a different water consumption practises to present day/post-apartheid era. This is due to insufficient resources. The concept of water saving has particularly been a familiar concept adversely different to the westernised methods of water consumption. There has been change, due to the access of resources and infrastructure or one may argue, the access to the black middle class African. With this access, there may have been a neglect of the past cultural influence on water consumption that would have been passed down through generations.

Use of these cultural influences can be utilised into changing domestic water consumption techniques. The study will further explore if these methods can be possibly used to assist in water management and the water crisis relief.

1.3 Research Question

How can the cultural influences of Black Nguni African students, that have influenced their adaptation of domestic water consumption assist in rebranding Day Zero within their community (Cape Town, City Bowl)?

1.4 Sub-Research Questions

Several specific research questions were formulated to guide the study:

1) Does ethnicity influence household water use?
   a) Do differences or disparities exist across ethnic communities relating to water use and conservation in terms of perceptions, attitudes and behaviours?
   b) If so, what differences exist?
   c) To what extent is ethnicity an influence?
2) What are the reasons and factors that underpin the ethnic differences and disparities? In other words, how does ethnicity influence households' water use and conservation?
3) What are the implications of ethnic diversity for water demand management? More specifically,
   o What are the opportunities for engaging ethnic communities in water management while maintaining important cultural values?
   o What are the barriers encountered when engaging ethnic communities in water management?

o How may these barriers be negotiated by water managers seeking to implement sustainable urban water management?

1.5 Purpose Statement

The purpose of this research is to explore the marketing strategy and branding of Day Zero and look at the perceptions of black Nguni African students regarding the crisis. This includes perceptions concerning water usage from their cultural influences and up-bringing. The study will delve into methods on the reconstruction and branding of Day Zero.

This research explores the cultural influences of Nguni Africans on water consumption and meaning and understanding of its use on their cultural backgrounds and up-bringing. This will be translated into how the water crisis in Cape Town in the past year to present date has affected them in terms of their adaptation to home water usage over the period of the crisis. Thus see the effects on perceptions of the marketing strategy around Day Zero given the changes that have commenced around it.

1.6 Research Objectives

To investigate effects that ethnic and cultural backgrounds of the Black Nguni Culture affect domestic water consumption. Further, explore how these influences affect the perceptions regarding the drought affecting The City of Cape Town. This contributes to an understanding of the perceptions of water, and constructing transitions to sustainability. With these findings the study will explore whether they can be utilised to change the understanding of domestic water consumption and inflict change.

- Explore the cultural influences passed down to Nguni African Students in the way in which they use water.
- Explore how the marketing and Brand strategy around Day Zero and the water crisis has been implemented
- Explore the extent in which culture can influence water consumption
- Explore the perceptions and changes around Day Zero given the date being moved back
- Explore how Day Zero has influenced the way individuals use water today.
- See how the marketing and branding of Day Zero has affected individual perceptions

1.7 Key Theories

Culture : Culture is regarded as a set of distinctive spiritual, material, intellectual and emotional features of society or a social group, encompassing, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs" (Panebianco and Serrelli, 2016)

Ethnicity: Ethnicity is a concept that refers to cultural practices and attitudes that characterise a given group of people and distinguish it from other groups. People within a group have certain background characteristics including language, religion, ancestry and other shared cultural practices which provide them with a distinctive identity (Norton and Watt, 2004).

Sustainability of water: Water is at the core of sustainable development and is critical for socio-economic development, healthy ecosystems and for human survival itself (Un.org, 2018). It is central to the production and preservation of a host of benefits and services for people. Water is also at the heart of adaptation to climate change, serving as the crucial link between the climate system, human society and the environment. Water is a finite and irreplaceable resource fundamental to human well-being. It is only renewable if well managed (Un.org, 2018).

Domestic Water Use: Domestic water use is water used for indoor and outdoor household purposes which are all the things you do at home namely drinking, preparing food, bathing, washing clothes and dishes, brushing your teeth, Gardening, swimming, and even washing the car. (Perlman, 2018)
The above can be broken down into essential usage and leisure/various activities, in other words, household water consumption comprises discretionary and non-discretionary water usage.

Cultural Traits: Culture should be regarded as a set of distinctive spiritual, material, intellectual and emotional features of society or a social group, encompassing, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs" (Panebianco and Serrelli, 2016)

The Oppositional Culture Theory: Traditional environmental theories, building on the cultural-ecological approach of John Ogbu, have argued that blacks, given their racial marginalisation within socioeconomic social structure of a capitalist society, either develop an oppositional social "Identity-in-differential" that defined "certain activities, events, symbols and meanings as not appropriate for them because those behaviours, events, symbols and meanings are characteristics of white culture" (Mocombe and Tomlin 2010: 1)

2. LITERATURE REVIEW

2.1 Introduction

This section establishes a foundation for this study providing an overview of theories and knowledge supporting the research. It begins by introducing and reviewing the culture and ethnicity theory, the progress in sustainable water management in the City of Cape Town, domestic water consumption and then situates this study in the context of existing work and knowledge in the field. This chapter aims to identify the research gap that this study will fill, and to develop a theoretical framework for guiding this research.

2.2 Conceptualisation

Nguni Culture: The cultural characteristics of Nguni tribes which include the IsiXhosa, Zulu, Sotho, Tswana, Ndebele, Venda and Pedi cultures of Southern Africa. The way these characteristics differ from western culture and how their social cultural norms affect the way in which water is consumed and utilised compared to said western cultures.

Branding: A brand is a social construct. Meaning that brands are formed by society in all its spheres. We encounter brands that are commercial, political, fight for causes, brands as a city, brands as a country, Religious brands and so forth. All of the different spheres have a unique nature however have one thing in common, the conscious development of a particular and unique meaning that holds value and connects with people.

This concept will be carried throughout the study through the lens of looking at the branding of Day Zero. How the branding has been carried out and the lasting impact it has had on the sample (African Nguni Students) to determine whether alternative methods to the branding strategy could possibly be utilised.

Cultural Influence: Cultural influences means historical, geographical, and familial factors that affect assessment and intervention processes (Cultural Influences, 2015). Cultural influences that are relevant to an individual may include:

- Racial or Ethnic Self-Identification: How an individual identifies themselves in a racial or ethnic context
- Experience of Cultural Bias as a Stressor: Description of how the individual has experienced cultural bias.
- Immigration History and Status: Description of the individual's immigration path.
- Level of Acculturation: Level of acculturation (the modification of the culture of a group or individual due to contact with a different culture) could be western or any other culture, or a new social group, a new town, family or any change in group of people with whom the individual associates.
- Verbal Communication Style: Culturally impacted verbal and non-verbal communication styles— like call and response, looking at people in the eyes when they are talking, means of conveying conflict or conflict avoidance, tone of voice, posture and means of expressing one- self verbally and non-verbally.
- Spiritual Beliefs: Religious or other forms of spiritual beliefs.
- Health Beliefs and the Endorsement of or Engagement in Culturally Specific Healing practices.
- This concept is translated throughout the study by taking into consideration the varies ways that culture can impact and affect an individual. It will then explore to see how these various influences have particularly impacted black Nguni students on their water consumption methods.

Day Zero: Day Zero is Cape Town's imminent doomsday, the date the taps may run dry and residents begin queuing for water (Bernando, 2018). Cape Town is experiencing a serious water shortage due to insufficient rainfall and fast declining dam levels (Bernando, 2018).

The January announcement of an imminent "Day Zero" threw the city of Cape Town and environmentalists across the world into a frenzy and deputy mayor Ian Neilson wants the public to know that he was not responsible for announcing Day Zero stating that: "It's hard to say it was the right or wrong decision. Clearly, my sense is if I had been there I would not have made that statement, Because what I would have done, is I would have implemented these heavier restrictions in November already.(Yates, 2018)"

Neilson took over water crisis duties from Mayor Patricia de Lille in mid-January following a DA directive to remove the mayor from managing the water crisis. Since then, Neilson's two priorities have been to disseminate facts and to emphasise one simple order: Save Water (Yates, 2018). A theoretical Day Zero was predicted years ago, but it was never predicted for 2017, however, the water crisis remains an issue and the continual preservation of water is critical, emphasises Neilson. However, barring another historically low rainy season, the alternative mechanisms for providing water should be in place

by next summer (Yates, 2018). If Capetonians continue to adhere to the daily restrictions, they will never see a Day Zero and hopefully the water crisis as it stands will end within the next few years.(Yates, 2018). Experts do however still claim Day Zero is still likely for 2019 (Andersen, 2018).

2.3 Culture and Ethnicity

Culture is regarded as a set of distinctive spiritual, material, intellectual and emotional features of society or a social group, encompassing, in addition to art and literature, lifestyles, ways of living together, value systems, traditions and beliefs" (Panebianco and Serrelli, 2016). Studies of different cultures around the world give the impression of an enormous diversity of forms (Rohner, 1984). These differences are so vast that there may be an inclination to think every one of these cultures developed independently and people have found expression in the forms under which they live(Rohner, 1984).

If one were to take a look back over the twentieth century, it seems clear that culture moved to the foreground (Goodenough, 1999). With the discovery of culture being universal, the study of culture and the critique of culture became an increasingly central part of political and intellectual life. Anthropologists are often questioned as to what culture is, with the implication that the concept is outdated and ambiguous (Goodenough, 1999). Culture is often treated in quantitative social science as representing and inexplicable residuum of rigorous empirical analysis. An area of darkness beyond the reach of currently available scientific searchlights (Panebianco and Serrelli, 2016). It is assumed no progress in conceptualising culture has been made since 1934 and the progress in anthropological research is measurable by its movement away from the concept and toward the specific behavioural variables of economic, demographic and psychological research (Panebianco and Serrelli, 2016). This assumption, however, takes no account or regard of the recent conceptions of culture advanced within anthropology in recent years and found valuable in ethnographic research.

Cultures, including traditions, family and social customs, shape the particular ethnicity (Rohner, 1984). The study investigates ways culture influences water usage of black Nguni African students within the city bowl in Cape Town and explore methods these finding may be utilised in water management crisis (Day Zero).

Ethnicity has been conceptualised in anthropology and sociology for many years yet people still seem uncertain of its meaning, relevance and relationship to other concepts like race and nationalism. The term ethnicity has been used to describe human social interaction. Particularly relating to groups that would have previously been described as 'tribes', to minority migrant groups and 'host' societies. The

most common characteristics distinguishing various ethnic groups are ancestry, territorial possession, language, forms of dress, a sense of history and religion(South African History Online, 2017). These characteristics were the units of social, economic and political organisations and inter-communal relations. Ethnic differences are not inherited, they are learned (Yan, 2016). This study will review if ethnic differences which are learned can affect the way people utilise water and affect their consumption, specifically black Nguni African students within Cape Town.

South Africa consists of different ethnic groups located in different rural homelands. These were self-providing groups with agricultural economies(South African History Online, 2017). The land was important for the reproduction of social and economic life. Revealing that water consumption methods played a big role to native South African ethnicities based the structure of their economy showing high reliance on it for survival. This also gives a clear outlook on that the people of these ethnicities took great consideration into the way water was used for domestic use as well

The black African population of South Africa is divided into major ethnic groups namely the Nguni people which consist of Zulu, Xhosa, Ndebele and Swazi, Sotho people which include Northern Sotho (Bapedi), Southern Sotho (Basotho) and Tswana, Shangaan-Tsonga and Venda (South African History Online, 2014).

The characteristics and influence of the Nguni culture are the ones that the study will be researching to see if these influences have an impact on the way the Nguni cultures consume water
Their traditional material culture continues to exist, but many changes have taken place during the last two hundred years that have done much to alter it. New objects and materials have been introduced, mechanical transport has introduced, wild animals and foods have become scarce, Christian missionaries have influenced clothing and taught new skills and the white government has spread laws which have changed the mode of living (South African History Online, 2014).
Between the two major patterns, namely the traditional approach to all illness specific to African society and the increasing acceptance of Western approaches to psychiatry by many Africans, lies a transitional position of apparent acceptance of Western methodology with covert adherence to the approaches of the indigenous healer. Under extreme stress, moreover, there is a tendency to revert to traditional beliefs, with concomitant processes, and even communication.

Therefore, given these changes we take a look at how the adaptation of the Nguni cultural norms has affected their water consumption as well and see the adaptation to new ways of living has altered their consciousness when it comes to the consumption and use of water. Individual-orientated Western

approaches are at direct variance with the African social system. Norms and values are derived from a fixed, cohesive, group-orientated social order.

When gaining insight into the water use of a certain ethnic group, the influence of the culture attached to this ethnic group should not be ignored (Yan, 2016). Little is known about the water perceptions among ethnic minority groups and how their ethnic and cultural backgrounds might influence their participation in water conservation. There is a lack, therefore, of available information for the reference of water managers, planners or educators. Numerous studies have focused and continue building profound knowledge of the relationships between population and water consumption in domestic water use aspects. Limited water consumption use patterns of particular households among these study efforts address concerns of ethnicity as a factor of understanding domestic water use variations pertinent to water research and management (Darr et al., 1975; Murdock et al., 1991; Smith & Ali, 2006).

2.4 Sustainability of water: Cape Town

Water use and management are of critical importance in the pursuance of urban sustainable development Schaffer & Vollmer, 2010).

Water is not just a necessity required to satisfy the biological need for life; it also plays an important role in maintaining ecosystem health, economic development, social well-being and cultural values (Gleick, 1998). According to figures from 18 of the Western Cape's top hotels, income in January and last month was 10% to 15% lower than it was last year, said Judy Lain, head of marketing at Wesgro, the Western Cape's tourism, trade and investment promotion agency (Schoeman, 2018). This is just one of the effects that the water crisis and insufficient water sustainability can have on a city.

Sustainability cannot be achieved without sustainable water resource management supporting its development (Loucks & Gladwell, 1999).

In Sydney, water management agencies have made efforts to engage ethnic minorities in various demand management initiatives. The Ethnic Communities Sustainable Living Project has been a good example of engaging multi-cultural and bilingual communities in environmental protection, where sustainable living information is delivered to ethnic minority communities via bilingual educators (Yan, 2016)

Cape Town receives water from a system of dams supplying agriculture and other urban areas. A system heavily dependent on rainfall and managed by the national Department of Water and Sanitation where about a third of the supply consumed agriculture and 7% by other urban areas (smaller towns).

The Sustainable Water Management Plan ("the Water Plan") for the Western Cape Province was developed, following the recommendations made at the Water INDABA held in 2009 (Western Cape Sustainable Water Management Plan - 2012, 2018). Its development was done by the Western Cape Government and the National Department of Water Affairs where Short, medium and long-term actions to guide the implementation of projects and activities were developed, as a means towards achieving integrated and sustainable management of water in the Western Cape. The aim of the Water Plan is to guide sustainable water management towards meeting the growth and development needs of the region.

A summary of the key strategies and planning initiatives reviewed during the development of the Water Plan is provided in Annexure 1.

The Summary gives an outlook and structure as to how the development of the water plan must be in line with the Constitution of South Africa as well as other regulations and plans with regard to the sustainability of water in the country that the National planning commission in the presidency is mandated to set out on a National level as well as looking at Local and Regional regulations taken into consideration to counter Day Zero.

There has been multiple restrictions and regulations put in place to counter and prevent the water crisis in the City of Cape Town namely:

• Restriction Level 6B: Level 6 was enforced from 1 January 2018, and 6B from 1 February 2018. The target has been reduced to 450 million litres per day (MLD). Daily individual consumption must be limited to a maximum of 50 litres per capita per day (LCD) to be aligned with Level 6 tariffs. 4 million people at 50 litres per day = 200MLD. Approximately 150MLD is consumed by industry, commerce, government etc. This results in 100MLD less than the daily target of 450MLD (Water Outlook Report 2018, 2018).

• Communication campaigns. The municipality implemented communication campaigns to assist people in reducing their consumption, including household leak detection & repair and how to use 50 litres, and continues to use radio, print and social media to reach every citizen and mobilise to reduce consumption to 450MLD, aligned with 6B restrictions (Water Outlook Report 2018, 2018).

• Pressure reduction: Pressure reduction was previously initiated by the municipality and has now been accelerated to automate zones across the city to optimise the system and reduce demand especially the impact of leaks. Pressure zones are being used to force down consumption by controlling zones to the extent of limited supply if user behaviour in the zone is high in an effort to meet the daily water budget. Savings of nearly 50MLD have been affected so far (Water Outlook Report 2018, 2018).

• Household flow regulators: The programme has been dramatically ramped up to households who have not reduced consumption to restrict daily household consumption and safeguard against the impact of leaks. In many cases, this was due to undetected leaks, but under level 6 restrictions. The city will install these water management devices to manage debt where consumption is higher than 10.5 kilolitres (kl/month). A household of 4, each person using 50 lcd results in a monthly consumption of 6,000 litres per household. The allowance is per day, whether at home, work or school. Note also that the average household size in Cape Town is 3.2 people. While 6B restricts to 50 lcd, devices will only be fitted above 10.5kl, targeting the highest users (4B targeted households using over 20kl). Households with >4 occupants need to register with CCT to increase the allowable monthly use (Water Outlook Report 2018, 2018).

Historically, the management of water shortages or inadequate assurance of water supply was primarily driven by the development of new bulk water supply infrastructure (including dams, water transfer schemes, groundwater development, etc.) These conventional sources are becoming few and far between. A strong shift in water resource management and planning is taking place in terms of addressing the water demand-side interventions as seen above and can also be seen in the following efficiency and augmentation options that have further been explored by the city of Cape Town.

A summary of the following water use efficiency and alternative augmentation options explored during the development of the Water Plan is provided below:

• Water conservation and water demand management (WC/WDM)
• Water re-use
• Desalination

With numerous WC/WDM planning studies and strategies developed to date, there is a significant opportunity for implementation in both the urban and agricultural sector. This will require cooperative governance between authorities and heightened public awareness. Although Government has an important role to play, they cannot be solely accountable for all WC/WDM efforts. All water users need to implement WC/WDM measures within their community (Western Cape Sustainable Water Management Plan - 2012, 2018).

The efficiency of water use within the irrigation sector is influenced by three key significant factors which are conveyance losses, irrigation application methods and scheduling of irrigation. Farmers have optimised water use and achieved water savings. The latter is often used for further expansion, as per permitted water allocations (i.e. more crop per drop). The refurbishment of large irrigation conveyance

infrastructure offers significant water saving opportunity, where a 30% reduction in losses could be achieved (Western Cape Sustainable Water Management Plan - 2012, 2018).

Water consumption monitoring is a critical and imperative intervention that must be implemented by all water users. The Water Users Associations (WUAs) are required to address this in the irrigation sector while the Water Services Authorities (WSAs) are required to address this in the urban sector (Western Cape Sustainable Water Management Plan - 2012, 2018).

Water re-use opportunities have been investigated at a high level of detail and implemented to some extent in the Province. Most notably in Beaufort West, George and in the larger towns of the Cape Winelands District. The City of Cape Town has scheduled a feasibility study to investigate large-scale water re-use opportunities. Water storage is critical if water re-use is to be implemented at scale (Western Cape Sustainable Water Management Plan - 2012, 2018).

Desalination of seawater effectively offers an unlimited source of water supply and such schemes have already been implemented in other towns within the Province (Bitterfontein, Mossel Bay, Sedgefield, Plettenberg Bay). The City of Cape Town is also currently investigating desalination at scale and exploring possible measures to be taken for implementation (Western Cape Sustainable Water Management Plan - 2012, 2018).

The research will look at these strategies and view their effectiveness seeking alternative strategies to reduce consumption from the research on how culture and ethnicity influence domestic water consumption.

2.5 Domestic Water Use

Domestic water use is water for indoor and outdoor household purposes. These are all the things you do at home namely drinking, preparing food, bathing, washing clothes and dishes, brushing your teeth, Gardening, swimming, and even washing the car. (Perlman, 2018)

The above can be broken down into essential usage and leisure/various activities, in other words, household water consumption is comprised of discretionary and non-discretionary water usage. This division is very important when examining the effects of water use drivers, so that the targeted water-saving potentials implemented by demand management approaches, can be satisfactorily achieved through discretionary water use without translating the burden to a household's basic needs for water (Corbella & Pujol, 2009).

All around the world water consumption per inhabitant varies. For instance, an American needs an average of approximately 500 litres a day, a Western European 150 litres and an African only 50 litres

a day, proving that people are not using water equally based on differences that affect their perceptions of water usage (Lenntech.com, 2018). One main difference that can be identified is that in the rural areas/ countryside, people use less water than in the city. Generally speaking, the high-consumption lifestyles of households are believed to be the main cause of stress over water resources (Hurlimann, 2006).

Growing interest has been expressed in investigating the determinants of urban water demand since the late 1960s and the initial focus was upon the 'requirement concept' of estimating water demand which assumed that water requirements were just a function of population growth and the particular type of urban development (Foster & Beattie, 1979).

Research then progressed from this requirement model to economic models in which the roles of economic factors (e.g., water price and consumers' incomes affecting urban demand) were addressed. The ownership of water-use related amenities such as washing machines, gardens and swimming pools, has also been identified as an important influencing factor regarding domestic water consumption.

In 2010, Cape Town's water consumption in the average household used 250 litres of water a day. That is 7500 litres a month which is more than the monthly free water allowance every household received from the municipality (Capewatersolutions.co.za, 2018). In a typical South African household of 3 children and two parents. The average water consumption would be 37500 litres of water a month. With a growing population, over the years that resulted in the increase of water consumption. The average water use per household has increased to almost 1000 litres per day. A number of homes in Cape Town were singled out for the water management devices. The water usage of these households over six months ranged between 19 000 and 48 000 litres per month. Meaning, on average, the daily consumption of these households often exceeded 1 000 litres per day (News24,2018).

20.5% of Cape Town's population currently lives in informal housing (Viljoen, 2015). This category can be characterised as consisting of very poor water and sanitation infrastructure.
Water and sanitation services are commonly supplied by the City at certain points within the settlement areas and in line with the national guideline levels. Including water provision via one tap per 25 families within a distance of 200 m and sanitation services comprising a minimum of one toilet per five families (Viljoen, 2015).

A breakdown of the City of Cape Town's total water consumption by individual land-use category for the financial years 2015/2016 and 2016/2017 (Africa Check, 2018).

Category	2015/2016 (%)	2016/2017 (%)
Houses	55.6	55.0
Flats and complexes	9.2	9.5
Domestic other (mostly homeless shelters & old-age homes)	1.8	1.8
Informal settlements	4.7	3.6
Retail & offices	11.0	12.8
Industry	3.9	4.2
City-owned facilities & city departments	5.2	4.9
Government	2.5	2.2
Other*	6.2	6.0

The above stats reveal that a majority of the domestic water consumption comes from formal settlements and suburban areas. One main reason identified to be the cause of such high water use within formal areas is the use of water for outdoor use which the city considers non-essential water use. Only a small fraction of the water consumption is used in informal settlements. This could, however, be linked to the cultural influence that the residents of these areas have if one were to look into the demographics of the area.

Household or population dynamics (household size, household composition, age structure, gender and employment status) are the basic elements that facilitate understanding of the domestic consumption (Lux, 2008). As opposed to the economic factors, these socio-demographic factors have more influence on water usage than incentives. With regard to household size in general, the more members living in a household, the higher the aggregate water consumption. However, a certain level of economy of scale is found to exist in large households. The rationale is that water is used more efficiently in large households as members share resources. For example, people tend to take short showers in large households so that others can use the bathroom and this is the general norm for households in less formal and informal household where black Nguni Africans reside.

2.6 Conclusion

The above findings have given a profound understanding into the set theories explored within the Theoretical framework. In these theories it can be clearly identified that there can be a link to culture and ethnic influences to the use of water and its effects to our water consumption however further research has to be conducted to distinguish the extent of its effects and how cultural influences may later assist with the sustainability of water within the City Of Cape Town.

3. PROPOSED RESEARCH METHODS

3.1 Introduction

This section illustrates the research framework that was adopted to collect and analyse the primary and secondary data for answering the corresponding research questions. It starts by introducing the paradigm, methodology framework and research Design. The main data sources, sampling strategies and the conduct of each research approach, including the questionnaire and focus groups analysis are then introduced and explained.

3.2 Paradigm

The interpretive paradigm, is characterized by a concern for the individual. Interpretive paradigm explores a deeper understanding of the subjective world of human experience. This is highly appropriate to this study as it takes an observation of cultural and ethnic eccentricity of the Black Nguni society's water assimilation. This will then contrasted against the development of modern societal shifts in water consumption amongst different ethnic groups namely: White, Coloured and Indian. This will be achieved through the use of qualitative and quantitative research approaches which will be further discussed in section 3.3 (Methodology Framework and Research Design).

An extensive analysis of these findings will then further study the perceptions, knowledge and techniques utilised on water conservation and management and further explore recommendable alternatives to managing a water crisis. The imposition of external form and structure is resisted, as this reflects a bias view- point of the researcher. The interpretivist researcher understands their role as a social actor and seeks to focus on meaning and understanding the differences between individuals.

3.3 Methodology Framework and Research Design

Quantitative research techniques enabled the researcher to draw links between ethnicity and water use, such as identifying the patterns of use, and the correlations between ethnic status and level of environmental concern and environmental behaviours. Qualitative techniques, however, challenge the investigator to look into the 'why' behind the diverse water use patterns (Medd et al., 2007). The employment of a qualitative research approach overcomes the disadvantage of utilising quantitative techniques in order to understand the reasons, consideration and values that influence people's choices about water use and their everyday practices. As pointed out by Klocker and Head (2013), merely focusing on quantitative testing about which groups (majority/ ethnic minority) are more environmentally concerned or more engaged in environmental behaviours is unlikely to reveal the rich

diverse knowledge, values and practice brought by diverse migrant groups. Based on the above considerations, this study employed quantitative and qualitative research techniques, involving both secondary and primary data sources. A household questionnaire survey was conducted to collect primary data on households' housing and socio-demographic characteristics, as well as information on attitudes, knowledge and behaviour relative to water use among targeted ethnic groups.

Qualitative study approach with the use of focus groups and cultural practice observations, were also undertaken following the distribution of a questionnaire survey to deepen information and evidence of individuals' perceptions, knowledge and practices relating to water use. These findings were combined with those of the household survey. All of the above contribute to the outlining of the big picture of the ethnic and cultural correlates of water use. More details about each research approach will be presented in the following sections.

3.4 Population and sampling

Cape Town Is the second most populous city in South Africa behind Johannesburg and is the provincial capital of the Western Cape. The city is famous around the world for its beautiful harbour and is considered one of the best places to visit in the world. According to the most recent census the city sits at a population of 3.7million with a growth rate of 2.57% over 10 years. This puts the 2018 population approximately at 3.81million with a 1,530 people per square kilometre. With an increase in population it is therefore expected that the city will experience an increase in water demand and consumption relatively.

Cape Town is one of the most multicultural cities in the world and is a major destination for expatriates and immigrants.

- 42.4% Coloured
- 38.6% Black African
- 15.7% White
- 1.4% Asian or Indian
- 1.9% Other

In ethnically diverse cities such as Cape Town that face water stress, understanding the variation in perceptions and attitudes among ethnic groups regarding water use, water conservation and related issues is vital. The second major ethnic minority group - Black Africans were chosen for the purpose of

this research in Cape Town as the control sample. This categorisation was based on ethnic and cultural diversity experienced in the country as an entirety and on stats that the Black African ethnic minority group is 67.5% of the overall population of the country.

The selection of the target ethnic communities was based on these important considerations:

The larger the population of an ethnic community, the bigger the implications or impact that said community may have on water management; for this reason, the population size of the ethnic group was the first criterion.

The residential concentration of the ethnic community was another important criterion. Residentially concentrated areas can provide relatively easy access to an ethnic population and in turn ensure sufficient samples for the study.

In order to understand the expectations, attitudes and cultural norms of particular ethnic communities regarding water use and conservation (which is essential to the study), background knowledge about the ethnic community and its culture is required to ensure the high confidence level of the in-depth research. In the case of this study, given the cultural background of the author, it seemed prudent to focus on the ethnic group of Black Nguni backgrounds.

It is neither possible nor necessary to include all ethnic groups within the research. This research aims to better conceptualise and understand how ethnic and cultural backgrounds impact on water use in households through an in-depth investigation and analysis of one specific ethnicity. This was preferable to employing statistical modelling techniques, which require a wider sample across the society.

3.5 Data collection and Analysis Methods

Quantitative Study: Questionnaire Survey

- Questionnaire design

First, the respondents' attitudes towards water use and related water issues were measured using a 13-item scale question developed from a previous studies, Yan, L. (2016). Attitudes towards five aspects of water issues – water availability, water management, water consumption, conservation and reuse – were measured. Based on participants' responses to a 5-point Likert scale (1-strongly agree to 5-strongly disagree), the construct of this measure aimed to identify the different constructs of attitudes among households. Additional questions on willingness to learn more about water conservation and to

reduce water consumption were also included to explore each respondent's attitude towards engagement in water conservation.

Second, a 3-item question with 5-point scale responses (1-a lot of knowledge to 5-no knowledge at all), two single choice questions and another 3 items with yes/no/not sure responses were designed to measure respondents' knowledge about water use and management and their general familiarity with Cape Town's water issues.

Third, participants were asked to respond to a number of single and multiple choice questions about their perceptions of Cape Town's water supply situation, water demand management strategies, incentives and education programs. As well, they were asked about their perceptions of their own water consumption and situations that challenge their capability to conserve water. Sources from which respondents usually received information about water issues and their preference of particular sources were sought through a series of questions, so as to measure the access of ethnic communities to information and constraints by language.

Households' water use practices were investigated through a list of questions about what households use water for and how water is used, including the number of water-use devices (e.g., washing machines) and amenities connected to dwellings (e.g., swimming pools, gardens), and the water saving actions household usually undertake at home. This measuring system attempted to explore the ways in which different households use water through every day practices and the level of household engagement with water conservational practices.

As regards the measure demographic characteristics of households and ethnic-based information, questions and answer categories were designed so that comparisons were possible.

- Questionnaire survey

The questionnaire administration mode may affect the participation rate, accuracy and reliability of the responses. Compared to some other administration modes, such as face-to-face interviews or telephone interviews, self-administered questionnaires ensure more privacy for the participants and are particularly suitable for sensitive topics such as income and showering time (Koponen et al., 2011).

Given the limited time given to conduct the study, an electronic questionnaire was employed. As the questionnaire should ideally be conducted within the City of Cape Town, however, given the nature of distribution channel (Electronically: Social Media and Emails) there was limited control of demographic locations of respondents.

- Quantitative Analysis Methods

Data gathered by the questionnaire survey was processed using MS Excel software and was prepared for use in the quantities analysis. Non-parametric statistical analysis methods such as cross-tabulation and graphs were employed to analyse the data and to identify patterns and relationships.

Qualitative study

- focus groups

Additional information was obtained through qualitative research. A focus groups was conducted between in August 2018. Qualitative research explored the attitudinal and behavioural aspects of water use among the Black Nguni ethnic community as well as constraints and opportunities for community engagement in water management. Qualitative studies complemented the quantitative analysis by clarifying ambiguous or unexpected findings, and supplemented it with in-depth insights into the perceptions and attitudes of households towards their use of water, water conservation programs and water pricing, their vernacular water-saving practices, their achievements in saving water at home, the challenges they encountered as well as their ideas and opinions on the cultural interaction on water use attitudes and practices.

Focus groups are often used following quantitative surveys for interpreting quantitative results and adding depth to the surveys (Hennink, 2013). In this study, focus groups were employed to better understand the results of the questionnaire survey as well as to generate ideas and concepts which were missed in the questionnaire study.

Participants were recruited and selected through a random selection process through the same platforms of distribution for the questionnaire survey. They were grouped by ethnicity (language) and location (suburbs). One focus groups was conducted with a total of 4 people attending. Discussion focused on a range of topics including perceptions of daily water use, awareness of and attitudes towards water conservation, incentives and challenges for saving water, plus changes in attitudes, behaviour and feelings over time, information access and awareness of conservation programs.

- Qualitative Analysis Method

Thematic content analysis is used. This is a process utilised to interpret verbal and behavioural data. The process consist of sectioning the data into themes after transcribing and coding the data for thorough understanding of finding and identification of patterns and the identification of relationships among themes.

3.6 Anticipated Contribution

This research is significant because it provides an understanding of everyday practices of water use by ethnic groups. It has important implications for water planning and management and for cultural sensitivity and equal opportunity. People from different ethnicities have developed different habits, followed varying routines, and have culturally particular considerations when they make decisions. These differences lead to diverse water-use patterns and to people responding differently to water policies and management approaches. This highlights the importance of including ethnicity and cultural sensitivity issues in the processes of decision-making and environmental management. The lessons drawn from this research are applicable to many other cities, and to a myriad of environmental issues. There is an urgent need to act on these lessons, given the threats posed by population growth, increased consumption, climate change and the lack of easily available water sources. Fortunately, as a result of this research that builds on other studies of ethnicity and environmental issues, readers now know a little more about how to include ethnicity in the promotion of sustainable urban water use.

3.7 Conclusion

The existing literature on this study's topic provides a sound theoretical background from which this study can gain insights from. Measurement procedures and paradigm information from previous studies clarified some uncertainty surrounding the methods to use in this specific study. Previous research outlined that the study of culture and the critique of culture became an increasingly central part of political and intellectual life and has also shown that there has indeed a link between culture and domestic water consumption however in other parts of the world.

Research has also shown that the sustainability of water in Africa has been a weak point for the continent however due to lack of technology and resources and not particularly linked to the way that water is consumed in these countries. This gives the researcher foreground to have the assumption that indeed there can also be a link to African Nguni culture and the way water is consumed by these individuals based on their cultural methods exercised.

As this study will explore this link, it will further look into how these methods can then be utilised to rebrand Day Zero and assist in having a long term solution in the sustainability of water for the city of cape town by changing the perceptions of individuals in how water is perceived and the function of the commodity as well as it usage.

4. QUANTITATIVE FINDINGS

4.1 Introduction

This section presents the quantitative findings of the study. It starts by addressing the results of the household questionnaire survey, which provide insights into the perceptions, knowledge and post-migration behavioural changes of ethnically diverse groups, as well as incentives and challenges that shape people's engagement with water conservation. It then displays the results of the correlation analysis of the primary data (questionnaire data), which quantitatively examine the impacts of ethnic backgrounds on attitudes and behaviour pertinent to water use and water consumption. The last section displays the results of the quantitative examination of behavioural water saving changes among ethnic groups.

4.2 Water use Behaviour and Perceptions

Environmental knowledge is regarded as a prerequisite for environmental awareness (Pfeffer & Stycos, 2002); and, individuals' perceptions influence their water-use behaviour (Adams et al., 2013). Therefore, it is important to examine the variance across ethnic groups regarding how familiar or informed households are with water issues within the city of Cape Town.

The questionnaire sought to determine participants' perceptions of Cape Town's water supply situation in the long term. A comparison of responses across four ethnic groups (Black, White, Coloured, Indian) revealed significant differences in respondents' perceptions (Figure 1. 1). Black respondents were more likely to believe that the City of Cape Town is only just able to maintain their water supply (27 percent) compared to the 4.65 percent of White respondents and 2.33% coloureds. 11 percent of Black respondents believe that the City Faces a water crisis, water restrictions and has sufficient water supply respectively and 6.98 percent are not sure about the state of the city's water resources. White respondents tend to believe that there is a water crisis and they're aware that the city faces water restrictions however less are believe that the city is able to maintain their water supply.
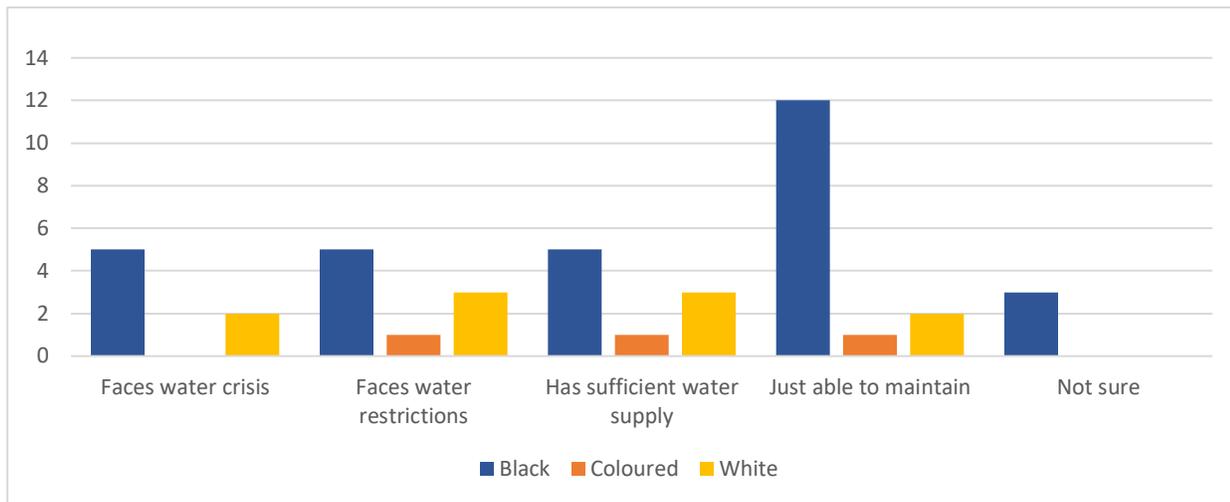
Figure 1.1 Perceptions of Cape Town's water supply situation in the long run by ethnicity Q4

The respondents' perceptions of Cape Town's water supply compared to those of their home cities may have influenced their perceptions and judgement of water issues, which in turn would influence people's attitudes towards water conservation and water use behaviour. As seen in the table below (Figure 1.2). To this end, questions were asked regarding what the participants thought about Cape Town's water quality and quantity compared to water conditions in their home cities (Q5 and Q6). As shown in Figure 1.2, The two ethnic groups outside of Black Africans all tended to be more neutral or think the water quantity and quality is poor or very poor. However, regarding the quantity and quality Black respondents also tended to think that the quality and quantity of the water in the City is Poor or very poor or were neutral about it. Overall, the respondents showed to be very impartial to the perceptions around the water supply of the city, with only a small percentage of respondents in each group stating that Cape Town had a good or very good water supply. Thus over all meaning that 39.4 percent of the respondents were either neutral or thought the quality of water supply was poor, only 3 percent thought of it to be Very Good or Very Poor and 5 percent with the perception that it is good. With regards to the quantity of water supplied by the city 41 percent was impartial reporting they are neutral to the quality of the water supply and 38 percent reporting it is poor. A very low percentage of respondents reported the quality to be very good or very poor and only 5 percent regarding it to be good.
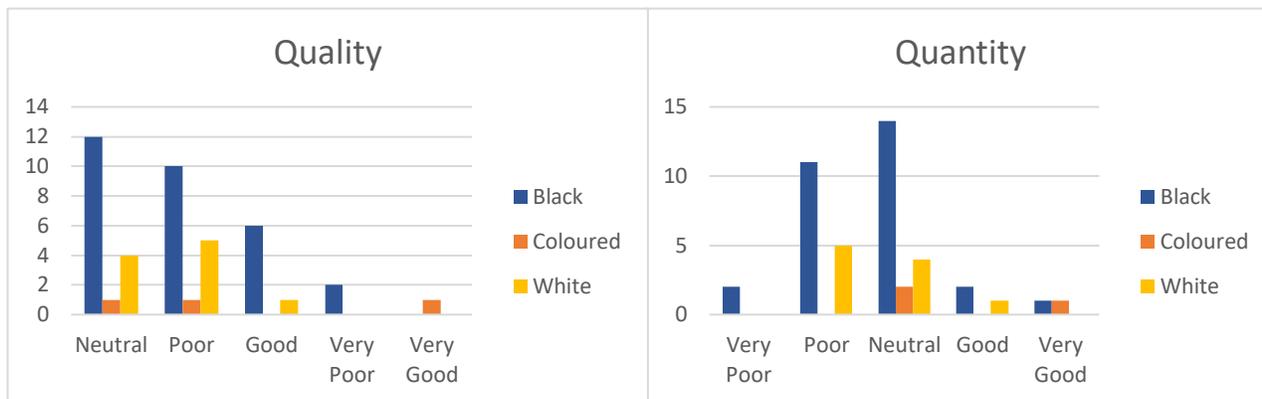
Figure 1.2 Participants' perceptions of Cape Town's water quality and quantity compared to those of their birth city Q5 and Q6

4.3 Information sources

Figure 1.3a presents the sources through which respondents usually receive information about water issues (multiple choice question Q7). Figure 1.3b summarises the main information source reported by respondents (single choice question Q8). Overall, as shown in Figure 1.3, Black African respondents were likely to have more sources of information than the other groups. Half or more of Black respondents reported usually receiving information about water issues from four information sources: Internet, newspapers, radio, friends and family and television with work, government sources as well as school threading behind respectively. In contrast, only 3 or less information sources were reported by more than half of the respondents in each of the other two groups. Sources of information tended to vary according to groups. Specifically, the internet was the most reported information source by all groups: 76.6 percent by the Black African group, 100 percent by the Coloured group, 80 percent by the White group. Friends and Family were the second most reported sources of information for water issues in Coloured (100%) and White (70%) groups. In comparison, the Black group was relatively more likely to nominate Television as an important source following Friends and Family; with 56.7 percent and 46.7 percent respectively compared to 33.3 percent and 30 percent in the Coloured and the White group. Moreover, 26 percent of Black respondents, 33 percent of Coloured and 10 percent of White respondents specified the Government departments as one of the important information sources.

The pattern of responses for the main source of information source was similar to that for important information sources. Generally speaking, all the ethnic groups were more alike and tended to specify the Internet (Black= 53.3%, Coloured= 100%, White= 80%). Television and Social Media followed for the Black and White respondents (Television: Black=25.8%, White=10%) as the main sources for them

to receive information about water issues. The Coloured and White respondents were more likely to nominate Radio (Coloured=66.6%, White= 30%) and the water corporation (23.3%) as the most important sources of information. Responses seemed to be less varied among respondents in the 'Others' group, with almost half (48.5%) of this group indicating television as the most important source of information about water issues.
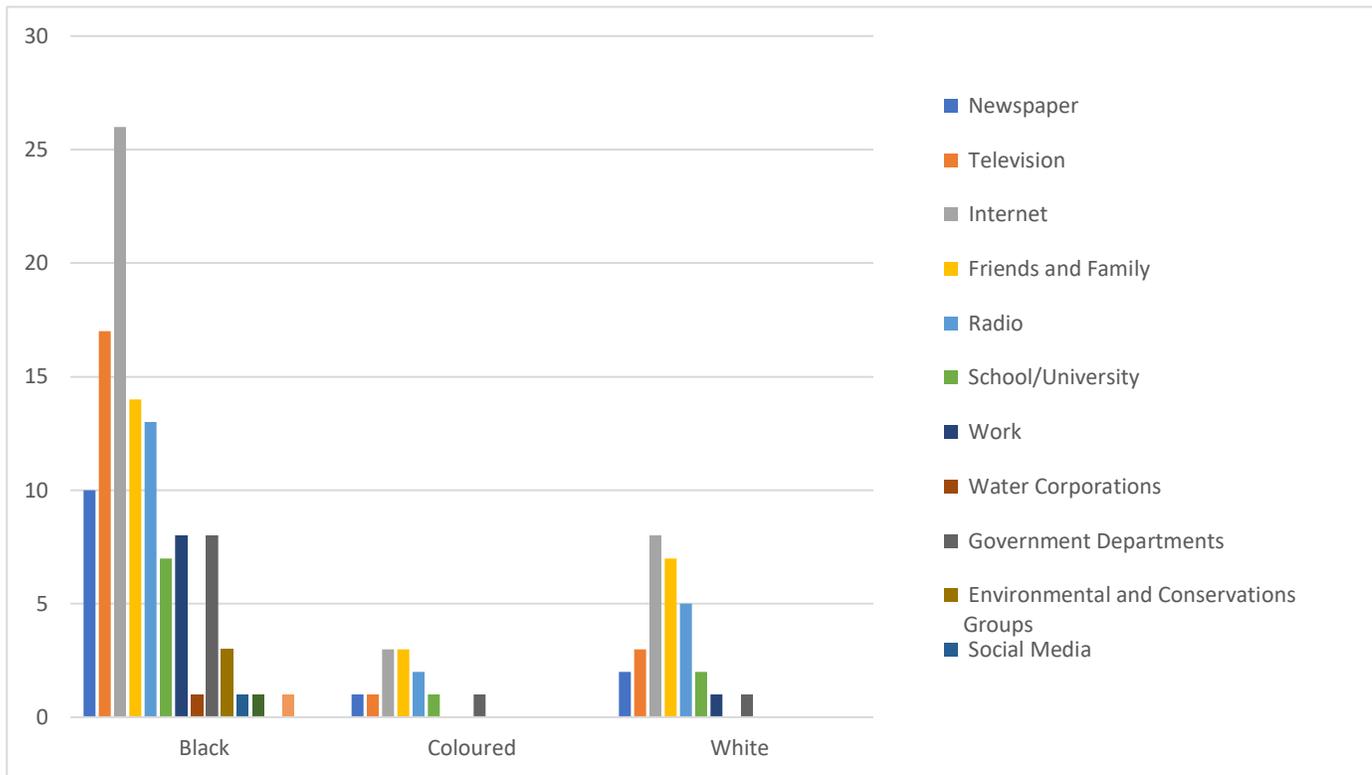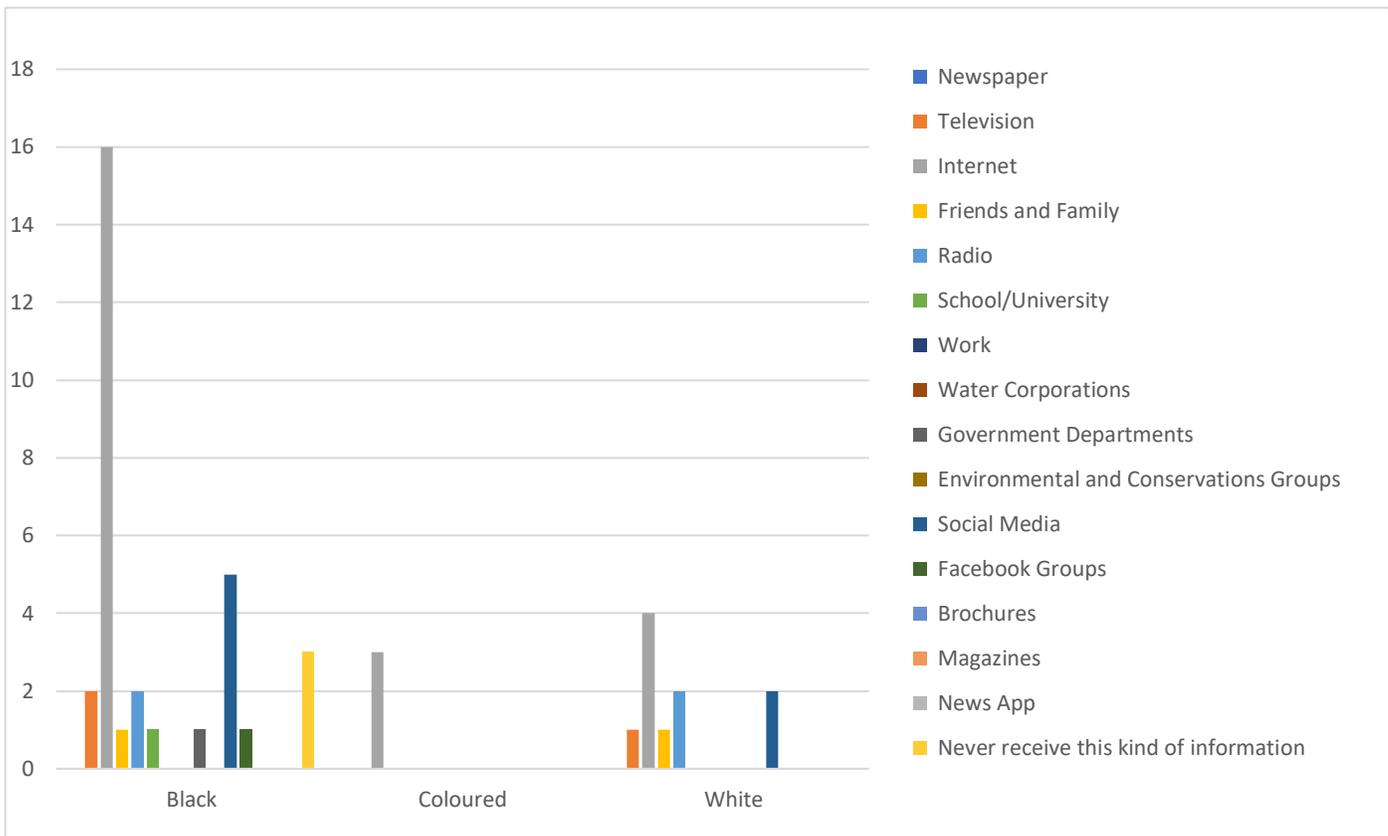

Figure 1.3a

Figure 1.3b

4.4 Perceptions of water usage and management

Figure 1.4 below shows people's perceptions to overall water management and usage. The graph further shows perceptions on the implications on the misuse of water and implementations by the government on water supply. These statements include:

- People should have the right to use as much water as they wish.
- The government should place restrictions on how much water a household can use.
- I believe that over-use of water depletes the resources available for use by other people.
- I have a personal responsibility to conserve water.
- Most households use more water than they need.
- The water supply in Cape Town is sufficient to meet the needs of the community for many years to come.
- It is important that lawns be kept green and healthy, even if it means using a lot of water.
- If an area has a water shortage problem, mandatory rationing should be enforced.
- It costs more to fix a leaky faucet than it is worth in water savings.

- It would be easy to reduce the amount of water used in your household.
- I believe that my actions can benefit the environment.
- Waste water can be effectively treated to a standard so that it is safe for flushing toilets, watering gardens, washing cars and other outdoor uses.
- Waste water can be effectively treated to a high standard so that it is safe for drinking.

25.5 per cent of respondents Strongly agreed and Agree to the notion that water should be utilised at citizens free will. This indicates that a significant part of society, among all racial ethnic groups, are aware of the importance of water conservation. 46.5 per cent of the respondents Strongly disagreed and Disagreed with this statement and the remaining 28 per cent responded to being neutral indicating uncertainty to the rights pertaining water usage and consumption. Majority of the respondents have strong beliefs on the effects on others pertaining the over-use of water and how their actions can be beneficial towards the environment should they practise healthy water consumption techniques (83.7% and 100% respectively). When questioned on the application of water restrictions on households by government institutions 69.8 per cent of respondents agreed with this method of exercising water conservation, however, 39.5 percent were neutral to the statement and 13.9 per cent disagreed completely. This implies that respondents are aware of the need of water conservation techniques being imposed but with room to explore substitute methods being mandatory as more than half of the respondents agreed that water reduction in households is possible (62.8%)
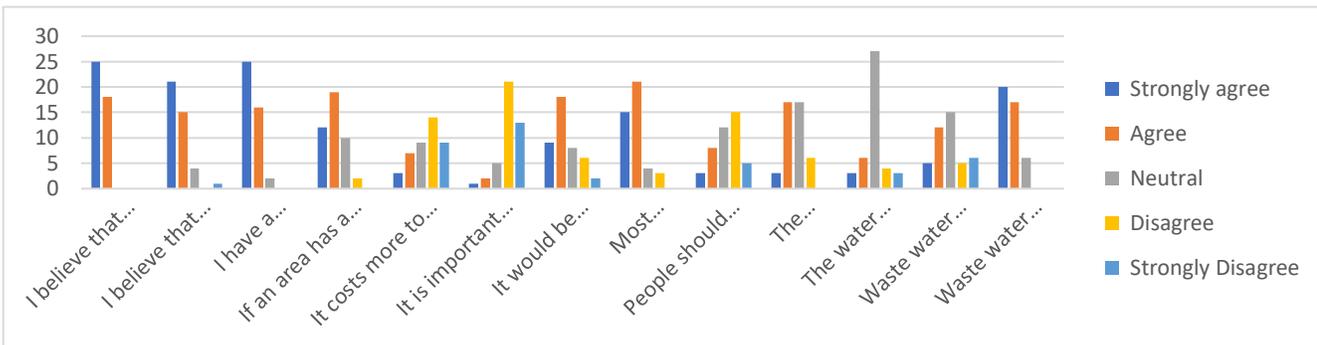

Figure 1.4 Perceptions of water management and usage.

4.5 Self-Knowledge on water supply system

The questionnaire also tested respondents' personal perceptions; that is, how knowledgeable they were about water issues including drinking water sources, grey water reuse, and water pricing. As shown in Figure 1.5, the results indicate that the White respondents tended to claim to have High and Standard knowledge of where household water comes from and the use of grey water system even

nothing about those water issues compared to their counterparts in other groups. Specifically, 85 per cent of White respondents admitted that they knew about

where their drinking water came from and the use of grey water compared to only 41 per cent and 50 per cent of Black Africans and Coloureds with 53 percent of Black Africans reported having little to no water about grey water system. The White respondents seemed relatively more confident about their knowledge compared to their counterparts, although more than half of the White respondents reported having little or no knowledge about water pricing.

A high proportion (65 per cent) of respondents indicated that they had Little to No knowledge of water pricing system in Cape Town. Compared to both the Black and Coloured groups, the White respondents were more likely to claim that they had moderate or quite a bit of knowledge about those water issues.
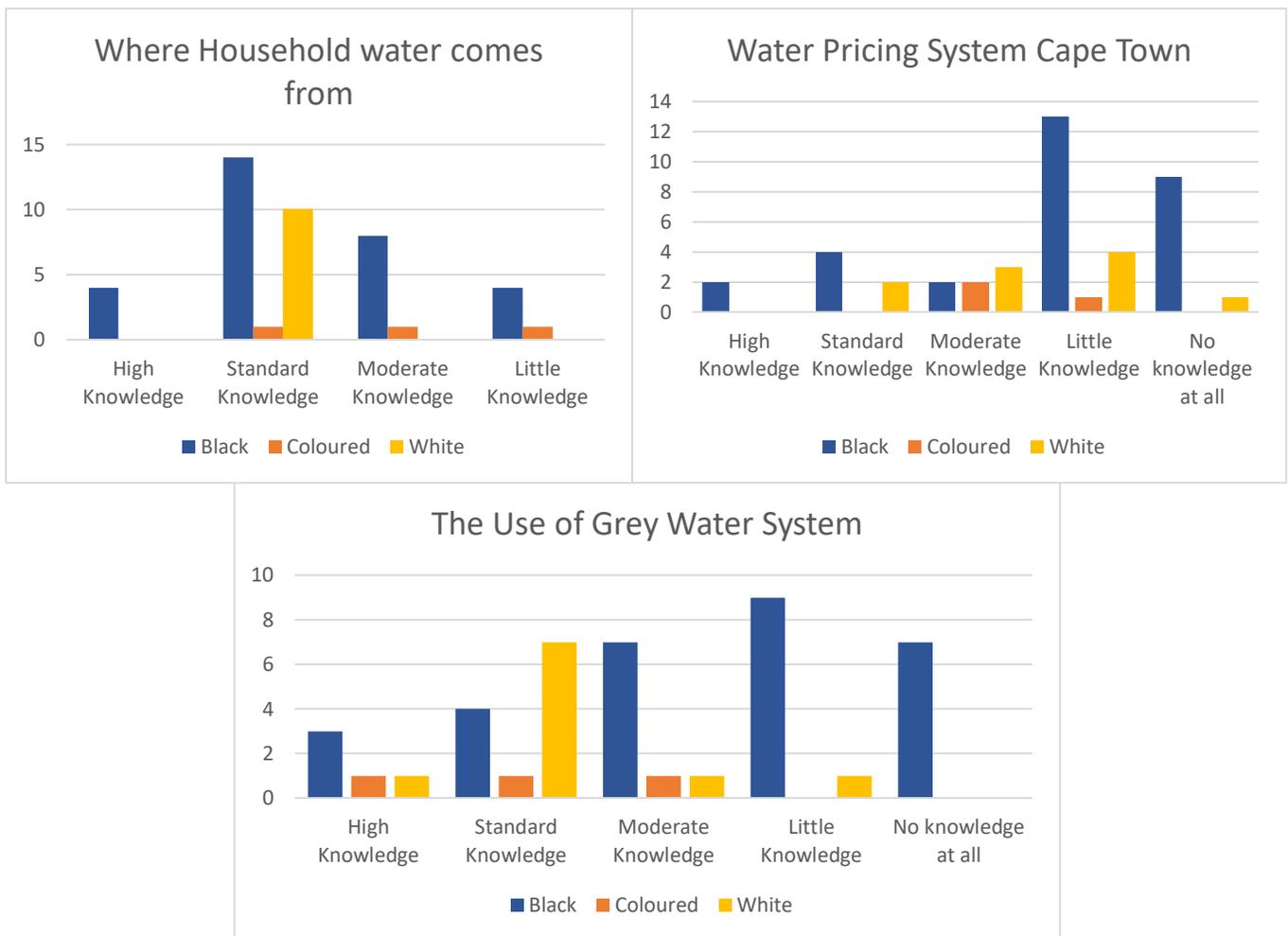

Figure 1.5 Self-knowledge on water supply system within the city of Cape Town

4.6 Water consumption Practises

When respondents were asked about their water consumption practices when in the City of Cape Town compared to other locations. Results (Figure1.6a) showed how their isn't a vast difference among respondents of different ethnic groups. Majority of the respondents claimed to practise more water saving actions when in the city of Cape Town (63%) with 84 per cent claiming the willingness to change water consumption methods. It is, however, recorded that more of the White group make significant changes to their water consumption (80%) which reveals slight indications of which ethnic groups make major adjustments compared to others. As a result, more Black African respondents claimed to be unsure of their practises compared to other cities more than claiming to not making changes. With 16% of the respondents not willing to adjust consumption methods all came from Black African respondents. Unwillingness to adjust methods could insinuate that the respondents feel there is no reason to. Figure 1.6b reveals that majority of respondents are willing to change their consumption techniques with majority of the respondents agreeing that some form of change needs to be applied
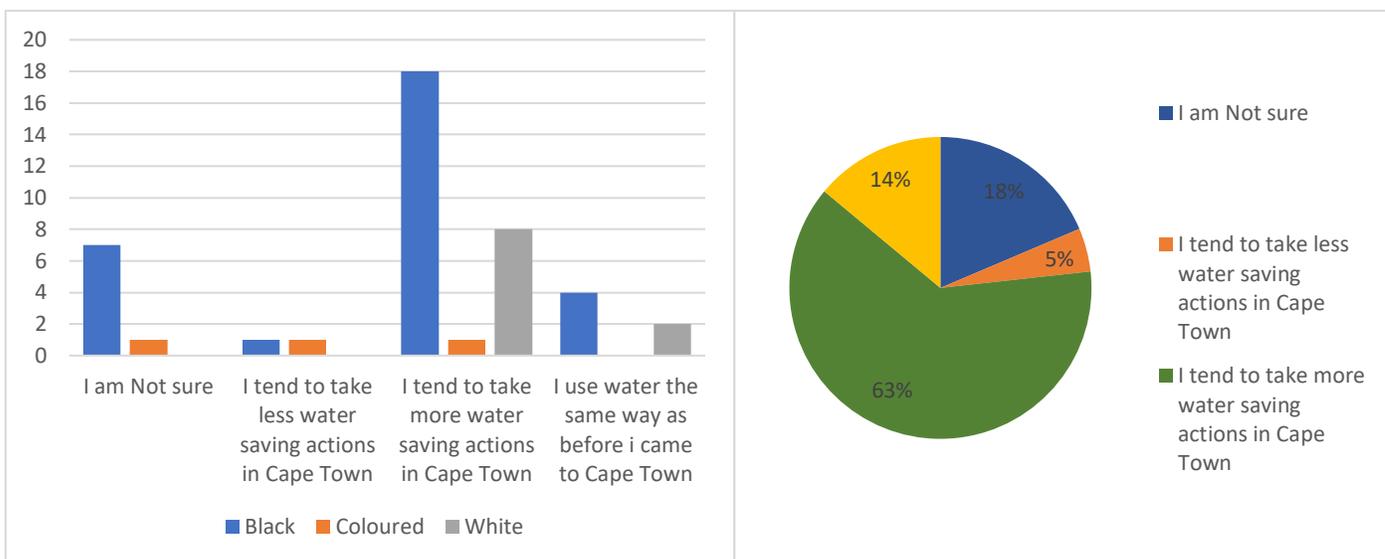

Figure 1.6a Ethnic differences in water consumption practises when in Cape Town
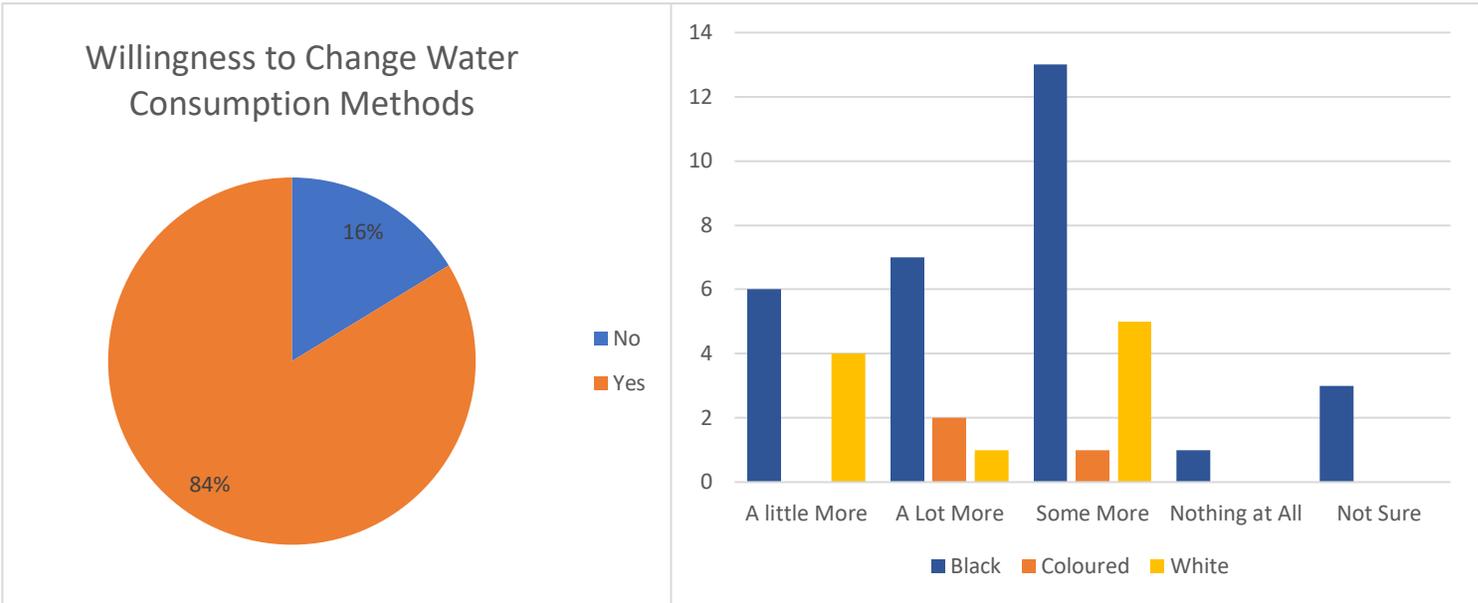
Figure 1.6b Willingness to change and how much change to water consumption methods

4.7 Water Consumption Practices Applied

To continue from above, all respondents across all ethnic groups supported their claim to being willing to change their consumption techniques. An average of 46.7 per cent of Black African respondents changed consumption methods in at least one way. Overall the top three methods
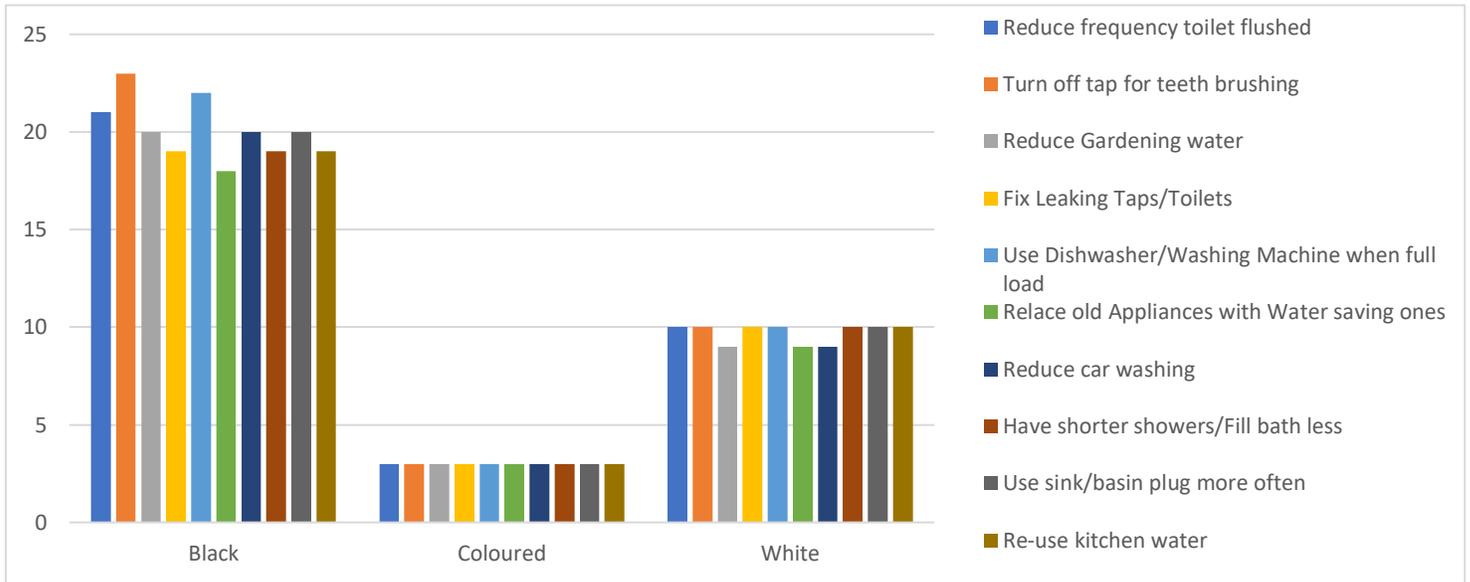

Figure 1.7 Methods implemented to reduce water consumption

applied by the ethnic group were turning off tap for brushing teeth, reduction of frequency of flushing the toilet and using the dishwasher/washing machine when there is only a full load.

In comparison other ethnic groups seemed to practise slightly more of the other reduction methods more frequently however this is only a minor difference. If linked to above information on the tendency of water consumption when in the City of Cape Town these results correlate.

4.8 Changes in Water Consumption

Looking at the figures below (Figure 1.8) all respondents willing to change water consumption methods claimed general environmental knowledge/awareness to be the main reason to adapting changes on water consumption (Black= 88.4%, Coloured= 66%, White=90%). Second main method are the water restrictions imposed by government, closely followed by the influence of others and community responsibility. This shows a good correlation to the response of the percentage of participants who identified the responsibility of conserving water (95% agreement). Methods imposing least impact on respondents is advertisement/promotion, media stories and upbringing and background (Black= 0%; 11.5%; 15.4%, Coloured= 0%; 0%; 2.6%, White= 10%; 10%; 50%) respectively.
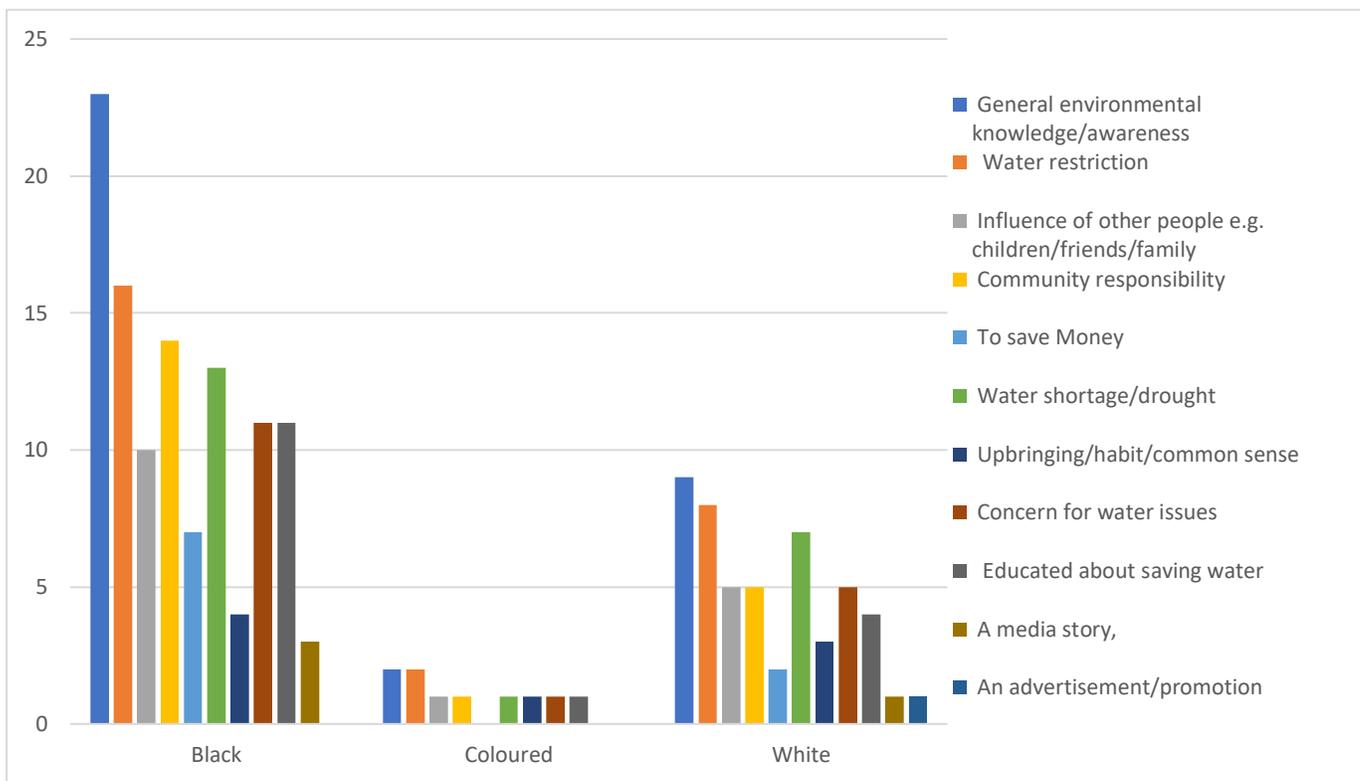

Figure 1.8 Willingness to change and how much change to water consumption methods
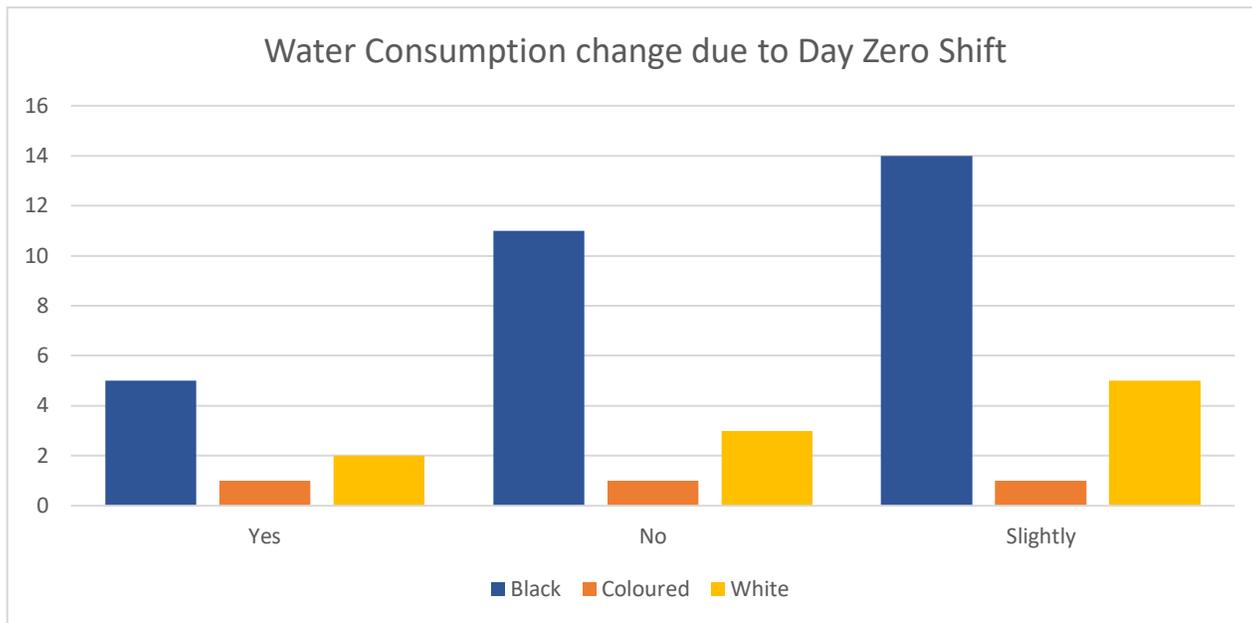
Figure 1.9 Water consumption shift (Day Zero)

4.9 Conclusion

This chapter summarised the findings of the quantitative analysis based on questionnaire data. Section 4.2, which drew on the self-reported questionnaire data, found that disparities existed in knowledge and perceptions of water issues across ethnic groups. Majority of Black respondents were found to have the perception that the City of Cape town is only just able to maintain their water supply. Showing minor acknowledgment of a water crisis compared to the remainder of respondents (Coloured and White) who reported the perception that the city faces a water crisis and restrictions. With regard to the quantity and quality of water supply there was a more neutral response about Cape Town's water quality and supply followed by a high response of poor quantity and quality of supply.

This indicates low knowledge about the local water issues across all ethnicities within the city. Reasons for low knowledge can be linked to main information sources on water issues respondents utilise (Section 4.3). The internet was recorded as the highest source participants used to gain information. The reliability of the source comes into question as the internet is flustered with information of non-reliable sources which are not verified. Very low use of water corporations or government corporations is used indicating that these institutions need to work towards availing these channels to the public to increase knowledge.

Section 4.5, which is based on the questionnaire data, examined the ethnic correlates of knowledge, attitudes and pro-conservation behaviours of water use, and confirmed the ethnic effects. Ethnic

differences exist in knowledge, attitudes and behaviour; and, even when the other demographic factors were controlled, the ethnic effects were still significant. The black and Coloured respondents were likely to have lower knowledge levels, less positive perception-based dispositional attitudes and were however less active in pro-conservational behaviour compared to their White counterparts (Section 4.7). Although the Black and Coloured respondents were more similar to each other than to the White respondents, disparities still existed. Moreover, acculturation-related factors were found to have impacts on the ethnic effects. Respondents from different ethnic and cultural backgrounds were found to be likely to follow divergent water use habits.

Ethnicity had greater importance than some economic and demographic factors in explaining the variations in per capita water usage among the populations. This study combines both quantitative research methods with the results presented in this chapter and qualitative research methods. The results drawn from the qualitative analysis (focus groups) component of this study are presented in the next chapter (Chapter 5).

5. QUALITATIVE FINDINGS

5.1 Introduction

This chapter presents the results of the qualitative analysis undertaken in this study. It starts by detailing the findings of the qualitative studies –focus groups– thereby contributing to a better understanding of the elements behind the phenomenon and patterns revealed in the quantitative study.

5.2 Ethnic Water Consumption Practise

Household activities vary; and, it is difficult to draw similarities or differences within or between groups of people given the limited samples in qualitative studies. Nevertheless, the discussion and investigation conducted did identify some differences in water use practices and perceptions of water use and conservation which were linked to ethnic and cultural backgrounds. Furthermore, the findings of the qualitative study also provide a detailed understanding of the ethnic differences in water use which were identified in the questionnaire. The following section looks at some household water practices in which significant differences were highlighted.

Through the discussion the participants highlighted that water use among their homes to be highly associated around sustainability and collective use as a saving technique. The mindset in their upbringing was not based around wastefulness and water use was a sensitive topic. The practise of recycling was imbedded in majority of the activities exercised at home. The plastic bags received from shopping were reused. And water was only available for domestic consumption and not recreational use. Examples mentioned: In winter or on colder days one respondents identified that their mother would bathe them in a wash basin in a room with a heater where it was warmer. The view was that it wold take longer to run hotter bath water. Another example is that

Resources that contribute to the high water consumption like showers, washing machines and dishwashers and sprinklers to name a few, were not available in most black households. Respondents reported having only had access to a shower at the age of 10 (year: 2002) or the closest resemblance of one being a shower extension attached to the bath. The act of water saving did not stem from water conservation concerns or the sustainability of water due to climate change (Environmental concerns). Water use did not have a strong link to economic factors in households. The identification of the water bill in households seemed to hold high importance and was strictly monitored regardless of the income generated by households. Even with respondents visiting families of other ethnic groups, they noticed that water consumption norms were not the same in their own homes. The notion is of that regardless

of economic standing across all ethnic backgrounds, these water consumptions would not have any difference due to the history of Black Nguni cultures.

Black homes have a strong association of labour to water. Whether water was being collected from the river/dams, community tap. Water has always been utilised for functionality. The luxuries of sprinklers and swimming pools that need to be drained or back washed. The use of water recreationally in black homes occurred when a water park or community swimming pool was visited. So the access to for recreational purposes was available however again on a communal basis.

5.3 Sustained Ethnic Water Consumption Practises

Generations have passed and with that comes a lot of changes in the way people live. Water consumption practices will also therefore take a shift as the years surpass. When the respondents were asked on the sustenance of the water consumption methods passed. The impression is the practises are still carried through however with slight changes and a sense of relaxation of implementation compared to water use back home. Respondents mentioned showered more in their own living environments. The inclination however is based on the water bill no longer being of concern. In other domestic uses like washing dishes and cleaning the techniques from home were maintained.

With water restrictions imposed or water being cut in particular instances, respondents identified that there wasn't a tremendous problem with adjusting their water consumption methods to fit current conditions. If anything the restrictions put in placed caused more of an inconvenience as flushing created an unhygienic environment. If better research was put in place water use could have been reduced in other areas and this is where they felt the City had failed them. Therefore the need to explore how water is consumed in different institutions becomes an important factor in water management in the city due to the diversity engulfed by the City.

Results of changed mindsets with regards to water consumption adjustments were discussed. Respondents mentioned a shift in attitude towards water, example the practise of purchasing drinking water was foreign before and there has been slightly prolonged showers. However, the use of other resources that utilise large quantities of water, still remain the same. Laundry is done once a week when there is a full load, washing dishes immediately instead of a pile that will utilise more water and washing the car at carwashes they have greywater systems in place or limiting a car wash to approximately 10-15litres (2-3 buckets).

5.4 Perceptions on Water Consumption and Day Zero

A main particular trend that was found among respondents is that Day Zero has become an inconvenience. Respondents reported and agreed that they felt the water crisis became high emphasis to other ethnic groups (Particularly White ethnic group) because they hadn't experienced the same extremities of shortage of the commodity. Water has "always" been an available resource to the white ethnic group due to the availability of infrastructure in comparison to the Black ethnic group.

Activities of saving water (Example: Bathing in a wash basin) are a norm to people of colour and other ethnicities being unable to utilise those methods is a clear identification of these differences. Now with the lack of research on ways to impose restrictions, there is a feeling of insensitivity from government as restrictions are imposed in areas where shortages are an existing issue.

Issues of the Government's announcement and management of the water crisis being disingenuous is another concern raised. Respondents identified that there are areas within the city which still have minimal access to water. Leakages are only attended to weeks after being reported and yet first to get heavily imposed restrictions, which raises questions around the crisis with regard to the level of urgency. Respondents raised that the water crisis for many areas within the same city, is not new as these areas have had ongoing water concerns before.

There was acknowledgement that the fear tactic believed to be used was a success. People only cooperate through fear and control their actions. The method also just caused way more panic than necessary, causing negative effects on the economy as tourism drastically decreased in a city that heavily relies on tourism. Respondents feel Black Nguni Cultural influences of water consumption can be utilised to better water management for the city, however, not in isolation. The "Day Zero" campaign caused confusion and uncertainties that could have been prevented with more research and disruptive approach to the solution of the water crisis. Particular massive tourist events commenced with minor repercussions whilst the city underwent the distress of a drought. This extends to that cultural influences may be used as a factor towards approaching a solution however with a high empathic concern of the environment and the people affected and rather promote the overall cultural influence of conservation.

6. CONCLUSION

Urban population growth and people's high-consumption lifestyles have put the environment under severe pressure throughout the world. Sustainable development offers cities a guide map to address the crisis they face. Water is a basic element of urban sustainable development; and, water demand management is an important approach to sustainable water use. Today, many cities are more ethnically diverse than ever before. In such cities, challenges include how to negotiate ethnic/cultural sensitivity, engage with culturally and linguistically diverse communities and equal rights. Addressing these challenges is of both great importance and urgency. A review of the existing literature indicates, however, that the relationship between ethnicity and residential water usage is not only unclear, but also rarely studied. In an ethnically diverse city such as Cape Town, it is important to understand the water use patterns of peoples from different ethnic cultural backgrounds, and to explore the influences of ethnicity on residential water usage and conservation. This current research contributes to an understanding of the perceptions of water among ethnically diverse communities, and constructs potential transitions to sustainability.

The study posed research question with relating sub-questions in chapter one. How can the cultural influences of Black Nguni African students, that have influenced their adaptation of domestic water consumption assist in rebranding Day Zero within their community (Cape Town, City Bowl)? With the aim of identifying the effects of ethnic and cultural factors on household water consumption. This was pursued through empirical study of White, Coloured and Black communities with further emphasis of Black Nguni Africans for extensive understanding. The research was guided by the following research questions:

- Does ethnicity influence household water use?
    - Do differences or disparities exist across ethnic communities relating to water use and conservation in terms of perceptions, attitudes and behaviours?
    - If so, what differences exist?
    - To what extent is ethnicity an influence?
- What are the reasons and factors that underpin the ethnic differences and disparities? In other words, how does ethnicity influence households' water use and conservation?
- What are the implications of ethnic diversity for water demand management? More specifically,
    - What are the opportunities for engaging ethnic communities in water management while maintaining important cultural values?
    - What are the barriers encountered when engaging ethnic communities in water management?

- How may these barriers be negotiated by water managers seeking to implement sustainable urban water management?

When answering question one, the results reported found that ethnicity does affect residential water use. Specifically the influence on perceptions, knowledge attitude and pro-conservational behaviour around waster use and its daily practices. The differences in perceptions across ethnic groups, based on questionnaire results, found that the importance of water conservation is prudent across all ethnicities. The Black respondents were however more of the belief that the water supply of the city is still sufficient to get by. With deeper research into the understanding of the links of water use and ethnicity. Black African Counterparts reported that the need for water conservation methods is more necessary for other ethnic groups than themselves. Disparities were further identified in the recording of water consumption norms between white and black counter parts. The respondents identified the use of water for recreational purposes is less of a norm for them compared to other ethnicities. This is due to the social construct of waters association with labour in Black homes which reveals high influence in the ongoing water consumption practises carried out today.

Reasons of these differences and disparities can be seen through the association of water in the mindsets of respondents as discussed above. Further, these are caused by beliefs and perceptions that are instructed from a young age. Results showed that regardless of ethnicity people have similar beliefs and perceptions of concerns around water consumption and conservation. The differences in availability of infrastructure and resources among the different ethnicities is another main factor contributing to the differences seen. White counterparts had more access to sufficient water supply compares to Black respondents who reported history of getting water from dams and rivers or communal taps. More extensive research is however necessary to make clear conclusions on the upbringing and history of other ethnic groups to draw more reasons which cause these disparities.

The study reported substantially higher willingness and potential to reduce water usage among the Black ethnic reported. The study did however reveal the sense of water saving to be a standard practise among Black Africans. With that said If this stated willingness can be translated into action, this finding further suggests that there may be greater potential among the ethnic minority groups for reducing household water usage than within the population in general. A concern found is the redundancy of having Black African cultural norms appropriated for the use of a water conservation campaign. Therefore barriers that could be encountered include: Access to participants for research, Lack of information and limited access, changing the resistant mentality of behaviours and patterns.

6.1 Ethical Considerations

Accessing participant – This is an ethical concern of gaining participants as the study is specifically targeted at Black Nguni African students so getting a sufficient number may become a problem for my sample. The participants will be informed exactly what the study pertains and how it will be conducted in terms of the survey, interview or focus group.

Consent for participation- The survey will have a disclosure section at the end for participants to sign and agree to their information to be used in conducting the study. If a participant is going to be taking part in an interview or focus group they will be asked to sign a consent form that will explain in detail how the information will be used and that their identity and personal information will be kept anonymous and used solely for the purpose of the study.

Personal information-The survey and interview questions may have sections that may ask participants to share personal information. It will be made clear in the survey that one does not have to share that information should they not be comfortable with doing so. This will also apply to the interviews and focus groups carries out

6.2 Limitations and suggestions

Qualitative research techniques were employed to supplement the quantitative analysis. It was expected that qualitative methods would deepen the information obtained from questionnaire survey. Although several communication methods were used to recruit participants, only a limited number of people attended the focus groups and interviews due to anonymity and confidentiality concerns, availability, low interest and change of mind, The relatively small sample size limited the scope of in-depth analysis to a certain extent.

The cultural probe was an innovative approach to this study, which was expected to help understand the specific water use practices that respondents mentioned in focus groups. However, due to the low response rate, the information collected through this technique was limited. Future research that intends to use the same data collection method could gain a large sample via a better designed recruitment process.

The results of this study suggest that attitudinal and behavioural differences by ethnicity are likely to contribute to the disparities in per capita water consumption. However, due to privacy requirements

about the use of data, direct correlations between the above two elements were not analysed. In other words, it was not clear whether the Black respondents who evinced positive water attitudes and high levels of activism tended to consume more or less water than the White and Coloured respondents. Therefore, further studies combining water consumption data with survey data (ethnicity, migration status, socio-demographic, housing and attitudinal data) at the household level are needed.

This study suggested that greater water reduction potential could be achieved by engaging with ethnic minority communities. Several aspects of water use were identified as good places to target. However, further studies based on actual water usage as measured in households are needed to confirm how much water households with particular ethnic backgrounds actually use for each water practice, and how much water can be potentially saved. More importantly, it is necessary to understand how water usage can be reduced by targeting the particular daily water-use practices that prevail in certain cultures. This could involve practical demonstrations, advice, and the promotion of innovative water saving facilities based on particular cultural preferences.

Similar research is also required in cities other than Cape Town, cities in which the population is ethnically, culturally and linguistically diverse, and the water supply is under stress. The lessons learned from this study also have implications for studies and management of other environmental issues. For example, ethnicity may impact on a households' energy consumption and willingness to support environmental protection. For this reason, further research is required to explore the effect of ethnicity on other environmental issues, and to increase our knowledge of this important phenomenon.

The time constraint to conduct the study hindered deeper understanding and analysis and contributions to the research. With a longer time frame more could have been explored and discovered with regard to contributions to behaviours and perceptions around the research question .

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