AN ANALYSIS OF THE PRICING MECHANISM OF WATER IN NAMIBIA: A CASE STUDY OF NAMWATER

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ABSTRACT

Water is essential for the existence, development and preservation of all human life, making it an essential commodity in the world. Hence, this thesis aimed at analysing the pricing mechanism of water in Namibia, using a case study of NamWater. The study specifically looked at the water pricing mechanism being used by NamWater as well as the advantages and disadvantages of such a pricing mechanism.

This study adopted a qualitative research method approach using a case study as the research design. The population consisted of all employees of NamWater and a sample of 35 staff members in the Finance Department was purposefully selected. Both secondary and primary data was used in the study; data was collected using a self-administered open ended questionnaire and interviews. Thematic analysis was used to analyse and present the data using tables, graphs and pie charts.

The study found out that NamWater uses the cost recovery pricing mechanism because of its advantages and due to the fact that it is a widely used pricing mechanism. Therefore, the study concluded that NamWater can continue using its current pricing mechanisms and try to factor in recommendations herein provided in the study.

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Jeremiah 29:11 says; “For I know the plans I have for you, declares the LORD, plans to prosper you and not to harm you, plans to give you hope and a future”; that is why first of all I have to thank the Almighty God for all the strength, courage, confidence and guidance that he has given to me throughout the entire study period. My special appreciation goes to my supervisors, Dr Blessing Chiripanhura and Mr Felis Kapepiso of the University of Namibia, who always went out of their schedule, not only to create a conducive environment for me during my study, but also for being mentors to me and for their entire contribution towards my academic progression.

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To all those who have made a contribution to this study, I am grateful and deeply feel proud of each and every one of you.

DEDICATIONS

This study is dedicated to my parents: the late Mr Protasius Nakutumba and Mrs Lonia Tulihaleni Mululu-Nakutumba, to my grandmother Mrs Veronika Mwayolange Hamukwaya-Nakutumba, my lovely husband Mr Robert Tileinge Ndemuweda, and the entire Nakutumba and Mululu family and to all my siblings and friends.

DECLARATION

I, Epifania Ndemuweda, hereby declare that this study, "An analysis into the pricing mechanism of water in Namibia: a case study of NamWater" is my own work and is a true reflection of my research, and that this work, or any part thereof has not been submitted for a degree at any other institution of higher education.

……. ……

Epifania Ndemuweda Date

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LIST OF ABBREVIATIONS

CEO:	Chief Executive Officer
DLG:	Department of Local Government
DWA:	Department of Water Affairs
EEA:	European Environment Agency
EurEau:	European Federation of National Drinking Water & Wastewater Services
GRICCE:	Grantham Research Institute on Climate Change and Environment
HoD:	Head of Division
LRMC:	Long Run Marginal Costs
MCP:	Marginal Cost Pricing
NamWater:	Namibia Water Corporation
NT:	National Treasury
O&M:	Operation & Maintance
PP:	Polluters Pay
PPP:	Polluter Pays' Principle
UK:	United Kingdom
UNAM:	University of Namibia
UNESCO:	United Nations Educational, Scientific and Cultural Organization

US: United State

WICS: Water Industry Commission for Scotland

WUC: Water Utilities Corporation

WSA: Water Service Association

CHAPTER ONE

INTRODUCTION

1.1 Background

Water is essential for the existence, development and preservation of all human life, making it an essential commodity in the world. It is vital for life and plays an important role for economic development. In the past decades, increasing population, urbanisation and industrial development have increased the demand for water, which has resulted into a considerable decrease in annual renewable water resources per capita. The design of a water price structure is a crucial issue for water utilities and local communities to achieve an efficient allocation of the scarce water resources (Mohayidin, Attari, Sadeghi & Hussein, 2009).

Water can either be distinguished as an economic good or as a free commodity. An economic good by definition are those goods which command value in the market as they are scarce goods. Any good which has a price is scarce and thus commands value in the market. But with change in space and time, non-economic goods have become economic goods, for example the oxygen we are breathing is a non-economic good, but for a patient in need of an oxygen cylinder it is an economic good. As long as we are living on the bank of a river we are using water as much as we can without paying but the moment we move into a city and start living therein, we pay water tax which is now an economic good (Singh, 2018).

On the other hand, a free commodity is defined by Pettinger (2017) as a good with zero opportunity costs. This means that it can be consumed in as much quantity as needed without reducing its availability to others. In many environments water will be a free good, for example if you live next to a river, a small community can easily take as much water as it wants with very little effort. If you take water from a river, there is plenty available for everyone else.

However, water could become an economic good in dry environments. In desert areas, water is not in plentiful supply; therefore, society has to devote many resources to the production of drinking water. Therefore, water becomes scarce and as such, it is no longer considered a free good. It is sometimes known as a 'common good' as it is freely available to all but at a certain point, there is a limited supply (Pettinger, 2017).

Before the 19th century there was no need to price water. However, due to the scarcity of water and an increase in day to day operating expenses for the water providers, the pricing of water has become a crucial issue for water utilities and local communities. As water services involve high capital investments, a lot of expenses are fixed costs which do not vary with the quantity of water consumed. This makes the allocation of costs among users more difficult to achieve, hence making water pricing difficult (Garcia & Reynaud, 2004).

In Namibia, the public utility that provides water to the nation is NamWater. The Republic of Namibia (1997), Act 12, states that NamWater has the power to determine and levy, in consultation with the Minister of Agriculture, Water and Forestry, tariffs on a full cost-recovery basis for water supplied. To make sure that NamWater is financially self-sustaining, the full costs incurred by the corporation to supply water to the nation are to be financed by revenue generated from the supply of water.

For the corporation to achieve the full cost recovery there is need to increase tariffs on an annual basis (The Republic of Namibia, 1997). For the audited financial year 2015/16, NamWater made an operating loss of N$3.4 million (NamWater Annual Report, 2016). This might be an indication that there might be something wrong with the pricing mechanism that NamWater is using, because the full cost recovery method ensures that all costs involved in running a project are recovered

through securing funding or charging at a level which includes a relevant proportion of organisational costs. This means that the use of a full cost recovery basis should enable Namwater to recover all the costs incurred.

There are many different pricing mechanisms that can be used by public utilities. For example, Akwaaake (2016) indicates that other utilities in Namibia, including NamPower and many local authorities, have developed a different pricing model, which involves the charging of a basic charge, whose sole purpose is for the replacement of infrastructure. This allows such utility providers to still recover the cost of infrastructure even in periods when customers are not taking any units from the utility. This also pools together adequate funds to establish an infrastructure fund which can be used to manage the placement of infrastructures.

While in the context of South Africa, the Department of Water Affairs (DWA) (2013) of The Republic of South Africa indicates that water pricing must be based on sound business principles, recognising that where, for social equity, environmental or affordability reasons, water management cannot be sustainably financed from specific water users, the shortfall must be recovered through cross-subsidisation.

Bogaert, Vandenbroucke, Dworak, Berglund, Gurlitz, and Schmidt (2012) have pointed out three pricing mechanisms, namely: Cost recovery which is about the amount of money that is being paid for water services; Polluter-pays' principle which looks at the adequacy of contributions from the different water uses towards the total costs based on their role in causing these costs; Incentives

pricing which deals with the way water users pay for their use and whether the right price affects the behaviour of water users.

To date, limited research has been conducted regarding the pricing mechanisms used by utilities providers in Namibia. This thesis therefore, attempted to fill the gap and contribute to the literature on the pricing mechanisms of water.

It was for these reasons that the research conducted was to analyse the pricing mechanism used by Namwater, analyse the various pricing mechanisms, find out the advantages and disadvantages of such pricing mechanisms, and provide recommendations that can assist Namwater to fully recover costs, so that it can enable the researcher to achieve her research objectives.

1.1.1 Background on Namibia Water Corporation Ltd (NamWater)

The Namibian Water Corporation Ltd (NamWater) was officially registered as a company on 9 December 1997. It is a commercial entity supplying water in bulk to industries, municipalities and the Directorate of Rural Water Supply in the Ministry of Agriculture, Water and Forestry. The Namibian Government is the sole shareholder, represented by the Ministry of Agriculture, Water and Forestry, which appoints the Board of Directors to ensure the efficient utilisation of resources. The board of directors appoints the Chief Executive Officer (CEO) who appoints all other NamWater employees from top management to the handyman in overall (The Republic of Namibia, 1997).

NamWater's primary business is to supply bulk water to customers, which is in sufficient quantities and of a quality suitable for that specific customer's purposes, which is cost-effective and not dangerous to the environment. The corporation's secondary business is rendering water-related services, supplying facilities and granting rights to customers upon their request (NamWater, 2017).

NamWater's customers are grouped into local authorities, mines, individual customers and government ministries and other government entities (NamWater, 2017).

Local Authorities

Fifty (50) of Namibia's fifty five (55) local authorities are supplied water by the corporation. The five that are not supplied water by the corporation had already developed their own supply systems by the time the corporation was established. Some towns such as Tsumeb, Grootfontein, and Omaruru, have their own water supply, whereas others like Windhoek and Okahandja supplement NamWater supply through their own sources (Pietila, 2005).

Mines

The corporation remains the major supplier of water to mines operating in Namibia, by supplying 38% of the water to mining entities in Namibia. This is often not an easy task, as the corporation is mandated to balance the needs of the mines with the sustainability of the water resources available. In doing so, NamWater must take into account the principles underlined in the water supply sanitation policy, in terms of which the water supply needs for human consumption rank higher than water supply needs for industrial purposes.

Individual customers

While the corporation's mandate does not include supplying water to individual customers, it has become difficult for the corporation to ignore the demand placed on it to supply individuals who live in the proximity of its pipelines or schemes.

Government ministries and other government entities

Another major customer segment to the corporation remains the various government ministries and other government entities, which sometimes operate outside local authorities. Government ministries such as the ministry of health and the ministry of education take charges of the water supplied to government hospitals and government schools instead of the respective hospitals and schools paying for their own water.

1.2 Problem statement

Namibia is a dry country and it has not received enough rain over the past rainy seasons. The operating expenditures of providing water have increased significantly and Namwater is not fully recovering its costs. For the audited financial year 2015/16, Namwater made an operating loss of N$3.4 million (Akwaaake, 2016). Namwater needs to have a proper pricing mechanism in place that will allow it to recover all the costs incurred to provide water. If water is not priced accordingly, it will result in either overpricing which means that water will be expensive for low income households as they will not be able to afford it, or water may be under-priced and thus make Namwater run a loss. Public utilities worldwide use different pricing mechanisms to price water such as cost recovery, polluter-pay principle and incentive pricing. The above mentioned problems are the reasons that have caused the researcher to carry out this study in order to analyse

the water pricing mechanism at Namwater, analyse its advantages and disadvantages as well as give recommendations on measures that can assist Namwater to fully recover costs.

In the same vein, the international review shows that the South African situation is comparable to that in other countries such as Malaysia and India, of which share South Africa's institutional complexity as well as its limited information availability. It indicates, however, that despite the fact that the real price of water is rising in these countries, water is still often under-priced, which impacts on the reliability and sustainability of supplies in the longer term. The formal processes through which South African water prices are determined are regulated by statute (Trade & industry chamber, 2007).

1.3 Objectives of the study

The researcher aimed to establish whether the current water pricing mechanisms used by NamWater is fully recovering its costs as per its mandate.

The study had the following specific objectives:

- To examine the water pricing mechanism used by Namwater, and
- To find out the advantages and disadvantages of such a pricing mechanism.

1.4 Significance of the study

The study is the first of its kind to be conducted in Namibia. Findings of this study are of benefit to researchers and students who are interested in researching on the various water pricing mechanisms of public utilities, as the study provides informative reference material as well as adds to the existing body of literature of accounting. The study is of benefit to other stakeholders and

Namwater as it explains the pricing mechanisms that other water providers are using, hence the findings can be used as a benchmarking tool by Namwater.

1.5 Limitations

This research covered a single case study on one water utility organisation to get ideas on the water pricing mechanism used. The study was mainly focused on NamWater. It was not feasible to extend the study to other utilities providers in Namibia. Only NamWater staff members from financial and management accounting division who are based in Windhoek and who have knowledge about water pricing were interviewed and participated is responding to the questionnaire. The time allocated for the completion of the thesis was also limited, that is why the study could not be extended to a wider sample in terms of geographic areas.

The researcher also encountered difficulties in obtaining information since some data are sensitive because the people within the two divisions who have knowledge on how water pricing is determined did not really want to participate in the interview and in responding to the questionnaire.

1.6 Delimitations

This study adopted a purposive sampling of thirty five respondents. The respondents were purposively selected because they are the only ones in the organisation that have an understanding of the water pricing mechanism. This delimits the study in the sense that purposive sampling can produce inaccurate assumptions and is prone to researcher bias. Thirty three of the purposively

sampled respondents were asked to complete a self-administered questionnaire that consisted of open ended questions while the other two respondents were interviewed.

1.7 Definition of key terms

For the purpose of this research, the following terms were used based on the definitions below:

Costs allocation: According to Bragg (2017), cost allocation is the process of identifying, aggregating, and assigning costs to cost objects. A cost object is any activity or item for which you want to separately measure costs.

Full costs: is the total cost of all resources used or consumed in production, including direct, indirect, and investing costs.

Pricing: is the process whereby a business sets the price at which it will sell its products and services, and may be part of the business's marketing plan.

Pricing mechanisms: is a mechanism of the way prices are set within a market for a given good. According to this mechanism, prices are set based on the balance of supply and demand in the market (Shaw, 2008).

Tariffs: a list of fixed price charged by a company for a particular service.

Utilities providers: is a category of companies for utilities such as gas and power. The sector contains companies such as electric, gas and water firms, and integrated providers.

Water pricing: refers to the processes involved in assigning a price to water, including elements such as utility tariffs (Ricato, 2018).

1.8 Research ethics

Ethics are moral principles that govern a person's behaviour or the conducting of an activity. The purpose of ethics in research is to safeguard that all research participants are not harmed or suffer negative consequences from research activities.

The present researcher strictly followed and obeyed the guidelines stipulated by the University of Namibia on research ethics. The researcher ensured confidentiality by not leaking information provided by the respondents unless demanded by court of law in writing in future. In addition, personal information gathered through questionnaires was treated with strict confidentiality and was not disclosed to unauthorised users. Anonymity was ensured in the sense that the researcher did not ask the respondents to mention or write down their names on the questionnaires. The researcher also explained to the respondents that they have the right to refuse participation in the research. The researcher also explained the nature and need of the research.

Furthermore, respondents were told that they could withdraw at any stage of the research. Soft copy information on the desktop and the laptop of the researcher was protected with a password that only the researcher knew and this will only be deleted permanently two years after the marking of the thesis. The used questionnaires and any other hard copy information obtained during the research process were kept in a lockable drawer and will be destroyed by means of shredding two years after the marking of the thesis. Moreover, the researcher avoided plagiarism by making sure that ideas borrowed from other scholars or researchers has been correctly acknowledged.

1.9 Organisation of the study

The remaining chapters of the study will continue as follows: chapter two will give an overview of the literature pertaining to water pricing mechanisms. Chapter three presents the research methodology; chapter four will report on the findings through data presentation, analysis and interpretation of findings. Lastly, chapter five contains the conclusion and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter examines the conceptual framework of the study and related literature. The purpose of the chapter is to analyse the theoretical foundation of water pricing. The chapter is organised in six sections and sub-sections. Section 2.2 defines key terms, section 2.3 reviews the different types of water pricing mechanisms, section 2.4 reviews the water pricing mechanisms used in developed countries, while section 2.5 looks at water pricing mechanisms used in developing countries, section 2.6 looks at the advantages and disadvantages of each mechanism reviewed and finally section 2.7 concludes the chapter.

2.2 Water pricing mechanisms

Water is essential for life and it is a major asset for the development of each country but it is wasted because of under-pricing. The increasing water demand for an increasing population, urbanisation and industrial development has caused countries to consider various mechanisms to improve water use efficiency (Mohayidin, Attari, Sadeghi, & Hussein, 2009). In addition, water is a natural resource that is scarce and has no substitute; it is a social good, and it has a moral and cultural value. By treating water as an economic good, pricing improves the overall allocations and encourages sustainable use. One of the basic principles of economics is that, anything that is scare and in demand commands a price (Jones, 2017).

It is important to understand the truth that water is not free. The environment bears the cost and is burdened by what we proclaim is “our human right” to use, abuse and return to the earth, unreasonably. The serious question of value is also of great importance as we discover that in a

world robbed of common sense, the only measures of worth are through economic and financial instruments.

We often do not know what the cost of delivered water is because the cost is buried under subsidies and sunk costs of municipal and regional water departments. The price of water bears little relation to either the available supply of water or the cost of delivering it to a customer's tap (Kouyoumijian, 2012).

Informing and engaging the public about water use and pricing could bring changes in behaviour that are potentially significant in reducing water stress, and in successfully implementing fundamental changes to water provision such as water pricing. This represents a significant challenge as it requires raising awareness and changing customer attitudes regarding the value, availability and price people are prepared to pay for water. In the United Kingdom (UK) where it rains a lot, this remains a challenge (The Royal Academy of Engineering, 2010).

As per the United Nations Educational, Scientific and Cultural Organisation (UNESCO), 2003) costs for water are usually associated with processing and delivering alone, rather than the assigned value of water (free). Yet, free or highly undervalued water gives limited incentive for water efficiency. Putting a price on water helps to reduce demand, and generates revenue to cover the costs of providing water supplies and maintain infrastructure (The Royal Academy of Engineering, 2010).

Cooper and Fishman (2010) confirm that the lack of transparency in water pricing results in water utilities not having the means or incentive to invest in greater efficiency, and the water utilities are thus forced to accept very high leakage rates from aged infrastructure. Further empirical research

from the UK water market demonstrates that lacking incentives and financial accounting are responsible for neglected infrastructure.

Brennan (2006), underlines that the major constraint for optimum price equilibrium in permanent water markets is due to physical constraints on trade rather than administrative bottlenecks. Others like Hanemann (2006) lean towards the opposite view, and claim that political demand largely dictates water price.

Calculating a price that reflects the true value of water and thereby contributing to the long-term sustainable management of water resources is clearly not a simple task. According to the European Environment Agency (EEA) (2016), prices constitute the most efficient information system; they largely determine decisions taken by producers and consumers. When prices do not reflect the full costs and benefits of production and consumption, the facts about resource scarcity and environmental values aren't made known and nor are the actual costs of producing or consuming goods and services. Since they have nothing else to hand, however, people must base their decisions on such erroneous information: this phenomenon results in the overuse of some resources and the underuse of others. So there is a direct connection between mispricing and unsustainable development. To trace mispricing, one can look at two well-known failures: market and policy.

A market failure results when the price of goods and services does not reflect either the full costs (such as pollution) or the full benefits (such as improvement of wetlands). A different kind of failure occurs when government interventions misrepresent the market: this causes a type of policy failure arising from subsidies, taxation policies and price controls or regulations (EEA, 2013).

There are several aspects that determine the extent to which a water pricing mechanism can be expected to be successful. Such a mechanism has to be flexible enough to make it widely

applicable in different geographical conditions, different water infrastructure conditions, and different sectors of the economy, different institutional settings and changing circumstances over time. Such mechanisms are herewith discussed in the sub-sections below.

2.2.1 Cost recovery mechanism

Cost recovery is about the amount of money that is being paid for water services. The mechanism, however, extends not only to the financial costs of the provision of water services, but also to the costs of associated negative environmental effects (environmental costs) as well as forgone opportunities of alternative water uses (resource costs) (EEA, 2013).

There are a number of ways in which costs can be recovered. Tariffs, subsidies, and financial support mechanisms can all contribute towards sustained service delivery while raising consumer awareness for the financial, economic and environmental aspects of providing such a service. It is generally agreed and widely accepted that users should, in most cases, pay for recurring costs, while there are varying opinions about whether users should pay for capital costs, and if so, what percentage is reasonable, and how might it be paid (Cardone & Fonseca, 2003). For the purpose of this study, the researcher concentrated on tariff pricing as a cost recovery pricing mechanism.

From a cost-recovery point of view, the rate of the tariffs (and taxes) is the most important factor. Tariff structures are also relevant, but cost recovery is basically possible under different structures.

For example, Denmark (where all costs of water supply and sanitation are covered by a volumetric rate) achieves a high level of cost recovery, but the same is true for England, Scotland and Wales, where domestic water tariffs are largely unrelated to the level of water consumption and most

households remain unmetered. Cost recovery for environmental and resource costs remains a largely unresolved issue, given the variety in the interpretations of the concept.

Assessing the costs that should be recovered from water users is not a straightforward task. Massarutto (2007) points out three major difficulties as stated below:

- The costs to be considered should be only the efficient ones, for example those that would be incurred by a service provider behaving efficiently and paying all inputs at their own marginal cost. However, this does not necessarily occur, owing to a number of market imperfections along the value chain of water services.
- Two important components of the cost (depreciation and capital cost) depend very much on accounting practices and on the patterns of allocating the ownership of assets and economic risks between operators, users, and public authorities.
- Resource and environmental costs call for complex and site-specific analyses.

Improving cost recovery clearly involves more than just charging higher costs or spending more on cost collection. However, which water costs are to be recovered and what mechanisms can be used to recover them has to be specified. The full costs of providing water can be divided into three categories: direct project costs, environmental costs, and marginal user costs. Direct project costs are the easiest of the three to measure, and most projects take only direct costs into account in determining cost recovery. Direct costs refer to costs stemming from the process of capturing and delivering water, which can be broken into fixed costs and variable costs. Fixed costs include all investments in infrastructures such as building reservoirs and canals and installing meters and pumps, plus depreciation and interest payment on the investment. Variable costs consist of the operational and maintenance costs of water delivery, lower level administrative costs and costs of

supplying water, which include conveyance costs, groundwater extraction costs and costs due to water loss (Massarutto, 2007).

After determining which of these costs to include, the next concern is what percentage of total costs should be allocated to the household. In many cases, who should bear the costs of providing water is not clear.

2.2.2 Polluter pays principle mechanisms

According to Grantham Research Institute on Climate Change and the Environment (GRICCE, 2018), polluter pays principle is the commonly accepted practice that those who produce pollution should bear the costs of managing it to prevent damage to human health or the environment.

The polluter pays principle initially was a principle of economic policy stating that the polluter is responsible for the cost of pollution prevention and control measures. Thus, the polluter pays principle is aimed at an internalisation of the cost of pollution prevention and control measures: the cost of these measures should be reflected in the market price of products (Lindhout & Van den Broek, 2014).

The Polluter Pays Principle (PPP) examines the adequacy of contributions from different water uses, essentially disaggregated into industry, agriculture and households, towards the total cost based on their role in generating these costs, for example, it addresses the question of who pays for water (EEA, 2013).

Water pricing and recovery of the costs of water, operation, and maintenance have been contentious issues for many decades. The low charges for water are questioned, as well as, the

small percentage of households who actually pay the charges. In some projects, fee collection rates are near zero, even when water charges are well below the cost of project operation and maintenance (O&M) (Biernmann, Botin, Brohim, Droge, & Trabold, 2014). This creates serious problems both for the water provider and, in the long run, for the household. If the fees collected do not cover the costs for providing, its sustainability may be at risk.

A practical approach (taken for instance by the Netherlands) is to consider the costs made for mitigating measures as the (current) environmental costs. Such costs are by definition recovered if the polluter has to take measures to prevent pollution and pays for these measures him/herself. Under this 'narrow' interpretation, the damage done by un-prevented pollution and the resource costs (opportunity costs of water use) remain unaccounted for, even though systems of pollution and abstraction charges can ensure cost recovery for these costs as well.

Costs to be recovered from consumers should in principle include depreciation, renewal and maintenance costs, as well as the cost of financing long-term investment so that the benefits are shared between current and future generations in a sustainable manner. This makes cost recovery different from the Polluter Pays Principle.

The Polluter Pays Principle promotes the sustainable use of water, as the polluter is incentivised to reduce or to avoid pollution. This balances the cost of preventing pollution with that of mitigating its impact. The Polluter Pays Principle relies on incentive-based water pricing and on a correct economic cost allocation.

Water services in some countries such as Belgium are obliged to apply additional treatments to water to remove pollution that often originated from industrial or agricultural practices. The additional costs of operating within such a polluted environment should not be recovered from

water service users but from the entity that caused the pollution. In the case of historic pollution, where nobody can be easily identified as being responsible for it, the costs should still not be recovered from current water service customers (European Federation of National Drinking water and Wastewater Services, 2017).

According to Ambec and Ehlers (2010), many countries have adopted the Polluter Pays Principle as a water pricing mechanism. It basically renders the polluter responsible for the damage it causes to the environment. It requires that the costs of pollution should be borne by the entity which profits from the process that causes pollution. In order to satisfy the Polluter pays Principle, the entity that pollutes should compensate those who suffer from this pollution for the damages it causes. If a victim is not fully compensated, then he or she pays part of the cost of someone else's pollution. Hence strictly speaking, the PPP principle imposes not only that polluters pay for the damage caused to society, but also that victims are fully compensated for those damages.

2.2.3 Marginal costing mechanism

Altmann (2007) indicates that the economic basis of water pricing is that the water provider must be able to recover all its costs including operations and maintenance, investment and social costs. At the heart of the problem of utility pricing is that marginal cost pricing will result in a unit price that is less than the average cost, therefore the utility will not generate sufficient revenue to cover costs.

One feature of the marginal cost mechanism to water pricing is the inclusion of fixed charges or connection fees. This is justified for two reasons: first as a means of recovery of fixed costs such

as administration, meter reading and other overheads. Second, this is to recover the variable cost losses that arise when marginal operating costs are below costs.

Although theoretically desirable, in practice strict marginal cost pricing is difficult to achieve for a number of reasons. First, it would lead to price fluctuations that may be unpopular with consumers and hold political risks for the government. Secondly, funds for investment in additional capacity may become available at a time when a comfortable barrier of capacity is still available, causing consumers to question the need for price increases. Thirdly there are risks involved with managing supply at or near its demand level (Altmann, 2007).

Monteiro (2005) points out that pure marginal cost pricing which is as a result of financial fairness (with fairness is the worry that marginal cost pricing could impose an undue burden on the poorest), may not be possible or even desirable.

On the other hand, Spulber and Sabbaghi (1994) discussed four definitional problems associated with marginal cost pricing. For instance, (i) due to water quantity, quality and location, the marginal cost is multi-dimensional in nature; (ii) it varies depending on whether a demand increment is temporary or permanent (due to the composition of fixed and variable costs as determined by short and long-term demands); (iii) it varies with the period over which it is measured, that is, short-run vs. long-run marginal cost, and (iv) marginal cost pricing tends to neglect equity issues. Within the periods of shortage or scarcity, if prices increase to the needed level, groups with lower income may be negatively affected.

2.2.4 Volumetric pricing mechanism

With volumetric water pricing, the charge is based on the amount of water delivered. The economic optimal pricing rule requires that prices should be set equal to the marginal cost of providing the water, and it requires accurate measurement of water through meters (Easter & Liu, 2005).

Many water suppliers in the United States (US) charge by volume in order to recover costs and in order to ensure that costs are spread equitably amongst water users. Volumetric water pricing has been advocated by the World Bank and other international donors, and it is mandatory in many projects in the western US that receive water from federally-owned reservoirs (Burt, 2006).

Before volumetric pricing can be implemented, the district must ensure that several necessary pre-conditions are met, including the ability to measure the volume of water delivered to users, the capacity to manage data related to water orders and billing, and the implementation of an equitable fee collection mechanism (Burt, 2006).

2.3 Water pricing mechanism in developed countries

Public service providers are generally faced with more comprehensive regulations that dictate price-setting methodologies. In Scotland, the national regulatory authority, the Water Industry Commission for Scotland (WICS) determines what financial resources Scottish water (the sole water supply company) needs in order to accomplish its mission. And this subsequently lays down the rules for pricing (level and proposed water price increases). Scottish Water was established in 2002 as a public corporation under the Water Industry (Scotland) Act 2002. Its regulatory framework comprises especially, the Water (Scotland) Act 1980 and the Sewerage (Scotland) Act 1968 (Hendry, 2016).

Hendry (2016) states that Scottish water will include a unit cost of water in the price charged for the service; ideally that price will reflect capital and operating expenditure, including a return on capital (full cost recovery).

In Germany, municipal laws govern the calculation of fees for drinking water provision and waste water treatment when provided by a public entity (Filippini, 2010). In addition, Germany, as in most of the member States of the European Union, the actual costs of supplying water are the basis for determining water prices. Water prices are not market prices, because there is no market for water. Rather, water supply is a 'natural' monopoly, whereby the water suppliers for technical and economic reasons cannot be in competition for service to the consumer.

In Germany, there is a long-recognized set of rules to regulate price setting, which is taken into account by all water suppliers and the supervisory authorities which are outlined below as discussed by Kraemer (1998):

- Prices should on the one hand cover the costs of water supply and on the other not be higher than the actual costs.
- Prices (and tariffs) should reflect the costs generated by particular users. Individual customers, especially large consumers that are relatively cheap to supply, can benefit from special contracts.
- Tariffs should take the cost structure into account. According to this principle, approximately 85 per cent of water supply costs which are fixed should be borne by a basic price that is not dependent on consumption. Only the remaining 15 per cent of variable costs should be calculated on water metre readings.

- Prices should take the necessity of maintaining capital assets into account. This means that depreciation due to wear and tear on facilities should be considered as a cost and included in prices, and that reserves should be built up to cover future investment in necessary repairs, taking inflation into account. Moreover, an appropriate rate of interest is to be guaranteed, as long as it is consistent with public goals.

In Croatia, the mayors of municipalities are required to approve water prices before they can be put into effect. Additionally, Croatian law calls for cost recovery, going so far as to implement a price floor below which utilities cannot offer water services (Filippini, 2010).

Sometimes, the methodology for calculating prices is laid out clearly in legislation. In the Netherlands, for example, volumetric rates for drinking water are determined according to the Drinking Water Decree and the Drinking Water Regulations. Slovenian water service prices were previously dictated by national legislation. But new rules allow municipal governments, who recently also became owners of water infrastructure assets, to set prices according to guidelines laid down in legislation. Slovenian legislation also includes a price ceiling, as the primary focus of policy formulation in this area is to reduce inflation. A legislated benchmarking system was also considered in 2004, but it was never adopted as its implementation was considered to be too cumbersome (Filippini, 2010).

It is clear that household water bills vary greatly across countries in Europe. A noteworthy distinction is that bills not establishing a direct link with the actual amount of water consumed or

discarded are higher than those for which water pricing reflects both fixed and variable (volumetric) components. This applies to all countries, with the exception of Germany.

Hanemann (2006) states that overall, water is cheap because it is being subsidized, not because it is not scarce, and that the prices charged by water suppliers are generally unrelated to the value of water per se, thus not reflecting the full costs of water supply. In contrast to this notion, there is also scrutiny that water in the UK may be significantly overpriced since privatisation in 1989, making it profitable for water companies to invest in new infrastructure rather than having to repair and maintain existing ones (Abou-Seada, Cooper, Ghaffari, Jones, Kyriacou & Simpson, 2007).

2.4 Water pricing mechanisms in developing countries

It is important to understand the pricing mechanism used by other developing countries as they may be a relevant benchmarking tool for Namibia. However, this background information is not meant to cover in-depth all pricing mechanisms used by all developing countries but to partially highlight the mechanisms used in some developing countries perspective. The focus will be only on two developing countries chosen randomly, namely South Africa and Botswana. Below is the discussion of the pricing mechanisms used in the above mentioned developing countries.

South Africa

The state's role is particularly strong in inter-sectoral allocation as the state is often the only institution that includes all users of water resources, and has jurisdiction over all sectors of water use. This is particularly true in South Africa, as the new government attempts to bridge the gulf between white and black farmers, wealthy suburbs with subsidized water supplies and millions of blacks without potable water, as well as between domestic, agricultural, industrial, mining, and

wildlife sectors. Thus, the Water Law Review Panel (Republic of South Africa 1996) sets out the principle that: “the national government is the custodian of the nation's water resources, as an indivisible national asset, and has ultimate responsibility for, and authority over water resource management, the equitable allocation and usage of water, the transfer of water between catchments and international water matters”.

South Africa’s water pricing performance is reasonably good, considering that its water is relatively scarce. It does not (yet) face the problems of supply reliability that confront some of its developing country peers (Trade and Industry Chamber, 2007).

The international review shows that the South African situation is comparable to that in other countries, many of which share South Africa’s institutional complexity as well as its limited information availability. It indicates, however, that despite the fact that the price of water is rising in most countries, water is still often under-priced, which impacts on the reliability and sustainability of supplies in the longer term (Armell, 1999).

Muller (2007), indicates the following in respect to South African water pricing:

- In the case of bulk water resources and bulk water services, there is an explicit effort to ensure that tariffs reflect the actual costs of providing the service. In municipalities, while the Water Services Act (WSA) requires tariffs to be set on the basis of the actual, ring-fenced costs of water service provision, tariff levels are constrained by other regulations from the National Treasury (NT) and the Department of Local Government (DLG), which caps tariff increases.
- In the case of bulk water resources, a precedent has been established by the Department of Water Affairs (DWA) in terms of which part of the cost of large, long-term and uneven

future growth projects can effectively be pre-financed through tariff structures (this has occurred in the Lesotho Highlands Water Project supplying the Vaal System and the Berg River Project supplying Cape Town). This contributes to ensuring that long-run marginal costs (LRMCs) are reflected in price setting as well as avoiding sudden rate increases or an unsustainable build-up of debt. A similar approach has been adopted in some of the Water Boards, notably Umgeni.

- It is notable that industrial water prices tended to reflect average domestic prices in the coastal cities such as Port Elizabeth and the Eastern Cape, while in Tshwane and Johannesburg and some of the inland towns, prices were set around the top tier of the domestic prices. This is appropriate since LRMCs at the coast will be determined by desalination costs. In Polokwane, the shortage of water has seen competition between mining companies for access to sources of municipal wastewater.

Botswana

Arntzen, Masike and Kgathi (2000) point out that the Water Utilities Corporation (WUC) of Botswana holds the monopoly of urban water supply. The WUC uses step tariffs with increasing unit water prices. The overall water price is based on the Long Run Marginal Costs (LRMC). In this way, large consumers subsidize small consumers that do not spend more than 5% of their income on water, and the WUC recovers its costs. Urban water prices differ from area to area due to differences in the LRMC. The highest prices are charged in Gaborone while, Selebi-Phikwe, which is located close to major dams has much lower prices.

Rural water prices are primarily based on equity considerations. The price of water only reflects the operational costs, and is restricted to individual connections. Water from standpipes is free for

social reasons. Rural prices are determined by the Department of Water Affairs (DWA) and the Central Government.

The key features of rural water pricing are as outlined by Arntzen, Masike and Kgathi (2000):

- Partial costs recovery and high subsidies as supply costs tend to be higher than in urban areas;
- The water tariffs are staggered with a low subsidized unit price for low consumption (up to $5m^3$/ month/ connection) and a higher unit price for higher consumption levels; and
- The same price applies throughout rural Botswana, irrespective of the costs of water supply in a particular village.

On the other hand, Segosebe and Parida (2006) pointed out that water in Botswana has always been a key resource for livelihood and development because the country is semi-arid. Water has therefore been a concern for the government, which is reflected in the fact that water is the only natural resource for which the government has prepared a long-term plan (1990 - 2020). This has therefore necessitated the implementation of strategies for Water Demand Management (WDM) with the assumption that a reduction in the growth of water demand was seen as a possible way to defer capital expenditure on water supply.

To realise sustainable development, it is quite crucial for the government and the private sector dealing with the water sector to employ appropriate strategies for its supply. There is therefore, a need to integrate economic growth with community welfare. Presently, emphasis on three aspects of WDM, namely water tariffs, water restrictions and water reuse is in vogue. These strategies

have proven quite successful; particularly the high water tariffs and increasing block tariffs have been credited with the relatively low per capita water consumption, which means a saving for big businesses. The successful application of water tariffs notwithstanding, Segosebe and Parida (2006)'s paper has argued that this approach also has limitations that include marginalisation of the poor rural people, especially women, and the fact that tariffs have failed, in the case of Botswana, to attract companies to locate in areas of low water tariffs because of the potential influence of other production factors.

The shortcoming in the tariff system underscores the need to diversify demand management strategies. A careful combination of strategies, rather than mere selection, seems appropriate. It is therefore encouraging that the Department of Water Affairs of the Government of Botswana has embarked on a project on developing demand management and conservation policy for the water resources (Arntzen, Masike & Kgathi, 2000).

2.5 Advantages and disadvantages of different types of water pricing mechanisms

This section discusses the concepts, advantages and disadvantages of several water pricing mechanisms such as: cost recovery, polluter's pay principles, marginal cost pricing and volumetric pricing.

2.5.1 Cost recovery

Although tariffs cannot remedy all financial deficiencies and ensure the complete viability of the water system, they go a long way to achieving financial sustainability. The use of tariffs as a mechanism to recover the cost of water supply services has increased in rural and low income

areas, mainly due to an acknowledgement that the service of water should be paid by users (Brikke & Rojas, 2001).

Advantages

Cardone and Fonseca (2003) point out two advantages of cost recovery as follows:

- Firstly, cost recovery through tariffs raises enough revenues to cover specific costs. These can be operation and maintenance costs, financial costs or even reflecting the full marginal cost, for example, the extra money required to provide an additional unit of water.
- Secondly, tariffs make access to drinking water affordable for different income groups which should take into account the ability to pay for a service and the fact that there are major impacts for health, well-being and poverty alleviation targets. The tariff should not be too high to drive consumers to unsafe alternatives or to decrease daily use to dangerous levels.

Disadvantages

Cardone and Fonseca (2003) similarly point out the disadvantages of cost recovery as follows:

- High levels of unaccounted-for or unbilled water make cost recovery much more difficult. They can have a variety of causes such as illegal taps, leakage, or fee waivers for larger government, industrial, or military consumers.
- Meters or other gauges of consumption are a critical component of cost recovery, although it should be noted that in areas with abundant supply, the cost of installing and maintaining meters may be less cost-effective. Meters must be read on a regular

basis and fixed promptly when they break down. This poses technical, institutional, and financial challenges.

- Output-based tariffs and subsidies can be a challenge in a political environment that is resistant to reform and accountability of service-provider finances and accounting processes.
- Designing a flexible billing cycle that accommodates the needs of the poor (with regards to seasonal income, non-regular income, etcetera) while allowing for the service provider to maintain steady income to meet expenses can be a challenge.
- High administrative costs can arise in billing for water, and providing information to consumers about the system.
- Monitoring and evaluation for effectiveness at the system level is often inadequate, which means that problems are not corrected in a timely way.

Massarutto (2007) also pointed out three major difficulties associated with cost recovery as stated below:

- The costs to be considered should be only the efficient ones, for example those that would be incurred by a service provider behaving efficiently and paying all inputs at their own marginal costs. However, this does not necessarily occur, owing to a number of market imperfections along the value chain of water services.
- Two important components of the cost (depreciation and capital cost) depend very much on accounting practices and on the patterns of allocating ownership of assets and economic risks between operators, users and public authorities.
- Resource and environmental costs call for complex and site-specific analyses.

2.5.2 Polluter pays principle

Many countries such as Australia, France, Ghana and Sweden have adopted the "polluter-pays" (PP) principle as a regulation mechanism. It basically renders the polluter responsible for the damage it causes to the environment (Ambec & Ehlers, 2010).

Advantages

Ambec and Ehlers (2010) point out the advantages of the polluter pay principle as that it requires that the costs of pollution should be borne by the entity which profits from the process that causes pollution, meaning that the entity causing water pollution will pay for the cost of pollution. This cost will be factored in the price of water to be supplied to that specific entity. In order to satisfy the polluter pays principle, the entity that pollutes should compensate those who suffer from this pollution for the damages it causes. If a victim is not fully compensated then he or she pays part of the cost of someone else's pollution. Hence, strictly speaking, the PP principle imposes not only that polluters pay for the damage caused to society, but also that victims are fully compensated for those damages.

Disadvantages

Coffey and Newcombe (2001) point out the disadvantages of the polluter pays principle (PPP) as follows:

- Firstly, despite its long history and extended meaning, the application of the PPP has been far from comprehensive.
- Secondly, there have been numerous disputes on the practical interpretation of the principle. One recurring theme has been the relative role of regulation versus economic

instruments in the implementation of the PPP; another has been whether 'polluters' have to pay for the full costs of control and/or restoration measures.

- And lastly, where charges and other economic instruments have been used, these have also been very variable, sometimes designed to raise revenue to cover costs, or to cover restoration work. In some cases, charges are closely associated with individual polluters, thereby providing clear incentives to alter behaviour; in others, charges are placed on whole sectors without necessarily seeking to influence the behaviour of individuals.

2.5.3 Marginal cost pricing

A marginal cost pricing (MCP) mechanism targets a price for water to equal the marginal cost of supplying the last unit of that water. An allocation which equates water's unit price (the marginal value of water) with the marginal cost is considered an economically efficient, or socially optimal, allocation of water resources.

Dinar, Rosegrant and Meinzen-Dick (1997) point out the advantages and disadvantages of marginal costing as outlined below:

Advantages

- The most obvious advantage of MCP is that it is theoretically efficient. Not only are the marginal costs and benefits equal, but at the efficient price the difference between the total value of water supplied and the total cost is at a maximum.
- MCP avoids the tendency to under-price (and consequently overuse) water. Under conditions of scarcity, excessive water use is obviously undesirable and comes at a high

social cost. An MCP system could avert overuse because prices would rise to reflect the relative scarcity of water supplied.

- MCP approaches to water allocation can also be combined with pollution charges or taxes so that the externalities in use of water are embedded in the incentives facing the water user.

Disadvantages

One of the principle limitations of MCP is related to difficulties in defining marginal cost itself. These difficulties are in part a result of problems in collecting sufficient information to correctly estimate and subsequently monitor benefits and costs. Spulber and Sabbaghi (1994) note the following definition problems:

- The marginal cost is multi-dimensional in nature in that it includes several inputs, such as water quantity and quality.
- The marginal cost varies with the period over which it is measured, that is short-run versus long-run marginal cost.
- The marginal cost varies depending upon whether a demand increment is permanent or temporary. That is, the composition of fixed and variable costs as determined by short and long-term demand has a significant impact on the marginal cost.

MCP also has disadvantages because it tends to neglect equity issues. In periods of shortage or scarcity, if prices increase to the necessary level, lower income groups may be negatively affected.

At a more practical level, MCP is difficult to implement because it requires volumetric monitoring, which is very costly and difficult to administer. Also, MCP concepts are frequently poorly understood by those involved in policymaking and administration.

Moreover, the information requirements for an efficient system of administered prices are demanding and much of this information would necessarily be gathered by trial-and-error experimentation. Information is expensive and mistakes made in the trial-and-error process may be costly. If prices are set too low, demand for water would be excessive, and if prices are set too high, water would be wasted to drainage.

2.5.4 Volumetric pricing

In order to price water based, at least in part, on volume, the service provider must first accurately measure the water delivered to individual households. This type of pricing mechanism is associated with the following advantages and disadvantages.

Advantages

- The advantage of this pricing method is that it encourages households to limit their water use. Also, it is easy to understand in the sense that you pay for the quantity of water delivered to your water tap (Easter & Liu, 2005).

On the other hand, Ricato (2018) points out the advantages of volumetric pricing as follows:

- It is easy to administer
- It can provide a stable cash flow if set at the appropriate level
- It is easy to understand for consumers - people pay according to how much they actually use
- Volumetric pricing ensures cost recovery if set at an appropriate level - revenues adjust automatically to changing consumption.
- It also ensures economic efficiency if set at or near the marginal cost of water.

The process of tariff revision is simple and it ensures social equity. With volumetric pricing people can limit their bills by reducing consumption.

Disadvantages

The first disadvantage of volumetric pricing is the fact that the implementation costs can be high because meters are required, and they have to be honestly read and reported. Secondly, marginal cost pricing does not allow full cost recovery in the case of decreasing average costs (for example, large canal systems) (Easter & Liu, 2005).

Ricato (2018) also pointed out the disadvantages of volumetric pricing as follows:

- Volumetric pricing needs a water metering system which is expensive.
- Institutions that need a lot of water will have a high water bill, which may make them move to other sites with other tariffs. A nationally coherent strategy is thus necessary when applying this type of charging.

2.6 Conclusion

Previous researchers have found that it is difficult to make an overall conclusion on water pricing policies, considering the large variability in both tariff design and price level, hence the most important factor influencing the ability of water pricing and allocation policies which lead to sustainable water use is metering (Bogaert, Vandenbroucke, Dworak, Berglund, Interwies, Gorlitz, & Moeller-Gulland ,2012) .

The empirical findings reveal that the first best pricing is a widely accepted mechanism for partial or full cost recovery of the water schemes as it considers inefficiencies in water use. On the other

hand, the second best pricing mechanism sets the price of water equal to the marginal cost of providing it or incremental costs associated with incremental production. Finally, there exists currently a debate that while water pricing mechanisms promote economically and environmentally efficient water use, they may not always be appropriate as water pricing is often perceived as a policy intervention that negatively affects poor small householders. It can be concluded that all of the mentioned theories consider water pricing as an important tool which policy makers can apply for the management of this valuable resource (Lin, 2003).

Generally, the most common used water pricing mechanisms is full cost recovery as shown by the literature reviewed by the researcher.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter briefly describes the research methodology used. It describes the research design, the research population, the sample, the techniques that were used for sampling, the research instruments, the process of data collection and the way in which the results were analysed.

3.2 Research design

A research design is a set of guidelines and instructions to be followed when addressing the research problem (Saunders, Lewis, & Thornhill, 2007). The main function of a research design is to enable the researcher to anticipate what the appropriate research decision should be in order to maximize the validity of the eventual results.

De Vaus (2006) states that the research design refers to the overall strategy that a researcher chooses to integrate the different components of a study in a coherent and logical way, thereby, ensuring that the research problem will be effectively addressed; it constitutes the blueprint for the collection, measurement and analysis of data. The research design can identify the research problem clearly and justify its selection, particularly in relation to any valid alternative designs that could be used. Qualitative methods were used for achieving the set objectives because the qualitative research method is used to uncover trends in thought and opinions and to dive deeper into the problem. The set objectives are as follows: to examine the water pricing mechanism used by NamWater, and to find out the advantages and disadvantages of such a pricing mechanism.

This study adopted a qualitative research method approach using a case study as the research design. The researcher's research title implies that a case study approach is used. The scope of the study was restricted to a case study, namely an analysis into the pricing mechanism of water in Namibia through using a case study of NamWater due to time and financial limits. A case study explores a research topic or phenomenon within its context or within a number of real contexts (Saunders, Lewis, & Thornbill, 2012). The case study strategy is also relevant when one is to gain a rich understanding of the context of the research and processes being enacted (Eisenhardt & Graebner, 2007).

3.3 Population

The population of a study has been stated differently by different authors, but the elementary explanation of a population remains unchanged. According to Suen and Ary (2014), the population is the abstract idea of a group of many cases from which a researcher draws a sample and from which the results from a sample can be generalised. While Graziano and Schroeder (2010) also define the population as a larger group to which all objects or people of interest belong. For the purpose of this study, the population comprised of all Namwater employees. The total population of this study was 700 employees.

3.4 Sample

A sample is a small group chosen from the larger group. Sekaran and Bougie (2010) state that a sample greater than 30 and less than 500 units of analysis is suitable for most types of research which are qualitative in nature. The study used a sample of thirty-five staff members from the finance department of NamWater, who were purposively selected.

By using the common formula to calculate the sample size $n = \frac{N}{1+N(e)^2}$ of which

N=Population

n=sample size

e=margin of error with a population of 700 employees and an 83.6% confidence level, the sample size was $n = \frac{700}{1+700\times(0.164)^2}$ = 35.

A sample size of 35 employees was selected by adopting purposive sampling as a sampling technique because the researcher would like to find out specific information about water pricing and the researcher could only get such information from the key informants which is the thirty five employees from the management and financial accounting division.

Purposive sampling, also known as judgment, selective or subjective sampling is a non-probability sampling which enables the researcher to rely on his or her own judgment when choosing members of the population to participate in the study (Palys, 2008). The sample consisted of the financial and management accounting division staff members who have knowledge on how water pricing is determined. The sample consisted of two Heads of Division (HODs) namely Head: Management Accounting and Head: Financial Accounting and the remaining thirty-three belong to employees that hold middle to junior positions (manager, accountants and clerks).

3.5 Research instruments

To collect data which enabled the researcher to meet the research objectives, the researcher used self-administered open-ended questionnaires and structured interviews to get a comprehensive understanding of the water pricing mechanism used by water providers. Structured interviews were used to interview the two heads of divisions and self-administered open-ended questionnaires were completed by the remaining thirty-three respondents as data collection methods.

One of the key characteristics of a research instrument is the ability to enable the researcher to gather accurate and meaningful data. The researcher must pay attention to the wording of each question (Wagner, Kawulich, & Garner, 2012). Thus, the questionnaire for this study contained short and straightforward questions derived from the research objectives.

3.6 Research procedure

Before the researcher started to collect data, permission to carry out the study was first granted by the University of Namibia's Centre for Postgraduate Studies that enabled the researcher to request for a permission from the head of research and development at NamWater to collect data from staff members in the financial and management accounting divisions. The researcher then made appointments with the respondents on the day and time suitable for the two parties. During the briefing sessions with the participants, the researcher assured every participant that their participation was voluntary.

They were also assured that the information obtained would be kept confidential and would only be used for the fulfilment of the research objectives. The questionnaire consisted of open-ended

questions that allowed respondents to give a free-form answer which consisted of customer perceptions on water pricing, water pricing mechanisms, and advantages and disadvantages of various pricing mechanisms as the major categories of the questionnaire. The secondary data was collected through the analysis of literature relating to water pricing.

3.7 Data analysis

Data gathered through interviews and questionnaires were analysed through thematic analysis because this helps to identify patterns of meaning across a dataset that provides an answer to the research question being addressed. Braun and Clarke (2006) define thematic analysis as a method for identifying, analysing, and reporting patterns (themes) within data. It is a method that organises and describes your data set in detail.

The researcher analysed the data by following the six steps of thematic analysis as outlined by Braun and Clarke (2006) as per the below steps. The interpretation and analysis of responses were based on the questionnaire and interview questions categories.

Step 1: Become familiar with the data

The first step in any qualitative analysis is reading, and re-reading the transcripts. The researcher read and re-read the questionnaires and interview responses so as to be familiar with the entire body of data.

Step 2: Generate initial codes

Coding reduces lots of data into small pieces of meaning. In this phase the researcher started to organise the data in a meaningful and systematic way. The researcher used theoretical thematic analysis hence the researcher did not code every piece of text. The researcher coded each segment that was relevant and captured something about the research objectives. In addition, the researcher used open coding; meaning that the researcher did not have pre-set codes but developed and modified the codes as the researcher worked through the coding process. Coding was done manually.

Step 3: Search for themes

A theme is a pattern that captures something significant or interesting about the data and/or research question. Step three began when the researcher coded and collated all data, and had a long list of the different codes that the researcher had initially identified across the data set. The researcher used visual representations to help sort the different codes into themes.

Step 4: Review themes

During this phase the researcher reviewed, modified and developed the preliminary themes that were identified in Step 3 by gathering together all the data that was relevant to each theme. The data associated with each theme was colour-coded. The researcher read the data associated with each theme and considered whether the data really supported it. The researcher then thought about whether the themes worked in the context of the entire data set. Themes should be coherent and they should be distinct from each other, which is why the researcher asked herself the following questions:

- Do the themes make sense?
- Does the data support the themes?
- Am I trying to fit too much into a theme?
- If themes overlap, are they really separate themes?
- Are there themes within themes (sub-themes)?
- Are there other themes within the data?

Step 5: Define themes

This is the final refinement of the themes where the researcher identified the essence of what each theme is about; what the theme is saying and if there are sub-themes and how do they interact and relate to the main theme and finally how do the themes relate to each other.

Step 6: Writing-up

The researcher wrote up all the analysed information under each respective theme as research findings.

CHAPTER FOUR

RESEARCH FINDINGS AND ANALYSIS

4.1 Introduction

This chapter focuses on the presentations of research findings and analysis of results. The data which was collected through questionnaires is presented in the form of tables, graphs and or figures. The data presentation was guided by research objectives presented in chapter one which are: to examine the water pricing mechanisms used by Namwater, and to find out the advantages and disadvantages of such a pricing mechanism.

4.2.1 Description of the research instrument

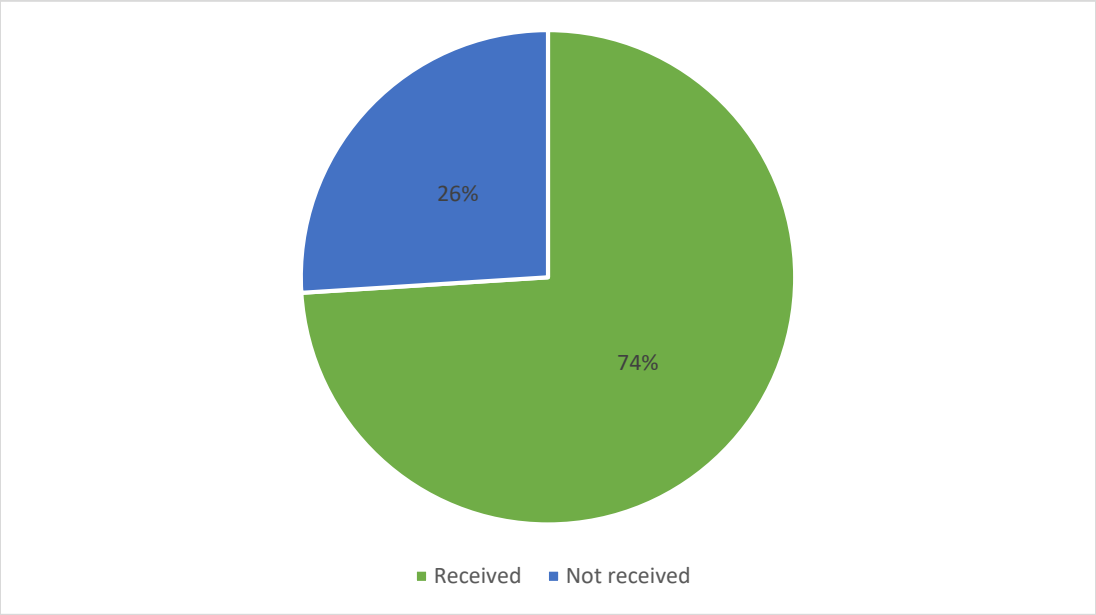
A questionnaire and interview was used in the study for data collection. The questionnaire had five sections with thirteen open ended questions in total that required the participants to explain their responses. The interview schedule was not divided into sections but had ten questions that covered similar questions as the one covered in the questionnaire. Section 1 of the questionnaire covered general questions on participants' departmental information and hierarchical levels as well as their gender. Section 2 of the questionnaire had three questions. These questions dealt with the customer's perceptions on water pricing. The third section of the questionnaire had six questions. This section dealt with issues concerning water pricing mechanisms. Section 4 of the questionnaire which had two questions addressed the advantages of various pricing mechanisms. Section 5 of the questionnaire pursued to determine the disadvantages of various pricing mechanisms. This section had only two items.

4.2.2 Response rate

Respondents totalled 35, however this consisted of two head of divisions who participated through responding to interview questions and 33 participated through answering questionnaires. Thirty-three self-administered questionnaires were hand delivered to respondents as follows: eight questionnaires were given to the accountants namely, debtor's accountant, creditor's accountant, financial accountant, management accountant, cost accountant, area accountant: central, area accountant: Cuvelai and to the trainee: chartered accountant; four questionnaires were given to the trainee accountants, one was given to the manager: debt collection; fourteen questionnaires were given to different clerks and finally six questionnaires were given to the cashiers. Two heads of divisions were interviewed, namely head management accounting and the head of the financial accounting division.

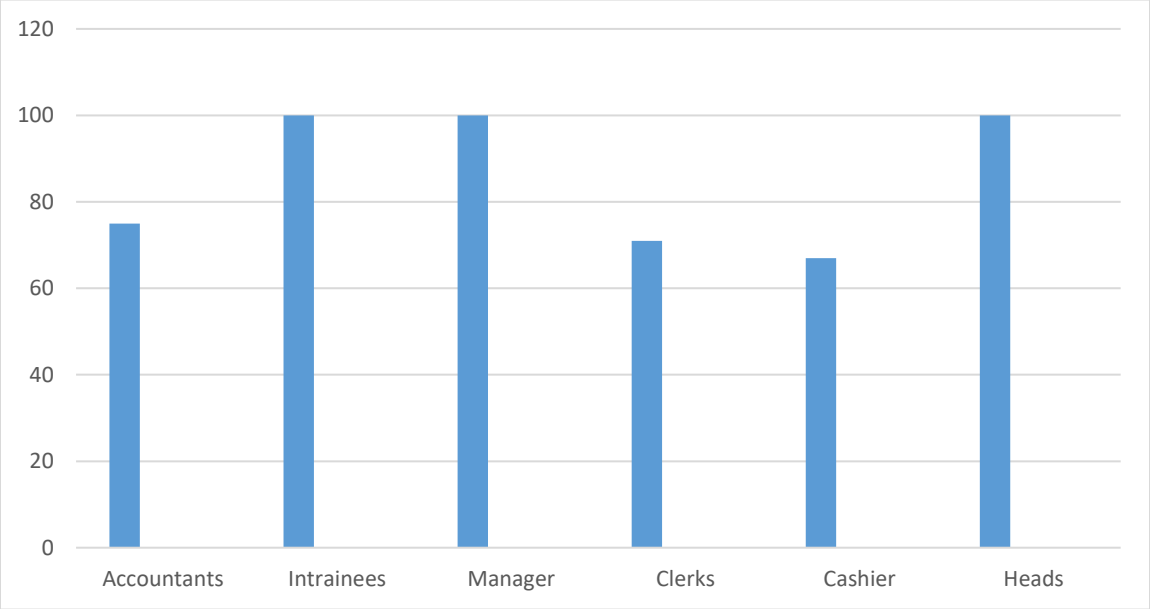
Of the 33 questionnaires that were distributed, 25 were returned, which represents a response rate of 76%, while eight questionnaires were not returned, which represent 24% as depicted in figure 1 below. Out of those 25 questionnaires returned, 6 were from the accountants which represents a response rate of 75%, 4 were from the trainee accountants which represents a response rate of 100%, while 1 was from the manager: debt collection which translates to 100%, 10 were from the clerks which totals 71%, and finally 4 came from the cashiers which represents a response rate of 67% as indicated in figure 2 below. On the other hand, all the two heads were successfully interviewed which represents 100% response rate. The researcher considered it significant to report the details for each position's response rate because response rates provide a measure of reassurance that the findings that are obtained can be projected to the population from which the sample was drawn.

Figure 1: Overall response rate: Questionnaire



Source: Data collected through the questionnaires in September – October 2018

Figure 2: Specific response rate: Questionnaire and interview for the heads (in %)



Source: Data collected through interviews and the questionnaires in September – October 2018.

The above two graphs indicate that the responses, being the overall response rate or the specific response rate were above the average, the average being 50% (17.5/35x 100%) which is calculated as 35/2= 17.5. Therefore, it can be concluded that the response rate was a fair representation of the sample selected.

4.2 Demographic characteristics of participants

This section consists of demographic information where respondents were asked to indicate the department they are from, their division, position held and gender.

4.2.1 Gender of respondents

Of the 25 respondents who completed the questionnaire, 20 (80%) were female while 5 (20%) were male. This does not indicate a good balance in terms of gender representation across the chosen sample size. This is due to the fact that the NamWater Finance department is dominated by women. Though the majority of respondents were female, gender did not appear to have an influence on the responses to questions than male respondents. Based on the response rate on gender as per table 1 below, it appears that the chosen two divisions had more female staff members than their male counterparts.

On the other hand, out of the two key informants who were interviewed, 50% were female and the other 50% were male, which indicates a good balance in terms of gender representation across the chosen key informants. This is also illustrated in table 1.

Table 1: Gender of respondents

Gender	No of respondents (interview)	% of respondents (interview)	No of respondents (completed questionnaire)	% of respondents (questionnaire)
Male	1	50	5	20
Female	1	50	20	80
Total	**2**	**100**	**25**	**100**

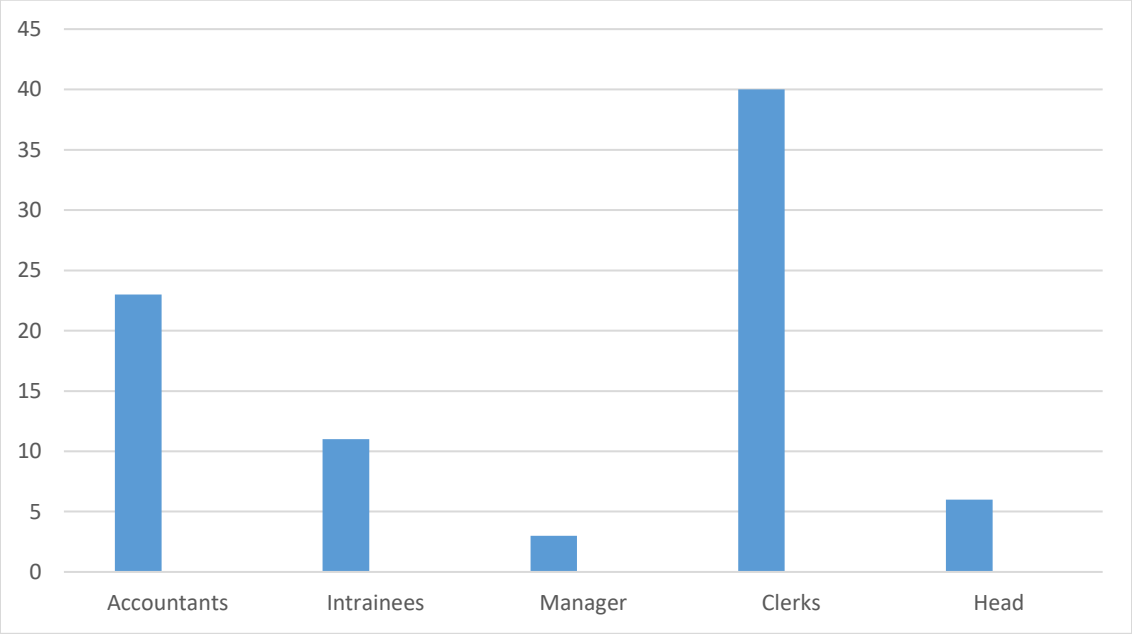
Source: Data collected through interviews and the questionnaires in September – October 2018

4.2.2 Position held and respondents' departmental division

The position held was used as a general indicator of exposure to the NamWater water pricing (tariff determination). The assumption was that those who had served in finance related positions of NamWater were in a better position to understand NamWater's pricing mechanism.

The data on the position held of the sampled respondents is presented in Figure 3. The employees were considered as capable of interpreting the questionnaire without any assistance.

Figure 3: Position held by sampled participants



Source: Data collected through interviews and the questionnaires in September – October 2018.

The finance department, which has three divisions namely financial accounting, management accounting and supply chain management was included in the study of which only two divisions (financial and management accounting) was selected. Of the 25 respondents who completed the questionnaire, 22(88%) were from the financial accounting division, while 3(12%) were from the management accounting division. This might seemingly not indicate a good balance in terms of divisional representation across the chosen sample size. This is due to the fact that NamWater's finance department is dominated by staff members from the financial accounting division, while the management accounting division only has four staff members in total of which one is the head of the division.

Although the majority of respondents who completed the questionnaire were representing the financial accounting division, the respondents' divisions did not appear to have an influence on the responses to the questions.

On the other hand, out of the two key informants who were interviewed, 50% were from the financial accounting division and the other 50% were from the management accounting division, which indicates a good balance in terms of divisional representation across the chosen key informants.

The data on the departmental division of the sampled respondents is presented in table 2 below:

Table 2: Respondents' departmental division

Division	No of respondents (interview)	% of respondents (Interview)	No of respondents (completed questionnaire)	% of respondents (Questionnaire)
Financial Accounting	1	50	22	88
Management Accounting	1	50	3	12
Total	**2**	**100**	**25**	**100**

Source: Data collected through interviews and the questionnaires in September – October 2018.

4.2.3 Gender of respondents

Of the 25 respondents who completed the questionnaire, 20(80%) were females while 5 (20%) were males. This might seemingly not indicate a good balance in terms of gender representation across the chosen sample size. However, this is due to the fact that NamWater's finance department is dominated by women. Although the majority of respondents were female, gender did not appear to have an influence on the responses to the questions. Based on the response rate on gender as per table 3 below, it appears that the chosen two divisions had more female staff members than male staff members.

On the other hand, out of the two key informants who were interviewed, 50% were female and the other 50% were male, which indicates a good balance in terms of gender representation across the chosen key informants. This is also illustrated in table 3.

Table 3: Gender of respondents

Gender	No of respondents (interview)	% of respondents (interview)	No of respondents (completed questionnaire)	% of respondents (questionnaire)
Male	1	50	5	20
Female	1	50	20	80
Total	**2**	**100**	**25**	**100**

Source: Data collected through interviews and the questionnaires in September – October 2018

4.3 Customers perception on water pricing

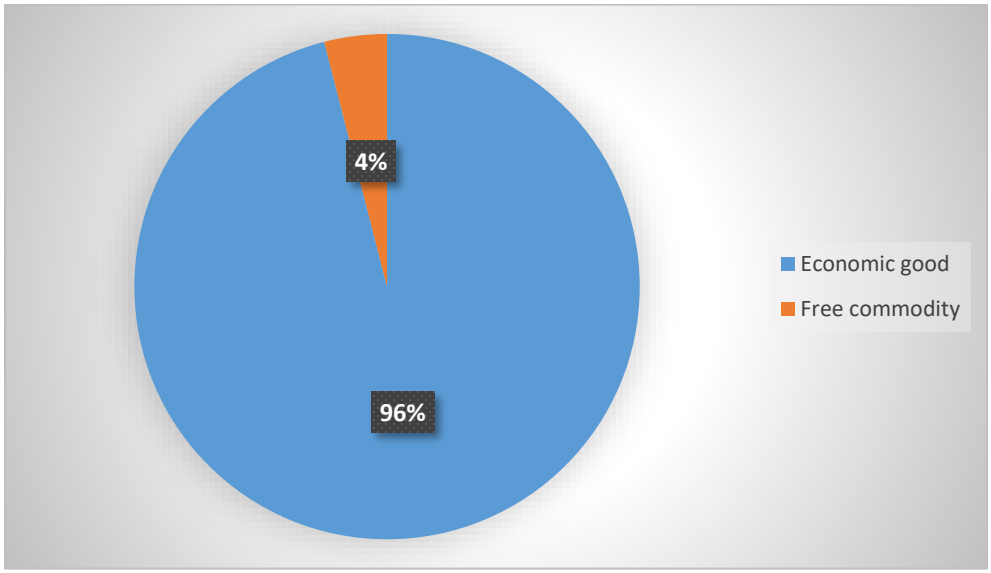
Section 2 of the questionnaire was designed to address issues pertaining to the perceptions of consumers on water pricing. The section had two descriptive questions. The objective of the questions was to extract what the respondents think about water pricing.

4.3.1 Water as an economic good or a free commodity

The objective of question one and two of section two of the questionnaire was to determine whether respondents consider water as an economic good or as a free commodity. The data on question one is presented in figure 4 below.

It is evident from figure 4 that the g majority (96%) indicated that water is an economic good and that it commands a price to cover treatment, distribution and storage costs and to avoid heavily relying on Government funding which is not feasible in the long run; however, 96% of the respondents also indicated that costs must be limited to operational costs and water must be priced at a basic rate. The remaining 4% believes that water is a free and natural resource given by God, therefore consumers must receive it for free.

Figure 4: Water as an economic or free commodity



Source: Data collected through questionnaires in September – October 2018.

4.4 Water pricing mechanisms

This section consisted of six questions. Firstly the respondents were asked about the impact of water pricing on consumer demand. Secondly, the respondents were asked to give their understanding of cost recovery as a pricing mechanism. Thirdly, respondents were asked to choose the most appropriate pricing mechanism for water providers between cost recovery, polluter pays principle, marginal costing and volumetric costing. Fourthly, respondents were asked to give their opinion on whether they think NamWater is fully recovering its operational costs.

4.4.1 Impact of water pricing on consumer water demand

In order to get a better picture of the impact of water prices on consumer demand, respondents were asked about their opinions on the effects of water pricing on demand. Findings show that

60% of the respondents were against water pricing because they are of the opinion that, water pricing has a high impact on the consumers of water because not all people have an income that can see them affording water. Secondly, customers are not well informed about water pricing and if the price is high, consumers might opt for rivers or dams as sources of water to avoid paying high amounts.

However, the remaining 40% of the respondents had opinions in favour of water pricing, arguing that if water is free, consumers tend to waste water because they are not paying for it; forgetting that water is a scare resource. A total of 40% of the respondents were also of the opinion that the pricing of water will not dictate demand because water is life. These findings are supported by the study done by Cardone and Fonseca (2003), who indicated that it is generally agreed and widely accepted that water users should pay for the recurring costs of providing water.

4.4.2 Cost recovery as a pricing mechanism

Respondents were asked to indicate their understating of cost recovery as a pricing mechanism. The researcher noted that respondents have quite a deep understanding of cost recovery as a pricing mechanism as per their explanations summarized below:

Cost recovery must:

- Charge for the service provided by the water provider in order to raise capital to maintain the infrastructure
- Ensure that tariffs are set based on the costs incurred
- Recover the costs of bringing water to the tap
- Be subsidized by the government

- Ensure that costs to be recovered from customers should in principle include depreciation, renewal and maintenance costs. The revenue which water operators receive needs to cover the totality of these costs, the charges should be set on the analysis of the investment needs of the water infrastructure.

The understanding of the respondents with regards to the cost recovery mechanism means that NamWater can consider implementing one or two points raised by the respondents as summarized above with the intention of trying to recover its full cost for supplying water.

4.4.3 Most appropriate pricing mechanisms for water providers

Respondents were further asked to express their opinions on which types of pricing mechanism they think is most appropriate for water providers and to justify their answers as to why they think such a mechanism is the appropriate one for water providers. The respondents were requested to choose between cost recovery, polluter pays principle, marginal costing and volumetric costing.

Out of the 25 respondents who completed the questionnaires, 19(76%) indicated that cost recovery is the most appropriate pricing mechanism, 4(16%) indicated the polluter pays principle, none of the respondents indicated marginal costing, and 2(8%) pointed out volumetric costing. Surprisingly all the two key informants that were interviewed indicated cost recovery as the most appropriate pricing mechanism. This is shown in table 4 below.

Table 4: Appropriate mechanism for water providers

Division	No of respondents (interview)	% of respondents (interview)	No of respondents (completed questionnaire)	% of respondents (questionnaire)
Cost recovery	2	100	19	76
Polluter's pay Principle	0	0	4	16
Marginal costing	0	0	0	0
Volumetric costing	0	0	2	8
Total	**2**	**100**	**25**	**100**

Source: Data collected through interviews and the questionnaires in September – October 2018

Respondents' views that have pointed to cost recovery as the most appropriate pricing mechanism for water providers has been summarized as follows: cost recovery is essential for sustainable water supply; and it enables consumers and water providers to be treated fairly and equally as it allows water providers to break even, meaning that they will not make a loss nor will they make a profit resulting in customers not being overpriced. Respondents therefore, suggested that cost recovery must be used and or implemented for non-commercial customers only. This finding is supported by the study by Filippini (2018) who indicated that Croatian law calls for the use of cost recovery as a pricing mechanism (see section 2.3).

Secondly, respondents' views that pointed to the polluter pays principle as the most appropriate pricing mechanism for water providers has been summarized as follows: the polluter pays principle should be implemented for commercial users in addition to cost recovery to ensure that water

pollution is kept at minimal. The polluter pays principle is the most appropriate because this principle is based on the fact that as much as pollution is unavoidable, the person or industry that is responsible for the pollution must pay some money for the rehabilitation of the environment and this is good for water providers because as a result, the water providing institution will not spend more money on water purification. This finding is supported by the study by Lindhout and Van den Broek (2014) as they emphasized that the polluter pays principle is aimed at an internationalising of the cost of pollution prevention and control measures.

Thirdly, none of the respondents pointed to marginal costing as the most appropriate pricing mechanism for water providers. This gives an indication that among all the respondents, none of them have an understanding of how marginal costing works.

Finally, one respondent viewed that volumetric costing is the most appropriate pricing mechanism for water providers because volumetric costing ensures that consumers are charged for the rightful quantity of the water that they have consumed.

4.4.4 Challenges faced by NamWater in recovering operational cost

Out of the twenty five respondents 20(80%) pointed out that in their opinion they think NamWater is not recovering it's operational costs from the prices charged for water because of a high rate of water losses as there is usually a high rate of water loss as a result of pipe breaks and hence they are of the opinion that Namwater losses out on the purification and transportation of such water.

Secondly, respondents think that NamWater's tariffs for individual customers are too low, unless they are recovering from the big customers such as mines. Moreover, a lot of consumers do not pay on time, making purification and pumping of water during the non-payment period difficult.

On the other hand, the remaining 5(20%) indicated that they are of the opinion that NamWater is recovering its operational costs from the prices charged for water due to the fact that there are some years when NamWater reported a profit, for example, for the audited financial year 2016/2017 when they reported a profit of N$ 44 159 845 (NamWater, 2017).

4.4.5 What NamWater can do to be able to recover its operational costs

The twenty seven respondents (twenty five who completed questionnaires and two interviewees), they gave their opinion on what NamWater can do to be able to recover its operational costs as summarised below:

- Increase the price on an annual basis so that NamWater will be able to keep up with the inflation rates that have an effect on the purchase price of chemicals used for purification. This point was raised by 80% of the responded.
- Namwater should re-evaluate its cost drivers to ensure that all drivers have been identified and that the correct amounts are allocated to the cost drivers. Only two respondents from the Accountants category that raise this point, which constitute 8% of the respondents who completed a questionnaire.
- The utility provider must try by all means to fight against illegal water connections by the community. Only one respondent that raised this point.

- NamWater needs to enhance the billing processes so as to ensure that all registered customers are being billed on time and every time. This can only be achieved if all customers are registered. Majority of the respondents (76%) have raised this point.
- It is advisable for NamWater to fit prepaid taps for all bulk and individual customers to avoid unpaid bills which in the process enhances cost recovery. This point was raised by the average (50%) of the respondents.

4.4.6 Pricing mechanisms that other water providers are using

It is surprising that out of the twenty five respondents who completed questionnaires and two who were interviewed, only one respondent indicated knowing what pricing mechanism the City of Windhoek is using but refused to mention it. Because the researcher indicated to the respondents that participation in the research was voluntary and therefore respondents had the right to refuse answering any question, or terminate the questionnaire without any justification, the researcher had no right to insist on the one respondent that knew about the City of Windhoek's pricing mechanism to mention it.

4.5 Advantages of various pricing mechanisms

This section consisted of two questions, where respondents were asked to provide the advantages of cost recovery as a pricing mechanism which NamWater is currently using and also to provide the advantages of other pricing mechanisms.

4.5.1 Advantages of cost recovery as a water pricing mechanism

Respondents were informed that NamWater is currently using cost recovery as a pricing mechanism and they were thereafter requested to point out the advantages associated with cost recovery. A total of 90% of the respondents pointed out the following benefits of using cost recovery as a pricing mechanism:

- Easy to implement and simple to administer, thus easy to recover costs
- Cost recovery can help increase overall profit
- Easy to maintain, cover costs, not draining customers, not relying on government
- Gives a fair pricing for a commodity such as water
- Costs related to data collection can be avoided as data is retrieved from internal records
- It enables the water providers to break even because the water provider will recover exactly everything they used to bring the water to the consumer's tap.

The remaining 10% of the respondents left the question blank. These findings are supported by a study by Cardone and Fonseca (2003) (See section 2.5.1).

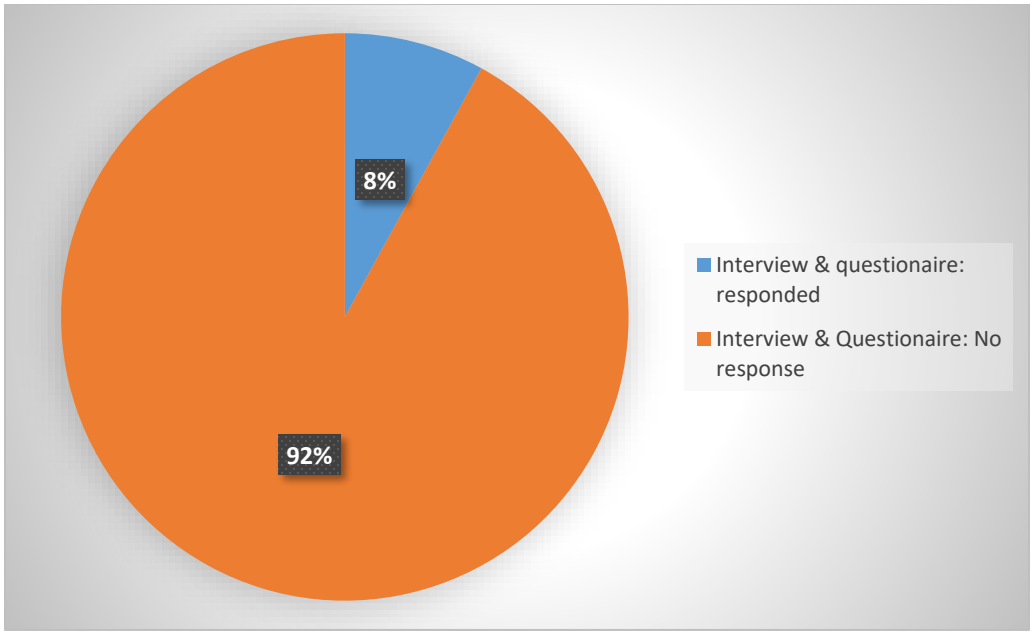
4.5.2 Advantages of other water pricing mechanisms

Respondents were further requested to point out the advantages of other pricing mechanisms that they know of. However, based on the response rate, it is evident that only two respondents which constituted an 8% response rate out of the 25 respondents that completed a questionnaire have some background knowledge of marginal costing as a pricing mechanism and they only provided the advantages of marginal costing.

Firstly, respondents are of the opinion that marginal costing avoids over and under absorption of overheads. Secondly, the 8% of the respondents pointed out that marginal costing is a useful mechanism for ad hoc pricing.

On the other hand, it is surprising that all of the key informants who were interviewed indicated that they didn't know about the advantages of other pricing mechanisms; hence this question received zero response rate from the interviewee as indicated in figure 5.

Figure 5: Response rate on disadvantages of other pricing mechanisms (both interview & questionnaire: Total of 27 respondents)



Source: Data collected through interviews and the questionnaires in September – October 2018.

4.6 Disadvantages of various pricing mechanisms

This section consisted of two questions, where respondents were asked to provide the disadvantages of cost recovery as a pricing mechanism which NamWater is currently using and also to provide the disadvantages of other pricing mechanisms.

4.6.1 Disadvantages of cost recovery as a water pricing mechanism

Twenty respondents out of the 25 respondents who completed the questionnaire and the 2 key informants who were interviewed pointed out the disadvantages of water cost recovery as a pricing mechanism as listed below:

- Do not provide incentives to reduce water consumptions
- Bulk and individual customers cannot reduce their water bill by economising on water use
- Does not take demand into account as this type of water pricing does not allow customers to receive a discount because of high demand. This is mostly affecting the individual customers and not the commercial customers and industrial customers such as mines.
- The price is based on historical data and usually it is not adjusted for future implications, hence there is a high risk of some costs not being factored in the tariffs which will result in the water provider to not recover all its operational costs
- Even if the cost of the infrastructure is recovered, the price still remains high, which in the end will have a negative impact on the customers as they will end up paying high prices for water
- Chances of not breaking even might arise

- Not necessarily that all costs incurred are recovered due to non-payment by customers
- Cost recovery is politically influenced and no one can increase tariffs without approval from the line minister, resulting in the water provider not having power over price setting

4.6.2 Disadvantages of other water pricing mechanisms

Lastly, respondents were requested to give the disadvantages of other pricing mechanisms. One respondent out of the twenty five respondents who completed the questionnaire pointed out that marginal costing is difficult to distinguish between fixed and variable costs hence it is not a suitable pricing mechanism to use as it can result in under or overpricing of water.

One respondent out of the two key informants who were interviewed stated that when using marginal costing as a form of water pricing mechanism results in decision making being difficult as marginal costing works on contributions only and does not take into account fixed costs. This type of mechanism is only used for short term decisions and it is not suitable for long-term decision making.

4.7 Summary

The purpose of chapter four was to present the findings of the data collected using a self-administered open ended questionnaire and interviews. The qualitative data reviewed indicated that cost recovery is the most appropriate water pricing mechanism. The results further give an indication that NamWater can continue using cost recovery as a pricing mechanism because of the advantages. The following chapter presents the findings and recommendations.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The previous chapter focused on the presentation, interpretation and discussion of the results of the study. This chapter draws the conclusions on the study and suggests recommendations to address challenges facing NamWater in relation to its pricing mechanism which is cost recovery. The chapter further points out the future research areas on the topic to address the challenges identified in this research.

The main purpose of carrying out this study was to examine the pricing mechanism used by NamWater and to find out the advantages and disadvantages of such a pricing mechanism.

5.2 Summary of findings and conclusions

Water pricing mechanism is an essential part of the financial decision making of any water provider organisation charged with the responsibility to assist the management to achieve sound utility pricing through effective price determination.

Despite the fact that Namwater is currently using cost recovery as a pricing mechanism, the researcher has found out that cost recovery is associated with a lot of challenges which outweigh its benefit. This finding is supported by literature such as by Massarutto (2007) who pointed out three major difficulties associated with cost recovery as a pricing mechanism.

The results emanating from the findings have pointed out that NamWater is not recovering it's operational costs from the prices charged for water because of a high rate of water losses as there is usually a high rate of water losses as result of pipe breaks and hence respondents are of the opinion that Namwater losses out on purification and transportation of such water (See section 4.4.4 in chapter 4: results from questionnaire).

Secondly, respondents think that NamWater's tariffs for individual customers are too low, unless they are recovering from the big customers such as mines. In addition, a lot of consumers do not pay on time, making the purification and pumping of water during the non-payment period difficult. This is also evidently reported in the published annual reports of the previous financial periods (financial year 2015/2016) where it is indicated that NamWater had been running on a loss).

5.3 Conclusions

The conclusions based on the research study findings are that despite the fact that Namwater is using cost recovery as a pricing mechanism; this pricing mechanism is not enabling them to fully recover its operational costs. This is evident from the respondents' responses as follows: 80% of the respondents pointed out that in their opinion they think NamWater is not recovering it's operational costs from the prices charged for water because of a high rate of water losses as there is usually a high rate of water loss as a result of pipe breaks and hence they are of the opinion that NamWater losses out on the purification and transportation of such water.

Secondly, respondents think that NamWater's tariffs for individual customers are too low, unless they are recovering this from big customers such as mines. In addition, a lot of consumers do not pay on time, making the purification and pumping of water during the non-payment period difficult.

Furthermore, the price is based on historical data and usually it is not adjusted for future implications, hence there is a high risk of some costs not being factored in the tariffs which will result in some costs not being recovered (refer to 4.6.1 under disadvantages of cost recovery as a pricing mechanism).

5.3.1 Research objectives conclusion

Research objective 1: To examine the water pricing mechanism used by Namwater

The researcher found out that NamWater uses cost recovery as a water pricing mechanism. The researcher further found out that 76% of the respondents indicated that cost recovery is the most appropriate pricing mechanism, 16% indicated the polluter pays principle, none of the respondents indicated marginal costing, and 8% pointed out volumetric costing. All the two key informants that were interviewed indicated cost recovery as the most appropriate pricing mechanism.

The findings of this study are supported by Cardone and Fonseca (2003), who pointed out that cost recovery through tariffs, raises enough revenue to cover specific costs. These can be operational and maintenance costs, and also financial costs. Secondly, tariffs make access to drinking water affordable for different income groups, which should take into account the ability to pay for a service and the fact that there are major impacts for health, well-being and poverty alleviation

targets. The tariff should not be too high to drive consumers to unsafe alternatives or to decrease daily use to dangerous levels.

Research objective 2: To find out the advantages and disadvantages of such a pricing mechanism

Advantages

The study presented the following advantages of cost recovery as pointed out by the respondents:

- Firstly, it was pointed out that a cost recovery mechanism is easy to implement and simple to administer
- Cost recovery can help increase overall profit. It avoids water providers from relying on the government for funds. Costs related to data collection can be avoided as data is retrieved from internal records
- It enables the water providers to breakeven because the water provider will recover exactly everything they used to bring the water to the consumer's tap

Disadvantages

The study presented the following disadvantages of cost recovery as pointed out by the respondents:

- Do not provide incentives to reduce water consumption
- Bulk and individual customers cannot reduce their water bill by economising on water use
- Does not take demand into account as this type of water pricing does not allow customers to receive discount because of high demand. This is mostly affecting the

individual customers and not the commercial customers and industrial customers such as mines.

- The price is based on historical data and usually it is not adjusted for future implications, hence there is a high risk of some costs not being factored into the tariffs which will result in the water provider not recovering all its operational costs.
- Even if the cost of the infrastructure is recovered, the price still remains high, which in the end will have a negative impact to the customers as they will end up paying high prices for water.
- Chances of not breaking even might arise
- Not necessarily feasible that all costs incurred are recovered due to non-payment by customers.
- Cost recovery is politically influenced and no one can increase tariffs without approval from the line minister, resulting in the water provider not having power over price setting.

5.4 Recommendations

The recommendations presented in this study are based on the conclusions that were found (see section 4.4.5) and they are stipulated below:

- Increase the price on an annual basis so that NamWater will be able to keep up with the inflation rate that has an effect on the purchase price of chemicals used for purification;
- Namwater should re-evaluate its cost drivers to ensure that all drivers have been identified and that correct amounts are allocated to the cost drivers;

- The utility provider must try by all means to curtail illegal connections;
- NamWater needs to enhance the billing processes so as to ensure that all registered customers are billed on time and every time. This can only be achieved if all customers are registered; and
- It is advisable for NamWater to fit prepaid taps for all customers to avoid unpaid bills, which in the process enhances cost recovery.

5.4.1 Further recommended studies

Due to time constraints and limited areas of concentration of the data presented, the study recommends that further work in this area should be considered through looking at other variables that cause under recovery of costs, as well as other alternatives that can enable water providers to fully recover their costs. Future researchers are further encouraged to carry out research that is focused at finding a model of cost recovery in utilities providers.

References

Abou-Seada, M., Coope, C., Ghaffarri, F., Jones, R., Kyriacou, O., & Simpson, M. (2007). *The economic consequences of accounting in the English and Welsh water industry: A non-shareholder perspective.*

Retrieved from http://www.st-andres.ac.uk/business/ecas/7/paper/ECAS- Cooper-et-al.

Akwaake, E. (2016). *Namwater tariff submission to the Cabinet.*

Altmann, D. (2007). *Marginal cost water pricing: Welfare effect and policy implications using Minimum cost and benchmarking models with case studies from Australia and Asia* Adelaide, Australia.

Retrieved://www.researchgate.net/publication/254305508_An_analysis_of_the_cost_structure_of_water_supply_in_Sri_Lankaon 20/04/2018.

Ambec, S., & Ehler, L. (2010). *Regulation via the Polluter Pays Principle*. Retrieved from https://onlinelibrary.wiley.com/doi/abs/10.1111/ecoj.12184 on 20/04/2018.

Armell, N. W. (1999). Climate change and global water resources. *Global Environmental Change, 9*, S31-S49.

Arntzen, J., Masike, S., & Kgathi, L. (2000). *Water values, prices and water management in Botswana: Sustainable use of water resources*.

Retrieved:http://www.fao.org/nr/water/aquastat/countries_regions/Profile_segments/BWA-Sourc_fra.stm on 29/06/2018.

Atieno, O. P. (2009). An analysis of the strengths and limitations of qualitative and quantitative research paradigms. *Problems of Education in the 21st Century*, *13*(1), 13-38.

Biermann, F., Bohm, F., Brohm, R., Droge, S., & Trabold, H. (2014). *The polluter Pay Principle under WTO law: The case of National energy policy instruments. Institute for climate impact research.*

Retrieved:https://research.vu.nl/en/persons/frankbiermann/publications/FatiraF/pureresearchoutput on 02/07/2018.

Bogaert, S., Vandenbroucke, D., Dworak, T., Berglund, M., Interwies, E., Görlitz, S., ... & Moeller-Gulland, J. (2012). *The role of water pricing and water allocation in agriculture in delivering sustainable water use in Europe: Final report*. Retrieved from http://www.feem-project.net/epiwater/docs/epi-water_nl02.pdf on 15/09/2018.

Bragg, S. (2017). *Cost allocation.* Retrieved from https://www.accountingtools.com/articles/what-is-cost-allocation.html on 21/05/2018.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3,* 77-101.

Brikke, F., & Rojas, J.C. (2001). Key factors for sustainable costs recovery in the context of community managed water supply. *Occasional paper series 32-E*. Delf, The Netherlands: IRC international water and sanitation centre.

Burt, C.M. (2006). Volumetric water pricing: Irrigation Training and Research Centre. *ITRC report 06-002.* Retrieved from http://www.itrc.org/reports/pdf/volumetric.pdf

Cardone, F. & Fonseca, C. (2003). *Financing and cost recovery*: *Thematic overview paper*. International Water & Sanitation Centre. Retrieved:http://www.pacificwater.org/userfiles/file/IWRM/Toolboxes/financing%20IWRM/TOP7_CostRec_03.pdf on 20/01/2019.

Coffey, C., & Newcombe, J. (2001). *The Polluter Pay Principle and fisheries: The role of taxes and charges*. London, UK: Institute for European environment policy.

De Vaus, D.A. (2006). *Research design: A review in De Vaus (*Ed*).* Retrieved from http://research.apc.org/images/5/5f/De_Vaus_chapters_1_and_2.pdf on 26/08/2018.

Dinar, A., Rosegrant, M., & Meinzen-Dick, R. (1997). Water allocation mechanisms: principles and examples. *Policy Research Working Paper 1779.* Washington DC: World Bank.

Dinar, A., & Subramanian, A. (1997). Water pricing experiences; an international perspective. *World Bank Technical Paper No. 386*. Washington, DC: World Bank.

DWA. (2013). *Revised water pricing strategy for water: The Republic of South Africa*. Retrieved from http://www.fao.org/nr/water/aquastat/countries_regions/ZAF/index.stm on 27/08/2018.

Easter, K.W., & Liu, Y. (2005). Cost recovery and water pricing for irrigation and drainage projects. *Agriculture and rural development discussion paper 26.* Retrieved from http://siteresources.worldbank.org/INTARD/Resources/Cost_Recovery_final.pdf on 03/06/2018.

EEA. (2013). Assessment of cost recovery through water pricing. *EEA technical report 16(2013).*

EEA. (2016). *The role of water pricing and water allocation in agriculture in delivering sustainable water use in Europe.* Retrieved:https://ec.europa.eu/environment/water/quantity/pdf/agriculture_report.pdf.

Eisenhardt, K.M., & Graebner, M.E. (2007). Theory building from cases: Opportunities and challenges. *The Academy of Management, 50*(1), 25-31.

European Federation of National Drinking Water and Wastewater Services (EurEau). (2007)

Customers and cost recovery: Realising the water framework directive. EurEau, Belgium. Retrieved from http://www.eureau.org/resources/publications/3031-water-matters/file on 07/07/2018.

Filippini, M. (2008). Cost efficiency of Slovenian water distribution utilities: An application of stochastic frontier methods, *Journal of Productivity Analysis*, *29*, 169-182.

Fishman, J.A. & Cooper, R.L. (2010). *National water summary*. Geology survey (US). Retrieved from https://www.nap.edu/read/25134/chapter/7 on 06/05/2018.

Garcia, S., & Reynaud, A. (2004). Estimating the benefits of efficient water pricing in France. *Resource and Energy Economics*, *26*(1), 1-25.

Granthan Research Institute on Climate Change and Environment (GRICCE). (2018). *What is the Polluter Pays' Principle.*

Retrieved from https://www.preventionweb.net/organizations/6018 on 06/05/2018.

Graziano, G.W., & Schroeder, D.A. (2010). *The oxford handbook of prosocial behaviour.*

Retrieved from https://global.oup.com/academic/product/the-oxford-handbook-of-prosocial-behavior-9780195399813?cc=us&lang=en& on 17/08/2018.

Hanemann, M. (2006).*The value of water.* Retrieved from

http://www.ctec.ufal.brlprofessor/vap/vaueofwater.pdf on 07/03/2018.

Hendry, S. (2016). *The value of Scotland's water resources: Legal analysis*. Scotland's centre of expertise for water on 07/03/2018r.

Retrieved:https://www.researchgate.net/publication/306932091_The_Value_of_Scotland's_Water_Resources_-_Legal_Analysis on 07/03/2018.

Kouyoumijian, M. (2012). *Selling water in the futures market: In search of a spot price in the UK.* Grenoble graduate of Business.

Retrieved:https://www.Selling/water/in/the/futures/market:/In/search/of/a/spotprice/in/the/source on 15/07/2018.

Kraemer, R.A., & Piotrowski, R. (1998). *Comparison of water prices in Europe*. Berlin, Germany: Ecologic Centre for international and European Environmental Research. Berlin, Germany 10/09/2018.

Lin, J. Y. (2003).The effects of development strategy on equity and efficiency. *China Economic Quarterly, 2*(2), 479-504.

Lindhout, P.E., & Van den Broek, B. (2014). The Polluter Pays Principle: Guidelines for cost recovery and burden sharing in the case law of the European court of justice. *Utrecht Law Review, 10*(2), 46-59.

Jones, T. (2017). *Pricing water*. Paris, France: OECD.

Massarutto, A. (2007): *Water pricing and full cost recovery of water services: economic incentive or instrument of public finance?* Paper presented at the 11th International Sustainable Development Research Conference, Helsinki.

Mohayidin, G., Attari, J., Sadeghi, A., & Hussein, M. A. (2009). Review of water pricing theories and related models. *African Journal of Agricultural Research, 4*(11), 1536-1544.

Monteiro, H. (2005). *Water pricing models: A survey, 45*(2005).

Muller, M. (2007). Trade and Industry Chamber fund for research into industrial development, & equity. *Administered prices study on economic inputs: Water sector*. Retrieved from https://www.gov.za/sites/default/files/gcis_document/201409/dtiannualreport20089.pdf on 10/09/2018.

NamWater Annual Report. (2016). *Annual report*. Windhoek, Namibia: NamWater.

NamWater Annual Report. (2017). *Annual report*. Windhoek, Namibia: NamWater.

Palys, T. (2008). Purposive sampling. In L.M. Given (Ed.). *The sage encyclopaedia of qualitative research methods, 2,* 697-698.

Pettinger, T (2017). *Economics concepts: Definition of a free good.* Retrieved from https://www.google.com.na/searchwaterasaneconomicgood

Pietila, P.E. (2005). *Role of municipalities in water services in Namibia and Lithuania*. Retrieved from https://www.researchgate.net/publication/258181268 on 31/10/2018.

Ricato, M. (2018). *Water pricing: General*. Retrieved from https://sswm.info/index.php/water-nutrient-cycle/water-use/softwares/economic-tools/water-pricing---increasing-block-tariffs on 06/06/2018.

Shaw, W.H. (2008). *Business ethics*. (6th ed.) Belmont, Ca: Thomson Wadsworth.

Saunders, M., Lewis, P., & Thornhill, A. (2007). Research methods for business students. *Communication and Networking, 7(*4), 624-627.

Segosebe, E., & Parida, B.P.(2006). Water demand management in Botswana: Challenges of a diminishing resource. *International Journal of Sustainability Development Planning, 1*(3), 318-325.

Sekeran, U. & Bougie, R. (2010). Research methods for business: A skill-building approach. *Creative Education 4(*9b), 484-487.

Singh, C. (2018). Risks and responses in rural India: Implication for local climate change adaption action. *Climate Risk Management, 2*1(1), 52-68.

Spulber, N., & Sabbaghi, A.(1994). *Economics of water resources*. Norwell, MA: Kluwer Academic Publishers.

Suen, H.K., & Ary, D. (2014). *Analysing quantitative behaviour observation data*. Retrieved from

https://jethrobelt.com/blog/suen-ary-2014-analyzing-quantitative-behavioral-observation-data/ on 07/08/2018.

Republic of South Africa, Department of Water Affairs and Forestry. (1996). *Discussion Document: Water Law Principles*. Retrieved:http://unpan1.un.org/intradoc/groups/public/documents/cpsi/unpan035539.pdf on 07/08/2017.

The Republic of Namibia. (1997). *Namwater Act (12) of 1997.* Namibia, Windhoek: GRN

The Royal Academic of Engineering (2010). *Global water security – An engineering perspective.* Retrieved from www.raeng.org.uk/gws on 25/09/2018.

Trade and industry chamber. (2007). Fund for research into industrial development, growth and equity. *Administered prices study on economic inputs: Water sector final report.*

Unesco. (2003). *Water for people, water for life.* Kyto, Japan. Retrieved:http://www.unesco.org/new/en/naturalsciences/environment/water/wwap/ on 25/09/2018.

Wagner, C., Kawulich, B., & Garner, M. (2012). *Doing social research: A global context*. Retrieved:https://www.amazon.com/Doing-Social-Research-Global-context/dp/0077126408 on 07/08/2018.

APPENDIX 1: RESEARCH PERMISSION LETTER (Unam)

CENTRE FOR POSTGRADUATE STUDIES

University of Namibia, Private Bag 13301, Windhoek, Namibia
340 Mandume Ndemufayo Avenue, Pioneers Park
☎ +264 61 206 3275/4662; Fax +264 61 206 3290; URL.: http//www.unam.edu.na

Faculty of Economic and Management Sciences

Tel: +264 61 2063339

E-mail: lblaauw@unam.na

RESEARCH PERMISSION LETTER

Student Name: Ms. E. Protasius

Student number: 201012987

Programme: Master of Accounting and Finance

Approved research title: An analyses into the pricing mechanism of water in Namibia: A Case study of NamWater

TO WHOM IT MAY CONCERN

I hereby confirm that the above mentioned student is registered at the University of Namibia for the programme indicated. The proposed study met all the requirements as stipulated in the University guidelines and has been approved by the relevant committees.

The proposal adheres to ethical principles as per attached Ethical Clearance Certificate. Permission is hereby granted to carry out the research as described in the approved proposal.

Best Regards

Prof Marius Hedimbi

Director: Centre for Postgraduate Studies

Tel: +264 61 2063275

E-mail: directorpgs@unam.na

25 July 2017

APPENDIX 2: REQUEST FOR PERMISSION (NamWater)

The Head: Research & Development

Office of the CEO

Namibia Water Corporation

Private Bag 13389, Windhoek

07 September 2018

SUBJECT: PERMISSION TO CONDUCT AN EDUCATIONAL RESEARCH STUDY AT NAMWATER.

Dear Sir

I am Epifania Ndemuweda a Master of Science in Accounting and Finance student at the University of Namibia and a cost accountant in the Management Accounting division of Namwater. I am intending to conduct an educational research for my thesis in order to fulfil the requirements for the M.Sc. in Accounting and Finance Degree. The title of the study is **An analysis of the pricing mechanism of water in Namibia: A case study of Namwater.**

The study will be useful to Namwater as it can serve as a benchmarking tool for Namwater. The findings from the research will also contribute towards the existing body of literature.

The data collection will be done administering a questionnaire and an interview with the heads (head Financial Accounting & head Management Accountant). I will personally administer the questionnaire to the financial and management accounting staff members of Namwater as they are the key informants.

I hope my request will receive your utmost attention.

Yours sincerely

_____

Epifania Ndemuweda

M.Sc. in Accounting & Finance student

Faculty of Economics and Management Sciences

University of Namibia

Cell phone: 081 6994028

Email address: eprotasius@gmail.com

APPENDIX 3: QUESTIONNAIRE

Dear Respondent,

I am Epifania Ndemuweda, a Master's of Accounting and Finance student at The University of Namibia, Department of Accounting, Auditing and Income Tax. I am conducting a research titled: **An analysis of the pricing mechanisms of water in Namibia: A case study of NamWater**, in partial fulfilment of the requirements of the study.

The information collected is solely for academic purposes and will therefore not be used for any other reason. It is important you answer all the questions as honestly as possible as your responses to this questionnaire will be treated with utmost confidentially.

Participation in the study is voluntary and therefore you have the right to refuse answering any questions, or terminate the questionnaire without any justification. Please email back the completed questionnaire to eprotasius@gmail.com.

The undersigned is prepared to guarantee the confidentiality of any information given by you at all times, and that information contained in the conclusion of this study will only disclose aggregated results.

Thanking you for your cooperation.

Yours faithfully

……..

Epifania Ndemuweda

MSc. Accounting & Finance student

QUESTIONAIRE

Section 1: Respondent's general information

Department: ……..

Division: ……

Position held: ……

Respondent signature: …….

Gender: ……....

Questionnaire number: ……

Section 2: Customer's perception on water pricing

1. Is water an economic good or a free commodity?

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2. In your opinion do you think it is wise to price water or rather to leave it as a free natural resources?

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3. As a water consumer do you think water is fairly priced or is it too expensive for the household? Briefly explain your answer.

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Section 3: Water pricing mechanisms

1. What is the impact of water pricing on consumer water demand?

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2. What is your understanding of cost recovery as a pricing mechanism?

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3. Between cost recovery, polluter's pays principal and marginal costing and volumetric costing, which one do you think is most appropriate for water providers?

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4. Do you think Namwater is fully recovering its operational cost from the price of water they charge their customers?

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5. What can Namwater do to be able to recover its operational costs?

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6. Do you know off any pricing mechanisms that other water providers elsewhere are using in pricing their water?

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Section 4: Advantages of various pricing mechanism

1. Namwater is currently using cost recovery as a pricing mechanism, kindly provide advantages that you think are associated with the above mentioned mechanism.

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2. Kindly give benefits of other pricing mechanisms that you know of except cost recovery.

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Section 5: Disadvantages of various pricing mechanism

1. Namwater is currently using cost recovery as a pricing mechanism, kindly provide disadvantages that you think are associated with the above mentioned mechanism.

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2. Kindly give disadvantages of other pricing mechanisms that you know of except cost recovery.

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The end…… Thank you……

APPANDIX 4: INTERVIEW SCHEDULE
Title An analysis of the pricing mechanisms of water in Namibia: A case of Namwater.

Topic: Key informants

I, the undersigned respondent, hereby declare that I understand the purpose of this study and have been informed that the information I have provided will only be used for this purpose and that under no circumstance will any of my particulars be linked with any information that I provide. I also know that I can withdraw from participating at any time.

I, therefore, willingly consent to participate in the discussion on the above mentioned topic.

Signed at _____ on the _____ day of _____ 2018

Signature: _____

Time_____

Interviewee number_____

Gender_____

1. What is your understanding of water pricing?

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2. What factors influence the setting of water tariffs?

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3. Please elaborate, does Namwater have water services by-law in place and what improvement can be made, if any to be effective?

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4. Is there a strategy in place to deal with water resources management? Briefly elaborate.

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5. In your view, do you think Namwater is fully recovering its operational expenditures and if so, how? If not why not?

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6. Kindly list the advantages of the pricing mechanism currently being used?

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7. Kindly list the disadvantages of the pricing mechanisms currently being used?

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8. Do you know of any water provider that uses a water pricing mechanism that seems to be a better pricing mechanism?

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9. If your answer in number 8 is yes, name that water provider and the mechanism they uses?

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10. Will you recommend the pricing mechanism you have mentioned in number 9 to Namwater and why?

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The end……. Thank you……..