

## Effect of Water Accounting on Employment Generation in Bayelsa State

Onwuchekwa John Chika<sup>1\*</sup>, Eneh Onyinye M<sup>2</sup>, Okoye Nonso John<sup>3</sup>, Damilola Felix Eluyela<sup>4</sup>

<sup>1</sup>Department of Accounting, Federal University, Otuoke, Bayelsa State, Nigeria

<sup>2</sup>Department of Accountancy, Nnamdi Azikiwe University, Along Enugu-Onitsha Expressway, Ifite Road, 420110, Awka, Nigeria

<sup>3</sup>Department of Banking and Finance, Nnamdi Azikiwe University, Along Enugu-Onitsha Expressway, Ifite Road, 420110, Awka, Nigeria

<sup>4</sup>Department of Accounting and Finance, Landmark University, 43FP+3V8, Road, 251103, Omu-Aran, Nigeria

DOI: [10.36348/sjef.2022.v06i03.003](https://doi.org/10.36348/sjef.2022.v06i03.003)

| Received: 21.02.2022 | Accepted: 26.03.2022 | Published: 30.03.2022

\*Corresponding author: Onwuchekwa John Chika

Department of Accounting, Federal University, Otuoke, Bayelsa State, Nigeria

### Abstract

The study evaluated the effect of water accounting on employment generation in Bayelsa state. The general objective of the study is to assess the effect of water accounting on employment generation in Bayelsa state. The study was anchored on protection motivation theory. Survey research design was adopted in the study and data collected were analyzed using z-test and descriptive statistics. The findings show that water accounting has significant impact on employment generation in Bayelsa state. There is high level of relationship between water management in employment generation in Bayelsa state. It was recommended that government should provide clean and portable water for its citizens through proper management and accounting of water resources. Government should also put in place functional water management system. Government should ensure public enlightenment to debunk the idea that services provided by the government should not be paid by her citizens.

**Keywords:** Water accounting, Water management and Employment generation.

**Copyright © 2022 The Author(s):** This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC BY-NC 4.0) which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

### INTRODUCTION

The importance of water in our everyday lives cannot be over-emphasized as most activities ranging from cooking, washing, and other house hold chores involves the use of water. Water is a clear, odorless, and colorless chemical substance that makes up the majority of the world's lakes, streams, and seas, as well as the fluid in which most living creatures move. It does not have any organic nutrients yet constitutes the most vital needs of humans and animals to survive. Water is a crucial resource for sustaining life on Earth since it is a major element in industrial activities that provide a variety of products and services that are important to our contemporary lifestyle (Gleick, 1998). Gleick (2012) went on to say that, despite growing water shortages, population expansion, and a burgeoning urbanization explosion, water consumption has continued to rise. Water has become increasingly scarce as the world population has grown in tandem with economic growth over the previous century. According to the United Nations Department of Economic and Social Affairs (UNDESA), the world's population is currently 7.6 billion and is predicted to reach 8.5 billion

by 2030. The rapid development offers a huge challenge to developing countries' governmental structures and infrastructure, which are already under stress from natural resource depletion. As a result, there is a pressing need to reframe water as an economic resource that must be managed to meet human needs, preserve social and environmental integrity, and ensure adequate allocation to meet rising demands (World Water Assessment program WWA (2009); World Bank 2010; Alcamo, Martina, Michael 2003; Lambooy 2011). According to the United States Geological Survey (2018), the world is a wet environment, with water covering 71 percent of the surface. The terrain of Bayelsa, Nigeria, is a watery environment, with water covering 71 percent of the surface. However, as a result of oil drilling activity in the city, the state's fresh water supply is gradually dwindling. With the present approach to water management, it is estimated that worldwide water demand will exceed availability by 40%, putting the planet at risk. To avoid this, urgent water accountability is critical.

Water accounting has existed for over 20 years in most civilized countries and the interest for water

accounting has kept growing due to its perceived benefits when put into practice. Water accounting if done, correctly and rightly enables authorities to keep track of how much water is available and the best ways to allocate water to ensure its effective and efficient distribution. It is also concerned with comprehending seasonal variations in rainfall, as well as unanticipated extreme flood and drought, as it takes into account medium and long term changes in water demand across all users. Therefore proper management of water is very crucial and its application will help revive the various water boards, improve the efficiency, and make water easily accessible to users while providing employment in the process. Water accounting is defined by the Food and Agriculture Organization (FAO) as "the systematic analysis of present conditions and projected trends in water supply, demand, accessibility, and usage within a given geographical domain." Water is a renewable resource whose patterns, availability, and accessibility vary by location and time, as well as being impacted by socioeconomic and biophysical variables. The problem of water scarcity in Bayelsa State is not as a result of lack of water but a case of non accountability and negligence. That is to say water is available but not accounted for and channeled towards the right course.

Bayelsa State is a riverine area hence is surrounded with water, during the rainy season. The water level rises causing disasters to the inhabitants and a concern to the state government and neighboring states at large. This disaster can be avoided where the relevant authorities account for water and take proactive steps in creating a walkway for it. Hence the need for water accounting and how it can boost employment generation in Bayelsa State, Nigeria.

## CONCEPTUAL DISCUSSION

### Concept of Water

Water accounting is gaining popularity because it gives information on the amount of water available and its usage, similar to how financial accounts provide information on revenue and spending. Water accounting is motivated by the belief that "we cannot plan and control what we do not measure" (The white paper 2016). Given the present focus on water as a valuable and scarce resource, the threat of catastrophic droughts, and water's important position in the 2030 agenda, it's difficult to understand why water accounting receives so little attention. Water accounting was created from several viewpoints, including hydrology, irrigation, civil engineering, and monitoring and assessment (Perry, Steduto, Allen and Burt, 2017).

The hydrological viewpoint is founded on an understanding of the physical mechanisms that regulate the quantities and rates of water flows, fluxes stocks, and management regimes in various landscapes and/or agro-climatic situations. The engineering perspective is primarily concerned with the design, construction, and operation of water storage systems and water treatment

plans, or, to put it another way, with the management of water stocks and the transfer of water pipelines and canal systems from sources to where it is required. In practice, water accounting is used to answer questions like "what are the underlying causes of scarcity in water supply (quantity and quality) and demand of different water users?" and "what are the underlying causes of scarcity in water supply (quantity and quality) and demand of different water users?" Is the present water usage level sustainable? What can be done to make the usage of water more fair and long-term?

The word water comes from different origins. In old English the word was pronounced as "Waeter" and "Watar" in Old Saxon. Water is a colorless, tasteless and odorless liquid that forms the main constituent of lakes, rivers, streams and ocean and it forms the basis of fluid in living organisms. The importance of water is so vast in the society and our natural environment and though it has no nutrients or calories its importance in human life cannot be ignored. Water is also known as H<sub>2</sub>O is a polar inorganic compound. It is the most prevalent material on the planet and the only one that exists in solid, liquid, and gas form on the planet's surface. With ocean water covering 70% of the planet, it's difficult not to be conscious of the vital role water plays in our lives.

As previously stated, water comes in three different forms. Water could be liquid, solid or gas depending on its degree and because water is everywhere we are unaware of its unique and unusual properties of water which includes a boiling point and a freezing point. At boiling point water is at 100°C (liquid) and at the freezing state it is at 4°C which is also known as solid state or iced state. When water is at its boiling state it cannot go beyond 100°C degree and the steams that come out at that point is known as Gas. The properties of water make it suitable for different organisms to survive during different water conditions.

Water is vital to the economy and the planet at large. Agriculture consumes around 75% of all fresh water consumed by people (World Development Indicators). Fishing in both salt and fresh water bodies is an important source of food in many areas of the globe, and boats are used to carry commodities such as oil and natural gas, as well as manufactured goods, across great distances through oceans, rivers, lakes and canals. In business and at home, large amounts of water, ice, and steam are utilized to chill and heat.

### Uses of Water

During the 20<sup>th</sup> century the world's population tripled and the uses of water by humans multiplied by six fold. Drinking, cooking, bathing, and cleaning are the most visible uses of water, yet they account for just a small portion of overall water usage. Industries use twice as much water as homes across the world. Some of the other uses of water include the use of water for

food production, rural development and irrigation. Irrigation for agriculture takes so much water as 30-40% is used for flood irrigation and 90% for drip irrigation. Water is also used for recreational purposes which include swimming, golf courses, boating and fishing. It is used industrially for processing fabricating, washing, cooling or transportation of products and sanitization needs within the manufacturing facility. It is used to create a suitable environment for patients to have hydrotherapy and also used for washing of surgical tools and equipments. Furthermore, aside from the uses of water stated above, the resource water can also be of economic value. For year, government has depended solely on oil proceeds to run the economy and other possible sources of revenue and employment generation have been ignored.

In developed countries like California water is scarce but despite its scarcity much of the country's revenue is raised through appropriate management and supervision of their water management system. Their water management system which is made up of three tiers includes the local, state and federal agencies in charge of water. The three of them together produce \$46,587,000 for water supply and a lower unemployment rate in the country. Bayelsa State is located on a riverine plain with abundant water, however the water is neither drinkable or healthy to drink. It has no quality. Though surrounded with water its indigenes do not have access to portable water. Employment comes as a result of a need and Bayelsa has the need of good water hence government could use the need for provision of water to provide employment opportunities for both skilled and unskilled labour and by extension generate income. Water if managed appropriately and properly rather than a disaster as it is often seen can be another means of revenue and employment generation.

### **Concept of Water Accounting**

The ever increasing demand for water brought about the increased interest in water accounting. Just like other resources like money and inventories are accounted for there is also need for water to be accounted for considering the vital role it plays in society. Water accounting is the systematic examination of present and projected changes in water supply, demand, and usage in the FAO-defined areas (2012). Water accounting is defined by the International Water Management Institute (IWMI) as "a process of communicating water resources related information and services generated from consumptive use in a geographical domain such as a river basin, a country, or a land use class to users of such policy makers, water authorities" (IWMI, 2014). Water accounting provides information on the amount and flow of water, as well as monitoring climate change and its influence on groundwater supplies, as well as the level of variation over time and trends in these flows.

Water accounting information allows us to understand how much water is available and how it is distributed so that taps do not run dry. Understanding the hydrological cycle, accessing regional and seasonal variation in rainfall, and dealing with unanticipated extremes of flood and drought are all part of water accounting. It considers long-term changes in all water users, communities, farming, the energy industry, and the environment, as well as climate change, when planning and investing in water infrastructure such as pumping, storage, and planning (World water council, 2016). Accurate answers are needed for society's questions concerning the supply and demand for water; hence the need to account for water. Water accounting, in conjunction with auditing, may increase the knowledge of costs in terms of sustainable development by assisting in the understanding and resolution of water problems. Water accounting is inclusive since it brings together water consumers from all origins, cultures, and educational levels. It establishes a shared language for water management and other stakeholders. This approach serves to increase transparency in water distribution and allows stakeholders to push policymakers to embrace long-term solutions to water issues. Bayelsa State is situated in such a way that it is prone to flood due to its geographical setting. Often during the rainy season the effect of flood is seen due to the level of destruction of infrastructures, homes and displacement of families. For this reason water is often viewed as a curse rather than a valuable resource which helps in the smooth functioning of economic activities. This should not be so as proper management of water serves as a source of income generation for the state rather than something destructive. By venturing into it, forecasts can be made concerning future rainfall and future water levels during the rainy season and if done in time the disastrous effect of water can be avoided, averted or managed. Water can be accounted for, its distribution managed and further future projections and predictions made through the adoption of water accounting as a measure for water control. Water accounting as a concept cannot stand on its own in terms of its practice, for it to be fully effective it is dependent on some other concepts such as water management, water governance and water auditing. It collects and disseminates relevant information on water resources, allowing political, social, economic, and administrative systems to formulate the policies needed to manage water resources. Water accounting can be used to generate employment opportunities for individuals as well as revenue for the state. As a result, the goal of this research is to suggest strategies for addressing water issues in Bayelsa State, as well as to conceptually examine water accounting in order to raise awareness among Bayelsans about the importance of water accounting in the environment.

### **Water Management**

Water management refers to the process of planning, producing, distributing, and maximizing the

use of water in accordance with established laws and regulations. It is the management and transportation of water resources with the goal of minimizing damage to people and property while maximizing efficiency. Water management include water treatment, drinking water treatment, and industrial water sewage treatment, as well as water resource management, flood prevention, irrigation, and water table control. It is often carried out to avoid water scarcity due to its necessity while reducing the negative effect of unmanaged water source. With proper management water is saved, managed and distributed efficiently. Saving water is part of water management and could be done in the several ways. Rainwater harvesting is a technique of water management that entails collecting rainwater in tanks or infiltrating surface water into sub aquifers. Another method of conserving water is ground water harvesting, which includes storing water beneath the earth in order to manage ground water flow. Fixing leaking taps, keeping the tap closed when brushing, and having a brief shower instead of a long bath are all examples of water-saving habits while some in the water industry refer to water as a "looming global water catastrophe," others argue that the predicted water difficulties, or possible water crisis, can be averted by changing how water is managed and regulated (Moriarty, Batchelor, Laban, & Fanny, 2007; FAO, 2012).

### Water Scarcity

UN Global Compact defines water shortage as the volumetric excess or scarcity of fresh water supplies (THE CEO WATER MANDATE). This occurs as a result of excess demand or water over the availability of the supply of water. It is also human-driven and dependent on the amount of water available in a specific location. It is a tangible and objective fact that can be measured, and its availability is determined by the availability and accessibility of clean and drinkable water for diverse applications, rather than by the physical quantity of water. The scarcity of water experienced in Bayelsa State is not as a result of absence of water, to the contrary Bayelsa state has abundance of water but have been severely polluted making the available water unfit for human and ecological uses. Hence water scarcity has to do with unavailability of clean and healthy water as opposed to absence of water. This means that water is scarce not because there is no water but the inability to use the water available due to pollution hence unfit for human consumption.

### Water Auditing

Water auditing is "a way of measuring water flows and quality in simple or complex systems with the goal of minimizing water usage," according to Sturman (2015). The awareness towards water accounting and auditing has been on the increase around the globe due to water's importance to human existence. The awareness has cut across both social and

political boundaries. Water auditing is a method of water conservation that will become more popular in the future as demand for water rises. The availability of high-quality water resources is diminishing as the human population grows. Pollution and climate change have exacerbated demand-supply mismatches, necessitating the management and auditing of current water supplies. It uses water accounting to provide guidance on water governance. It sits between water accounting and water governance. Water auditing examines features of water governance such as institutions, public and private expenditure, laws, and the wider political and economic of water in specified domains by determining trends in water supply, demand, and productivity (FAO 2017). Water audits provide a rational, scientific framework that categorizes all water use in your system. Water auditing may be used as a technique to address drought-related issues such as shortages, leakages, and losses, as well as the causes of these issues. It can also be used to assess compliance with regulations governing the provision, dispensation, and use of water resources. Water auditing ensures that water is used effectively. Information gathered from the audit is related back to the governing authorities to enable them make amends where necessary or formula new policies.

### Water Governance

Many nations, particularly water-scarce countries (drought), are concerned about the world's diminishing water resources, while flood appears to be an issue for others with vast amounts of water, which are two extremes of problems caused by a shortage of water or an excess of water. Individuals and institutions, both private and public, manage their shared concerns via governance. It refers to the ongoing process of reconciling competing or divergent interests and taking cooperative action. "Water governance refers to a set of political, social, economic, and administrative systems in place to develop and manage water resources and their distribution to people who require it at all levels of society" (Rogers and Hall, 2003). This concept relies on the idea of governance as including a variety of systems, including government and public services, but also extending to services offered by other parts of society. Water governance, in practice, is the dynamic operation of official and/or informal institutions aimed at guaranteeing the effective, responsible, and timely supply of water and water services to all sectors of the population, social and economic systems, and overall ecological systems. It is made up of numerous laws, methods, and processes that are used to analyze, utilize, control, change, and manage water resources and related disputes. The essential and political elements of those resources that are increasingly disputed are recognized via governance (Global water partnership, 2012).

Water governance is one of the most important areas for development and long-term sustainability. The

manner in which a country or state governs its water resources and services has a significant influence on people's livelihoods. Good water sector administration may lead to more efficient and improved service delivery; bad governance, on the other hand, can lead to greater political and social risk, institutional failure and rigidity, and a decline in the capacity to deal with shared challenges (Rogers and Hall).

Water is a necessity for everyday existence and may also aid in poverty alleviation. The importance of power and politics in water-related decision-making, as well as the representation of diverse interests in decision-making, are both essential factors to examine when analyzing government dynamics. Water's importance has prompted different countries to overhaul their water sectors, resulting in new water management plans. One of the most pressing issues confronting the world today is the growing shortage of water. As local demand for water exceeds availability in many areas, efficient water governance will be critical to attaining water security, a fair water distribution plan, and resolving water-related conflicts. Currently the Bayelsa State government makes available water trucks which distribute water to various locations in the capital city. This is a type of water governance, but water governance is not static, necessitating the government's use of more effective and efficient water distribution methods throughout the country, not just in the capital city, but also in numerous local governments, towns, and villages. Information gathered from the audit is used to make new policies and also make amendments where necessary.

### Employment

Employment is a contractual connection between two parties in which one party is the employer and the other is the employee. The employer might be a for-profit business, a non-profit organization, a cooperative, or another entity. Employees labor in order to be paid, which may be in the form of an annual salary, a monthly pay, weekly earnings, or daily wages, depending on the sort of job or sector of the economy in which they are engaged. An employee is a contributor of labour or expertise. Employees can find job through professional recruitment or consultancy to whom they are paid commission. According to Heathfield (2019), an employer is "a company, institution, government body, agency, professional services firm, not-for-profit group, small business, store, or individual who employs or puts to work a person known as an employee or staff member". The employer compensates the employee for their labor or service by paying a salary, hourly rate, or other perks.

Employment opportunities help to reduce corruption, terrorism and its plays the biggest part in poverty alleviation and this is why employment is important in the pursuit of government to create a happy and prosperous environment. Employment

improves the quality and living standard of the citizen. When a person gets employed he or she works hard to achieve the goals set to be achieved by the employer. This helps to improve the business of the employer, improve the productivity of any company and this by extension speeds business transaction and new investment comes to the market. The stability of an economy rests so much on the ability to maintain a low level of unemployment rate. The capacity to sustain a low unemployment rate is critical to an economy's long-term health. Employment rate and economic growth are connected, according to William Baumal (2014), since employment contributes significantly to any economy's growth. Nigeria has a high rate of unemployment, which may be observed in the rise of militancy, terrorism, kidnappings and other vices.

It is therefore necessary for government to generate opportunities for employment by considering other of natural endowments other than oil and effectively manage these resources to boost employment and reduce unemployment.

### Employment Generation

Job creation is a cornerstone of any economic recovery strategy. Job creation encompasses a wide range of activities, including urgent short-term possibilities with immediate effect, as well as the development of long-term lives in the public or private sector (United States Institute of Peace). Employment generation is a natural process where the different arrays of needs of humans present employment opportunities. This indicates that employment is created as a result of a need to be met. Job creation is critical on all levels; politically and socially, it gives the populace a stake in the peace process by giving young men and women alternatives to violence. Economically, work gives income to poor households, which supports general growth by reviving domestic demand for products and services. Long-term peace and progress need the development of sustainable livelihoods.

Nigeria is in the midst of an economic recovery, and the most pressing need is to get people back to work and money flowing. Public projects or work that can benefit the average Nigerian is an effective way to generate lot of employment. Government could work or improves on public projects that are beneficial to the common man and communities while generating employment. Cleaning up public areas, restoring roads and infrastructure, and establishing non-existent procedures and departments that are feasible to create work chances are all examples of job opportunities. One of such non-existent practice includes rehabilitation of the water sector (Water board). This restoration has the potential to have a long-term economic impact and should be examined as much as feasible through the lens of long-term viability. In Bayelsa state though surrounded by water has a need for clean portable and healthy water. The rehabilitation

of water board will help to provide portable water and in the course of the rehabilitation bring about employment opportunities.

### Bayelsa State Setting

Bayelsa is a Nigerian state located in the heart of the Niger Delta, between Delta and Rivers states. Yenagoa is the capital. Ijaw is the primary language, including dialects like Kolokuma, Bomu, Nembe, Epie-Atisssa, and Ogbia. It was created on the 1<sup>st</sup> of October 1996. It has a total area of 10, 773 km<sup>2</sup> (4, 159 sq m). In the last census in the year 2006 Bayelsa was found to have a total of 1, 704, 515 in population. The military regime of General Sanni Abacha established it out of Rivers state. Its name comes from the initial few letters of the names of the major local government districts. Bayelsa state contains some of Nigeria's biggest crude oil and natural gas reserves. Due to the terrain, the majority of the population lives in rural areas with inadequate transportation, health, education, and other facilities as a result of decades of neglect. Good water is one of Bayelsa's key issues. Although surrounded by water the inhabitants of Bayelsa State has no access to clean and portable water. The problem of lack of portable water has existed for as long as the creation of Bayelsa state and this is due to the damage caused by Oil drilling activities in the area. As a result, there is an urgent need to pay attention to the water challenges that Bayelsa State is experiencing by implementing essential regulations and putting in place measures to address them.

### Theoretical Framework

#### Protection Motivation Theory

Rogers (1975) was one of the most prominent proponents of this theory. The theory is made up of threat appraisal and coping appraisal which recognizes how man automatically adapt to situations that are rather unfavorable but continue to live in that condition because they have no choice. Though man is aware of the dangers of consuming dirty and contaminated water, he uses it against his wish. The severity and vulnerability of the issue are both considered in the threat assessment process. It focuses on the source of the danger as well as other elements that enhance the risk of maladaptive behavior. The amount of effect or harm caused by the unhealthy habit is referred to as severity. Another major aspect of threat appraisal is rewards. The term "rewards" refers to the advantages of beginning or maintaining an undesirable activity. The severity and vulnerability are put together to calculate the amount of threat faced, and then the benefits are subtracted. The term "threat assessment" relates to determining the extent to which an event or action affects the well-being of those concerned. The reaction efficacy, self efficacy, and response cost make up the coping assessment. The success of a recommended activity is measured by response efficacy, whereas response costs are the expenditures associated with the recommended action. The adaptive reaction and the

capacity of the affected persons to cope with or avoid the danger are the focus of the coping evaluation process. The quantity of coping capacity is calculated by subtracting the response cost from the combination of response efficacy and self-efficacy. The individual's assessment of the response efficacy or advised activity is referred to as coping appraisal.

The threat and coping appraisal factors are combined in a fairly straightforward manner, but the relative importance of each variable may differ depending on the target population. The theory was propounded with the aim of helping to alleviate and understand the impact of certain conditions that human face and the possible option. It has an option to either adapt the unfriendly situation or find means to avert its impact or effect on the general well being of the individual. Water pollution has been on the rise for years and people have adapted to the unhealthy water situation which is referred to as "Threat appraisal" where people have to adapt to certain unfavorable situation just because they can't find other means. The daily need for water is so great that individuals have little option but to consume whatever water is available, regardless of the consequences. With the aid of water accounting, the government might conduct a coping assessment in which it could offer portable water. Although the available water is polluted and contaminated government can set up other means of purifying the dirty water for the use of individuals thereby averting the health risks involved. This theory demonstrates why water accounting is important to consider. Water accounting aids the government in determining the extent and quantity of drinking water accessible to residents in each part of the country at any given moment. It provides a framework for determining and communicating the risks posed by contaminated and polluted water use in cities. This helps to quicken government intervention where necessary since water is very essential.

### Empirical Review

Yang *et al.*, (2017) used Jinan City in China's Shandong Province as a case study to examine the technique of analyzing water resource assets and liabilities. The research attempted to propose a solution to China's acute water situation, which has been exacerbated by policy difficulties. The study identified water resource assets and calculated them from 2011-2015. The study employed unit price of water, water quantity and quality, physical and quantitative accounting methods to produce the balance sheet. The calculations indicated that water resource assets in Jinan City grew and declined over time. Water resource assets totalled \$36.5 million, \$45.9 million, \$66.7 million, \$35.5 million, and \$37.5 million in 2011, 2012, 2013, 2014, and 2015. As a result, the study produced quantitative and physical proof for effective water resource management and accountability.

Katherine (2015) investigated the use of environmental management accounting in the Australian wine sector as a tool for better water management. The wine industry's sensitivity to water-related pressures and dangers was considerable. The research used a questionnaire-survey with managers from wine-producing companies in Australia as respondents. Due to situational and institutional factors, the water-related environmental management accounting (EMA) employed by wine businesses differs, according to the results of the multiple regression analysis. The study did, however, show that the use of water-related EMA in the wine sector resulted in better water management in Australia.

Egan (2012) looked at water management and accounting in Australian food and beverage companies. The research used primary data to assess the efficacy of water management and accounting in businesses. The study involved roughly seven different organizations. Two groups conducted widespread water management and accounting. Water management and accounting become the duty of everyone in those two organizations. The use was monitored and inspected on a regular basis, and reports to executives were sent out on a regular basis. The other five organizations investigated similarly showed little interest in the concept of water accounting. Water accounting and management must be institutionalized, according to the study's findings. For a better and more effective use of water resources, all companies should adopt the approach.

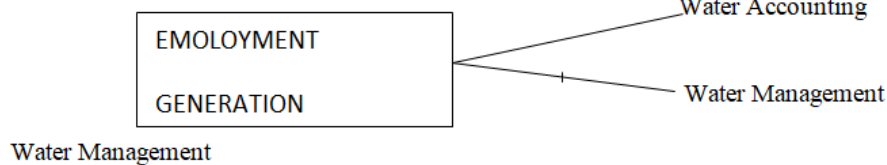
In the Queensland Border Rivers region, Tisdell (2001) looked at the effects of introducing commerce and distributing water for environmental purposes. Water markets were emerging as part of the Council of Australian Governments' drive to encourage the effective use of Australia's water resources. However, the study's findings indicated that water trading may diminish natural flow systems and boost extractive water usage, both of which are profit-driven and could render Australia's water policy ineffective."

**METHODOLOGY**

We used a survey research method. The survey research design proposed by the Statistical Society of London (1838) entails gathering data by asking a specific group of people a series of questions and then formulating ideas based on the data analysis. It is utilized when a researcher wants to survey answers from a sample of the public without having any control on the parts of the sample, and it is widely used to gather data on a variety of subjects (Nachmias and Nachmias, 2009). The participants in our study are 80 employees from the Ministry of Water Resources and the Bayelsa State Water Board.

However, due to practical problems in obtaining the population, a subset of the population was used as a sample. Using Taro Yamani's (1967) formula:  $n = \frac{N}{1+N(e)^2}$ , a sample of 66 employees was chosen from a population of 80.

Model specification



$$EG = B_0 + \beta_1 WA + B_2 WM + E_t$$

$B_0, B_1, b_2$ = Intercepts  
 $E_t$  = Noise Term

Where  
 EG= Employment Generation  
 WA= Water Accounting  
 WM= Water Management

**ANALYSIS**

**Table 4.1: Questionnaire Administration and Retrieval**

VARABLES	RESPONSE	PERCENTAGE
Returnable	66	82.5%
Non-Returnable	14	17.5%
Total	80	100%

From the table a total of 80 copies of questionnaire were issued to respondent of the selected companies for the study, of which 66 which represent

82.5% were returned while 14 copies were unable to be collected as shown on table 4.1.

**Descriptive Data Analysis****Table 4.2: Descriptive Analysis of Water Accounting in Resolving Water Problems**

S/N	Water Accounting	SA	A	I	D	SD	TOTAL	MEAN
1	The importance of water to human existence has raised the awareness of water accounting	32 (160)	26(104)	3(9)	1(2)	4(4)	66(279)	4.23
2	Water accounting examines the volume of water used by private and public users of water	44(220)	19(76)	0(0)	3(6)	0(0)	66(302)	4.58
3	Water accounting can be used as a tool to overcome drought, flood related problems, shortages, leakages and losses.	1890	30(120)	5(15)	10(20)	3(3)	66(248)	3.76
4	Water accounting brings about water improvement and sustainability of water resources	22(110)	34(136)	6(18)	3(6)	1(1)	66(271)	4.11
5	Knowledge of water accounting helps water provision authorities to know how much water is available and it's allocation to make sure taps don't run dry	15(75)	45(180)	3(9)	3(6)	0(0)	66(270)	4.09

The analyses of water accounting, shows that under the first statement in the table above; The importance of water to human existence has raised the awareness of water accounting with the mean of 4.23 indicates that water has effects on human existence in Bayelsa since the mean value is higher than the cut-off point of 3.00. The second statement, Water accounting evaluates the volume of water used by private and public water users, has a mean score of 4.58, which is greater than the cut-off value of 3.00, indicating that the previous statement is effective. With a mean score of 3.76, which is greater than the cut-off point of 3.00, the third statement of Water accounting may be utilized as a tool to combat drought, flood-related difficulties,

shortages, leakages, and losses. This suggests that water accounting may be used to combat drought, flood-related issues, shortages, leaks, and losses. Forth statement which states; Water accounting brings about water improvement and sustainability of water resources with a mean of 4.11 shows that Water accounting brings about water improvement and sustainability of water resources since the mean is higher than the cut-off point of 3.00. Knowledge of water accounting enables water provider authorities know how much water is available and its allocation to ensure taps don't run dry has a mean score of 4.09, which is greater than the cut-off point of 3.00, indicating that water accounting is successful.

**Table 4.3: Descriptive Analysis of Water Management in Resolving Water Problems**

S/N	Water Management	SA	A	I	D	SD	TOTAL	MEAN
1	Water management helps in planning, developing, distribution and optimum use of water resources	33(165)	27(108)	2(6)	2(4)	2(2)	66(285)	4.32
2	Water management enables active management of water resources on daily, weekly, seasonal and annual basis.	32(160)	28(112)	2(6)	4(8)	0(0)	66(286)	4.33
3	Water management helps to monitor the demand, supply and use of water resources	30(150)	29(116)	5(15)	2(4)	6(6)	66(285)	4.32
4	Water management encourages the use of water resources in ways that are socially equitable, environmentally suitable and economically beneficial to the Bayelsa state	25(125)	33(132)	4(12)	1(2)	3(3)	66(274)	4.15

The table above which analyses employment generation on water accounting, shows that under the first statement in the table above; Water management aids in the planning, development, distribution, and optimal use of water resources in Bayelsa, as shown by the mean of 4.32, which is greater than the cut-off point of 3.00. Water management permits active management of water resources on a daily, weekly, seasonal, and

yearly basis has a mean score of 4.33, which is greater than the cut-off point of 3.00, indicating active management of water resources on a daily, weekly, seasonal, and annual basis. With a mean score of 4.32, which is greater than the cut-off point of 3.00, the third statement of Proper Water Management aids in the monitoring of demand, supply, and use of water resources. This indicates that proper accounting and



management helps to monitor the demand, supply and use of water resources. Fourth statement which states; Provision of portable water in Bayelsa State will reduce unemployment with a mean of 3.26 shows that

Provision of portable water in Bayelsa State will reduce unemployment since the mean is higher than the cut-off point of 3.00.

**Table 4.4: Descriptive Analysis of Employment Generation of Water Accounting**

S/N	Statement	SA	A	I	D	SD	TOTAL	MEAN
1	Revenue generated from water can be used to run the economy of the Bayelsa State	21105	35(140)	4(12)	3 (6)	3 (3)	66 (266)	4.03
2	State internal revenue will increase if there are appropriate accounting, management and supervision of water resources in Bayelsa State	8 40	88(22)	10(30)	22(44)	4(4)	66(206)	3.12
3	Proper accounting and management of Bayelsa State water resources will boost employment generation	24120	31(124)	2(6)	6(12)	3(3)	66(265)	4.02
4	Provision of portable water in Bayelsa State will reduce unemployment	15(75)	19(76)	7(21)	18(36)	7(7)	66(215)	3.26

The table above which analyses employment generation on water accounting, shows that under the first statement in the table above; Revenue generated from water can be used to run the economy of the Bayelsa State with the mean of 4.03 indicates that water has effect on the revenue generation in Bayelsa since the mean value is higher than the cut-off point of 3.00. Second statement, state internal revenue will increase if there is appropriate water accounting, management, and supervision in Bayelsa State has a mean score of 3.12, which is higher than the cut-off point of 3.00, indicating that state internal revenue will increase if there is appropriate water accounting, management, and supervision. With a mean score of 4.02, which is greater than the cut-off mark of 3.00, the third statement of Proper accounting and administration of Bayelsa State water resources would enhance employment

production. This indicates that proper accounting and management as effect on the employment generation. Forth statement which states; Provision of portable water in Bayelsa State will reduce unemployment with a mean of 3.26 shows that Provision of portable water in Bayelsa State will reduce unemployment since the mean is higher than the cut-off point of 3.00.

**TEST OF HYPOTHESES**

**Hypothesis one**

*Ho<sub>1</sub>: Water accounting has no significant relationship with employment generation in Bayelsa State*

In attempt to test this hypothesis data on water accounting the hypothesis were tested with data on employment generation in Bayelsa State and the result obtained is shown in the table below.

**Table 4.5: Impact of Water Accounting on Water Problem**

Z-Test						
Test Value = 0						
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Employment Generation	26.154	67	.000	4.35662	4.0241	4.6891
Water Accounting	33.151	67	.000	4.33824	4.0770	4.5994

Source: SPSS version 22

From the table above shows that there is a high level of relationship between water accounting and employment generation in Bayelsa State.

The sig. level of 0.000 shows that water accounting has significant impact on solving employment generation in Bayelsa state. This suggests that the null hypothesis is rejected.

In compliance to the test above, we then concluded that, Water accounting has significant relationship with employment generation.

**Hypothesis two**

*Ho<sub>2</sub>: Water management has no significant relationship with employment generation in Bayelsa State*

To test this hypothesis data on water management were tested with data on employment generation in Bayelsa State and the result obtained is shown in the table below.

**Table 4.6: Impact of water management on water problem**

Z-Test	Test Value = 0					
	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Employment Generation	26.154	67	.000	4.35662	4.0241	4.6891
Water Management	60.485	67	.000	4.27574	4.1346	4.4168

The table above shows that there is a high level of relationship between water management and employment generation in Bayelsa State. With “T” value of 26.154 and 60.485 of employment generation and water management respectively.

The sig. level of 0.000 of both water management and water problem shows that water management as significant impact on employment generation in Bayelsa state. This suggests that the null hypothesis is also rejected.

In accordance to the test above, we then concluded that, Water management has significant relationship with employment generation.

## DISCUSSION OF FINDINGS

To investigate the influence of water accounting on job creation in Bayelsa State, we used the Z-test and descriptive statistics as data analysis methods, with the findings showing a significance level of 0.000, indicating that water accounting has a substantial impact on job creation in Bayelsa State. There is a high level of relationship between water management in employment generation in Bayelsa State, with “T” value of 26.154 and 60.485 of employment generation and water management respectively. The sig. level of 0.000 of both water management and water problem shows that water management as significant impact on solving water problem in Bayelsa state.

There is a high level of relationship between water accounting in employment generation in Bayelsa State, with “T” value of 33.151 and 44.941 of water accounting and employment generation respectively. The sig. value of 0.000 of both water accounting and employment generation shows that water accounting as significant impact on employment generation in Bayelsa state.

In conclusion water accounting and water management will contribute immensely to improvement in solving water problems and improves generation of employment in Bayelsa state. Bayelsa needs to work on sustaining or improving water accounting and water management to control water problem and improve employment generation.

## CONCLUSION

The importance of water in our everyday lives cannot be over-emphasized as most activities ranging from cooking, washing, and other house hold chores involves the use of water. Despite the numerous benefit of water to our daily lives, the government has demonstrated ineptitude to ensure the water board is well managed and functional in its duty to provide clean water for human uses and environmental protection. On this note it is necessary for the relevant authority in this case (water boards) to account for water, its provision, supply and standard while bringing about employment as well as generating revenue for the state.

In Bayelsa State, we investigated the impact of water accounting on job creation. The personnel of the Ministry of Water Resources and the Bayelsa State Water Board were questioned. The respondents' responses were compiled and evaluated. We observed that there is a substantial link between Water Accounting and employment creation in Bayelsa State, as well as a significant relationship between Water Management and employment generation in Bayelsa State, based on our studies.

The study is important to the government of Bayelsa State as it is an eye opener to the fact the government can have multiple streams of income to run the affairs of the state rather than relying solely on allocations and taxes. Also one of the biggest problems government has been trying to tackle is the issue of unemployment which has been on the rise. By accounting and managing water resources and ensuring effective distribution of portable water employment will be generated as people will be employed to discharge these services.

## RECOMMENDATIONS

Government should provide clean and portable water for its citizens through proper management and accounting of water resources. This may be accomplished by creating functioning water boards in each of the state's eight local government districts. People will be placed in place to monitor the water flow's operations. This always results in the creation of jobs for the state's inhabitants.

Government should also put in place functional water management system, this can increase the state revenue just like California in the United States of America where there is water scarcity yet

through proper management and accounting generate huge revenues for the state. Bayelsa state can take that prototype.

Private individuals are also encouraged to see the need for the provision of good water as a viable investment opportunity in the State. If good water is provided people will definitely buy the water which will generate revenue for companies and also provide employment opportunities as opposed to importing water from neighboring states.

Government should ensure public enlightenment to debunk the idea that services provided by the government should not be paid for by her citizens. If proper education is given about this, Bayelsans will embrace this and pay for good water which will ultimately boost the GDP of the state.

Government should ensure that bore holes drilled by private individuals in Bayelsa is at least bed sea level which is not less than 500 meters deep. By putting people in place to monitor this process employment is generated. Boreholes drilled by private individuals are often time not deep enough and as such produce brownish water which is as a result of Iron<sup>2</sup> (Fe<sup>2</sup>) present in the water and makes it unfit for consumption, this can be resolved by digging deeper into earth at least 500 meters deep or consult chemists on the treatment that can be applied to remove the Fe<sup>2</sup> deposit in the water.

Water is also a natural resource like crude oil. The knowledge and application of water accounting and management should be extended and embraced by other states as it will generate employment and internal revenue and reduce overall level of unemployment in the country. Proper water accounting and management mechanisms should be put in place, if properly put in place water can become another money spinner for the Nigerian economy like crude oil.

## REFERENCES

- Baumol, W. J. (1967). Macroeconomics of unbalanced growth: *The anatomy of urban crisis*. 57, 415:426.
- Cech, T. V. (2005). Principles of water resources. *History, Development, Management, and Policy*. 2<sup>nd</sup> edition. John Wiley and Son, Inc, Hoboken. ISBN: 0471-65810-3 (Wiley International Edition).
- Chenhall, R. H. (2003). Findings from contingency based-research and directions for the future, accounting organization and society management control system design within its organizational context: 28(2-3) 127-168.
- Egan, M. (2012). Water management and accounting change: A Study of Food and Beverage Producing Organizations, *A PhD Thesis Submitted to Discipline of Accounting, The University of Sydney Business School*.
- Emoabino., & Alayande, A. W. (2007). Water demand, management, problems and prospects of implementations in Nigeria. *Practices on River Basin Management*, 154-159.
- Food and agriculture organization of the United States, World Water Council. (2018). Water accounting for water and sustainable development, *The white paper*, 23-24.
- Food and Agriculture Organization for the United States. (2017). *Water Accounting and Auditing, a Source Book*, Revised edition.
- Gleick, P. H. (1998). Water in crisis: paths to sustainable water use. *Ecological Applications*, 83, 571-579.
- International Water Management Institute. (2008). Water figures, turning research into development. *International Water Management Institute*, 4, 1-7.
- Goodland, R. (2010). The World Bank vs. the World Commission on Dams, *Water Alternatives*, 3(2).
- International water management institute IWMI. (2014). on target for people and planet; *Setting and Attaining Water sustainable Water policies briefing*, 19.
- Alcamo, J., Flörke, M., & Märker, M. (2007). Future long-term changes in global water resources driven by socio-economic and climatic changes. *Hydrological Sciences Journal*, 52(2), 247-275.
- Katherine, L. C. (2015). Environmental management accounting as a medium for improved water management in the Australian wine industry: An Empirical Analysis. *PhD Dissertation submitted to the School of Commerce*.
- Lambooy, T. F. (2011). Corporate social responsibility; sustainable water use, *Journal of Cleaner Production*, doi:10.1016/5.jclepro.2010.09.009.
- Peter, S. (2014). Defining water scarcity, water stress and water risk: *Its not Just Semantics*.
- Moriarty, P. B., Batchelor, C. H., Laban, P., & Fahmy, H. (2007). The empowers approach to water governance, *Background and Key Concepts .Euro-Med Participatory Water*.
- Malmi, T., & Granlund, M. (2009). In search of management accounting theory, *European Accounting Review*, 18(3).
- Nigerian Environmental Study/Action Team, NEST. (1991). Nigeria's threatened environment: *A National Profile*. NEST publication, Ibadan, Nigeria. ISBN:978-31203-0-1.
- Ntengwe, F. W. (2005). Designing a domestic water supply system: *The Engineer's Perspective and Considerations as a Challenge to Consumers*.
- Otley, D. T. (1980). The contingency theory of management accounting: *Achievement and Prognosis Accounting*.

- Rogers, R. W. (1975). Protection motivation theory of fears and attitude changes, *Journal of Psychology*, 91(1), 93-114.
- Rogers, P., & Hall. (2003). Effective water governance, Tec report. No 7, *Global Water Partnership*, Stockholm.
- Susan, M. H. (2019). What is the definition of an employer, *Research Root*.
- Sturman, J. (2005). Water auditing and water conservation. Doi; 10; 2166/9781781780402710
- *World Water Council Annual Report*, (2016).
- Tisdell, J. G. (2001). The environmental impact of water markets: An Australian case-study. *Journal of Environmental Management*, 62(1), 113-120.
- Udoh, E. J., & Etim, N. A. (2016). Analysis of domestic water consumption pattern by farming households in Itu, Akwa-Ibom State, Nigeria. *European Journal of Social Sciences*, 5(2), 76-82.
- United Nations World Water Assessment Program. (2013). Water cooperation: facts and figures. UNESCO, UNECE and UNDESA. Available at <http://www.unwater.Org/water-cooperation-2013/Water Cooperation Facts and Figures>.
- World Water Assessment Program. (2009). United Nations world water development report 3: water in a changing world. Paris: UNESCO and London, *Applied Finance and Accounting*, 5(1). <http://www.unesco.org/water/wwap/wwdr/wwdr3/pdf>
- Yang, Y., Liu, Y., Cao, S., & Cheng, Y. (2017). A method of evaluating water resource assets and liabilities: A case study of Jinan City, Shandong Province. *Water*, 9(8), 575.