EFFECTS OF DEVOLUTION ON ACCESS TO WATER IN ARID AND SEMI-ARID AREAS OF KENYA: CASE OF WAJIR COUNTY

Ahmed Alas Daud
Master of Public Policy and Administration, Kenyatta University, Kenya

Dr. Patrick Mbataru
Department of Public Policy and Administration, Kenyatta University, Kenya

International Academic Journal of Law and Society (IAJLS) | ISSN 2519-772X

Received: 4th November 2019

Accepted: 15th November 2019

Full Length Research

Available Online at:

http://www.iajournals.org/articles/iajls_v1_i2_353_373.pdf

Citation: Daud, A. A. & Mbataru, P. (2019). Effects of devolution on access to water in arid and semi-arid areas of Kenya: Case of Wajir County. *International Academic Journal of Law and Society, 1*(2), 353-373

ABSTRACT

The promulgation of the Constitution of Kenya, 2010 heralded a new dawn by giving Kenyans the opportunity to have a greater say in governance. With the devolution of governance system prominently featuring in Chapter 11 of the constitution, the government of Kenya decentralized the functions contained in the Fourth Schedule to counties. Among these functions is the responsibility to provide water services. Consequently, the mandate of water service provision was devolved to the County Government of Wajir, since it was among the forty-seven counties of Kenya. Since the establishment of devolved system of governance, some interventions had been made in the water sector. However, the effects these interventions on access to water are still unknown. This study therefore aimed at assessing the effects of devolution on access to water in arid and semi-arid areas of Kenya with a focus in Wajir County. In particular, this study sought to establish the effect of resource allocation by county government, collaboration of national and county governments and technology adoption on access to water in Wajir County. The theory of fiscal decentralization formed the foundation of this study. To undertake this, a descriptive survey research design was used. The study targeted 88,574 households in Wajir County as per the Kenya Population and Housing Census, 2009 as representatives of water users and 5 county water management officials based at the county headquarters. Simple random sampling was used to select the water users while a census of all the water management officials was undertaken. The study used primary data obtained using semi-structured questionnaires. Data was analyzed using quantitative methods where the data obtained from the open ended questions was organized in to themes and simple summaries obtained. Frequencies, percentages, means and standard deviations were used in describing the quantitative data obtained. Inferential statistics particularly Pearson's correlation coefficients and regression coefficients were also extracted. A multiple linear regression model was used to show the link between devolution and water access in Wajir County. The study found that resource allocation by county government, collaboration between the county and national government and technology adoption by county government positively and significantly affected access to water in arid and semi-arid areas in Kenya particularly Wajir County. Resource allocation by county government had the largest effect on access to water in the county. The study concluded that devolution had transformed the level of water access by households in arid and semi-arid areas in Kenya particularly Wajir County. The study also concluded that resource allocation, collaboration between the county and national government as well as technology adoption by county government were major channels through which access to water by households in counties was enhanced. The study concluded that effective devolution of water services would greatly enhance the level of water access in arid and semi-arid areas Kenya though supplementary efforts by the national government in water investments in these areas could not be ignored. Several recommendations were drawn based on the study findings as highlighted in chapter five.

Key Words: *devolution, access, water, arid, semi-arid, Wajir County, Kenya*

INTRODUCTION

Devolution is seen as the better alternative to a centralized system of governance. This is because by devolving certain functions, the devolved units have greater flexibility in deciding which projects have what attention. This enables communities to have greater say in determining their priorities as opposed to when decisions are made at the centers of government power which are usually far from them. The clamor towards devolution by many countries especially in the developing world explains the importance of this system of governance. Bardhan (2002) terms this sudden demand for devolution as "rage" and believes that devolution will be beneficial as compared to the centralized state which has "lost a great deal of legitimacy".

Efforts to decentralize governance in Kenya date back to pre-independence. Agitation for this system of governance has dominated the political scene since independence up until it was officially enshrined in the constitution that was promulgated in 2010. There was significant discourse on the concept of federalism or *majimboism* as it was popularly called in the independence period. Indeed, whereas the debate on whether post-independence Kenya should be a unitary or federal state revolved around the safeguarding of tribal interests (Nyanjom, 2011; Materu, 2015; Human Rights Watch, 1993; and Orina-Nyamwamu, 2010), the push for regionalism was so dominant in Kenyan politics that as observed by Kagwanja and Mutunga (2001) it formed the basis of all constitutional negotiations. Kagwanja and Mutunga (2001) further argue that *majimboism* was the "central theme of the Lancaster House Constitutional Conference in 1962, ahead of Kenya's independence, and has jinxed the constitutional reform process in the multi-party era"

The high demand for regionalism notwithstanding, this system of governance did not last long save for a brief experimentation in 1963 that led to its eventual abolishment in 1964. And then the debate in favor of *majimboism* died down. Several reasons can be attributed to why Kenya went back to a unity system instead of a federal one. First, the concept of majimboism was hurriedly conceived with little thought about its implications (Kagwanja and Mutunga, 2001). Secondly, the merger of KADU with KANU and the dissolution of the former which was the main proponent of *majimboism* led to the abandonment of the federalism agenda. KANU was pro-unitary system and its enhanced grip on power enabled it to promote unitary governance. Thirdly, federalism is a costly undertaking because it requires the establishment of new federal administrative units and the re-alignment of government institutions. Considering that Kenya was a young republic that just gained independence, it did not have the financial and technical capabilities to fully implement a federal system of governance hence the adoption of unitary government.

The dissolution of KADU emboldened KANU and led to an imperial presidency with sweeping powers and resultant decline in service delivery (Nyanjom, 2011). Subsequently, the calls for constitutional reforms and equitable resource allocation had grown louder over the years. These calls which resulted in the piecemeal implementation of decentralization such as the District Focus for Rural Development, the Local Authorities Transfer Fund, and the Constituency Development Fund among other initiatives culminated into the full

recognition of decentralization and subsequent enshrinement of devolution in the Constitution of Kenya (2010).

USAID (2011) observes that with regard to devolution, the stakes are very high in Kenya. However, this statement best fits the ASAL areas of Kenya. Put simply, the inception of devolution in Kenya is a major achievement for rural communities particularly those living in arid and semi-arid areas. These communities have historically been marginalized by successive regimes and have had little development to show for the decades of the existence of independent Kenya. With devolution, ASAL communities now have the power to determine which development priority to embark on thanks to the funds allocated to their respective county governments which are constitutionally protected.

Arid and semi-arid areas of Kenya constitute 89% of the country's land mass (Republic of Kenya, 2015). The major economic activity in these areas is livestock keeping. Due to unpredictable and inadequate rainfall, pastoralists move with their livestock in search of water and pasture. Water is particularly a rare commodity in arid and semi-arid areas. Despite the efforts of the government, the country is still water-scarce (World Bank, 2016; UNESCO, 2006) with arid and semi-arid areas recording the lowest water coverage. Consequently, about 24% of people in arid areas take more than two hours to reach water in the dry seasons (RoK, 2008). Whereas there is substantial data on the general state of Kenya's water resources, little and generalized information has been written on access to water in rid and semi-arid areas of the country.

In the County of Wajir, access to water is a major challenge. Due to its vast land size of 56,685.9Km² (Open Data website), availing adequate water to the people is a problem especially in areas that depend on trucked water. In other words, some parts of the county have inadequate underground water. Consequently, boreholes drilled in these areas have low yield. To address this, the county government supplies water in water bowsers**.** In addition, lack of surface water has put more pressure on underground water reserves. In fact, Wajir town with no formal water supply (Luedeling & Leeuw, 2014) is dependent on shallow wells. However, frequent droughts are threatening these important sources of water as some shallow wells have already dried up.

Provision of water services is now a devolved function (Fourth Schedule, C.O.K, 2010) and this has significant implications on the water sector (Heymans et al., 2013). Under this new arrangement, the national government will retain powers concerning the use of international waters and water resources. In particular, the Ministry of Water and Irrigation will among other tasks, formulate national water policies and master plans. On the other hand, county governments have been allocated "County public works and services, including—storm water management systems in built-up areas; and water and sanitation" (Constitution of Kenya, 2010).

Despite clarity in roles between the national and county governments, provision of potable and clean water of sufficient quantities to most Kenyan households has not been attained. As a result, over 36% of the national population which live in arid and semi-arid areas of Kenya (Republic of Kenya, 2015) spend most of their time in search of water. For example, Wajir County with a total population of 661,941 persons (The 2009 Kenya National Housing and

Population Census) has only 14,360 shallow wells, 206 water pans and 98 boreholes (Republic of Kenya, 2013) scattered across a land mass of 56,685.9Km². Furthermore, in some settlements in the county, efforts to explore underground water have been unsuccessful.

Several attempts by both the national and county governments to drill boreholes in these centers consistently resulted in low water yield. Consequently, twenty-six (26) centers in the county depend on water trucking (Regional Centre for Mapping of Resources for Development website). This is unreliable source of water considering the vastness of the county, increasing population, mushrooming settlements with some located in far-flung areas, inadequate vehicles to supply water, mechanical breakdowns and other logistical and financial challenges. With the devolution of water services, focus has now shifted to county governments. It was important, therefore, that the status of the provision of such service by the devolved units be studied.

STATEMENT OF THE PROBLEM

The World Bank (2016) and UNESCO (2006) categorize Kenya as a water-scarce country with less than 1,000 cubic meters per capita of renewable fresh water supply. Despite the low national per capita water access, Society for International Development (2004) notes that there are glaring inequalities regarding access to water in the country with some regions such as Nairobi and central Kenya having more access to water than those in north eastern Kenya which is predominantly arid and semiarid. The draft National Water Services Strategy (2007 – 2015) attributes this to low investment in water sector, poor climatic conditions, and mismanagement in the water sector. This affects poor households the most because they do not have the means to a diversity of water supply options. In most cases, access to water is hindered by prohibitive water prices that disadvantage the poor (Society for International Development, 2004). With these daily challenges, residents of the arid and semi-arid areas of Kenya and in Wajir County in particular are forced to search for water in circumstances that are not only tiring and time consuming but also life threatening. This poor state of affairs notwithstanding, the transfer of water services functions from the national government to local governments is expected to address issues relating to water access. It was important, therefore, to study the effect of devolution on access to water in Wajir County with a view to understanding progress made since the inception of devolution and providing important recommendations that would enhance delivery of water services. This study was therefore aimed at determining the effect of devolution on access to water in arid and semi-arid areas of Kenya with a focus in Wajir County. In particular, this study sought to establish the effect of resource allocation by the county government, collaboration between national and county governments and technology adoption by the county government on access to water in Wajir County.

GENERAL OBJECTIVE

The objective of the study was to assess the effect of devolution on access to water in arid and semi-arid areas of Kenya, particularly Wajir County.

SPECIFIC OBJECTIVES

1. To determine the effect of resource allocation by the county government on access to water in Wajir County.
2. To investigate the effect of collaboration between national and county governments on access to water in Wajir County.
3. To establish the effect of technology adoption by the county government on access to water in Wajir County.

EMPIRICAL REVIEW OF LITERATURE

Water and Sanitation of Wajir County

According to Marshall (2011), one of the earliest analyses of Kenya's water resources has been undertaken by the British Crown in 1934. Marshal explains that this has been followed by studies on water conservation, effect of climate change on water resources and more recently the Poverty Reduction Strategy Paper of 2008, highlighting the Government of Kenya's acknowledgment of the importance of safe water in reducing poverty.

Several studies have been done on water and sanitation of Wajir. Osman (2012) and Luedeling et al (2015) observe that Wajir town which is the county headquarters has a high water table and depends on shallow wells, which according to Mailu (1997) have depth of 10-15 m. Laudeling and Leeuw (2014) established that despite the shallow depth of the wells and the resultant availability of water, there is yet a reliable source of clean water for the town. This is attributable to many factors; first, with the increasing population, domestic water consumption has increased. More underground wells have been dug for domestic and agricultural use. This, exacerbated by long dry seasons has caused water levels to go down with some wells drying up. Secondly, contamination of underground water has reduced the quality of water.

Osman (2012), attributes this contamination to poor sanitation methods thus; "these wells have restricted the town's sanitation options to open and bucket." Bucket latrines have defined the town's sanitation system for years. Once full, the buckets are emptied near the latrine. This coupled with the unregulated construction of septic tanks means that there is seepage of human waste into the underground water system. However, with rapid increase in population and a growing middle class, other forms of sanitation have been embraced. Traditional methods such as the use of bucket latrines and open defecation have been ditched in favor of septic tanks.

These emerging challenges have made water services providers and residents of Wajir town to question the sustainability of underground water that provides a lifeline to thousands of people. Consequently, some interventions have been made to solve this. According to Oord, et al., (2014); Laudeling and Leeuw, (2014), one such initiative is the proposed joint-funding between the Republic of Kenya and a Dutch company, ORIO, for the construction of a water pipeline that extracts water from the Merti Aquifer in Habaswein to Wajir town for purposes of clean water supply in Habaswein and Wajir towns. Nonetheless, this project has not been implemented because of unresolved issues such as the concern of communities surrounding

the aquiver that their underground water resources may be depleted by the extraction. This concern, real or imagined has significant impact on the implementation of the proposed project as aptly put by Laudeling and Leeuw (2014) thus; "Considering estimates about the risk of political interference and related variables, the chance of project failure is very high, possibly too high for most investors"

The Status of Water Service Provision under the County Government

Devolution of the water service function means that it is the responsibility of county governments to ensure access to water for all. By inheriting a poor water service infrastructure, counties in the ASAL areas have embarked on prioritizing the provision of water. In this regard, Wajir County allocated substantial amounts of its budget allocation to the County Department of Water Services, with the department receiving Ksh. 625,669,284 in the financial year 2018/2019, Ksh 1,187,985,583 in 2017/18, and Ksh 1,122,496,365 in financial year 2016/17 (Wajir County Gazette Supplement). Consequently, access to water has improved largely due to the drilling of boreholes and construction of mega dams.

Nevertheless, the impact of these interventions on access to clean water is not apparent as there is insufficient data. This is suitably explained by the Ministry of Planning (2015) in its Common Framework for Ending Drought Emergencies thus;

> "The counties appear to have no consistent reporting format on access to safe water. Some report on the water supply infrastructure, others on the number of households with access to portable water, and others on the percentage of the population with access to portable water"

Despite the lack of sufficient data on water, the Ministry of Devolution and Planning (2015) estimates that in Wajir county, access to portable water and average distance to water are 10% and 30 Km respectively. A multiplicity of factors contributed to this poor state of water provision. Financial resources and technical expertise were inadequate, and this was compounded by the fact that borehole yields might be low in some settlements despite committing resources. In addition, lack of local legislation on provision of water services at the county hampered efforts to improve the situation.

Resource Allocation and Access to Water

Owino (2018) explored whether Kenya was on track in enhancing the access to safe water and improved sanitation services. The study was based on document analysis approach. The study found that inadequate financing of investments in the water and sanitation sector by both the national and county governments affected the access to water by the Kenyan population. According to the study, even though expenditure to the water and sanitation sector increased in recent years at the national level and in some counties, significant resource gaps existed that prevented rapid scaling up of access. In addition, little priority had been given to investment in sanitation services, especially in rural areas. The study recommended that resource gaps in the water and sanitation sector should be addressed by tapping into alternative funding streams including official development assistance, blended finance and commercial financing.

Zakayo (2017) assessed the factors influencing the implementation of water projects under the devolved system of governance in Kenya focusing on Meru County Government. The study employed a descriptive survey research design. The study found that resource allocation particularly finances greatly influenced the implementation of water projects in the county. The study found that the allocation of insufficient resources and delayed disbursement of funds led to uncertainties in implementing the water project activities and sometimes the abandonment of these activities altogether. The study found that with increased inconsistencies in releasing funds, most of the water projects were not completed on time and implementation activities were punctuated with occasional stoppages of project works hence delayed benefits to intended citizens particularly access to clean water.

Orina (2014) explored the factors that influenced the accessibility to water for domestic use in Kenya focusing on Kip Karen Division, Nandi County. The study applied a descriptive study design. The study found that funding of water projects, staffing and technical services affected the access to water in this area. According to the study, the source of money to finance water projects still remained a big challenge. The study pointed out that a number of constraints were faced in achieving expanded access to clean water. These included an insufficient number of skilled personnel and effective institutions. The most common hindrance was the limited resources available to the sub county. Inadequate financing was found to be the single most important factor affecting the sub county's fresh water delivery abilities. The source of money to finance water projects in the area still remained a big challenge since donors only provided a portion and governments budgetary allocations were still inadequate.

Collaboration between National and County Government and Access to Water

The water sector in Kenya has been dynamic. It has undergone numerous structural and institutional transformations. For example, before the Water Act of 2002, provision of water and sanitation services were the mandate of the National Government (Busieney, 2014). The Water Act of 2002 was aimed at enhancing reforms in the water sector. Consequently, distinct but complementary roles were assigned to various government institutions to effectively handle essential aspects of the water sector such as management, regulation, arbitration, conservation, investments and the provision of clean safe and adequate water (Busieney, 2014; Osman 2012; Republic of Kenya, 2007)

It is worth noting that the institutional and policy framework in the country notwithstanding, the provision of sufficient clean water has not been achieved. The draft National Water Services Strategy (2007 – 2015) cites low investment in the water sector, old infrastructure, inadequate management and maintenance of existing infrastructure as the main impediments.

Devolution being a fairly new concept in Kenya, county governments had experienced challenges in executing their mandates. These challenges ranged from financial inadequacies to capacity gaps. While the national government had made interventions in the form of capacity building of county governments, there existed friction between the two levels of government. For example, the Daily Nation, (Thursday May 21st 2015) and The Standard (Tuesday, March 29th 2016) reported that the Council of Governors, an umbrella body that brought together all the forty-seven governors of Kenya had been unequivocally accusing the

national government of trying to take back some devolved functions in the guise of mismanagement, citing the water and health function as examples.

The existence of mistrust and competition between national or central governments and devolved governments, continued to be the biggest hurdle to the successful implementation of development and public service projects under the devolved system of governance (Robison, 2006). Similar evidence by Feiock (2004) exhibiting that competition, mistrust and intentions to sabotage were the biggest threats to public service projects implemented under the devolved system of governance. The study by Memon and Skelton (2007) on institutional arrangements and planning practices to allocate freshwater resources in New Zealand showed that the existence of a cordial relationship between the central government and devolved governments positively influenced the allocation of resources for the implementation of water projects in New Zealand. This they also found did improve access to water by citizenry living in these devolved units of governance.

In a study on intergovernmental fiscal relations focusing on the Nigerian experience, Ekpo (2004) observed that poor intergovernmental relations derailed disbursements of water projects funds adversely affecting the implementation of these projects in Nigeria. Similar evidence by Adele (2008) who in his study on intergovernmental relations and political opposition in Nigeria pointed out that sour relations between the central government and state governments had adversely influenced the implementation of water projects in most states in Nigeria worst cases been reported in Niger Delta region. In a study on the liaison between central and local governments to ease service delivery in Tanzania, Kamugisha (2014) observed that the cordial symbiotic relationship between the central government and local governments did contribute to the successful implementation of water projects at devolved governance levels in Tanzania. This he also argued did result to the exchange of technical experts expediting the implementation of water projects and consequently access to water (Kamugisha, 2014)

Moreover, Heymans et al (2013) noted that ambiguity in the definition of "national public works," "county public works" and "public investment" in the Fourth Schedule of the C.O.K and their application to water service provision was a key area of concern in the water sector. Lack of synergy between the national and county governments was an impediment to the realization of a water-sufficient country. To begin with, sharing of water data between the two levels of government helped in decision making. It also prevented duplication of duties and this went a long way in saving costs. For instance, it would be immaterial to have different water pans dug in one settlement by the two governments when only one was sufficient. Secondly, proper management of the water sector required huge budget which was not at the disposal of county government. Therefore, collaboration between the two tiers of government was essential as it would result in increased budgetary allocation for county governments contrary to the current setup up as reported by The Business Daily (Thursday, November 3 2016) that Sh304 billion was allocated to counties in 2016 despite governors asking for Sh486 billion. With a better working relationship between the two levels of governments, a consensus on appropriate budgetary allocation that would favor county governments might have been reached thus improving service delivery at the grassroots.

Technology Adoption by County Government

Gupta (2004) while taking Gujarat, India as a case study in evaluating the role of water technology in development found that the use of technology in construction of bulk pipelines and water treatment plants has greatly improved the quality and access to water. Ardakanian and Jaeger (2011) while evaluating the contribution of water technology in job creation found that water technologies could contribute to more efficient use of water resources by positively impacting water resources assessment, reduction of water losses, waste water treatment, and efficiency of water utilities which enhanced water access among households. The study highlighted that green water technologies mostly benefited public customers (municipalities, water associations, municipal companies. The study concluded that technological initiatives to improve drinking and irrigation water supply had to be duly complimented by grass-roots people's participation in the management of water distribution.

Dickinson and Kristof (2013) examined how the use of information communication and technology for monitoring rural water services water service delivery. The study use case studies from Ghana and Burkina Faso. The study found that the use of information and communication technologies for monitoring contributed to sustainable rural water services by meeting the information needs of sector stakeholders. According to the study, in the service delivery approach, information from across the life cycle of a service supported sector actors in their respective roles and responsibilities which enhanced water service delivery. The study recommended that flexible information systems for monitoring rural water supplies could be developed to meet sector information needs.

Tifow (2013) investigated the factors that influenced the sustainability of rural water supply in Kenya focusing on UNICEF supported rural water projects in Lake Victoria South and Lake Victoria North Water Services Board Regions. A descriptive sample survey was adopted. The findings indicated that where the selected technology was the preferred choice, the water supply project was equally rated to be more sustainable compared to where choice of technology was not the preferred choice or community did not adequately participate in the selection of technology. The study noted that project planners needed to allow for wider consultation and participation in decisions relating to choice of technology for rural water supplies. The weak link between technology and sustainability found was explained by the fact that technology choice was influenced by water source characteristics, settlement pattern of the users, demand, access to spare parts, cost of operation and ability of the consumers to pay for the services. Thus, choice of a technology however appropriate in itself alone did not render a project sustainable in the long run for such factors as the source characteristics which had strong influence on selection of technology options are beyond the project and beneficiaries control. The study concluded that technology was therefore only appropriate to the extent other mitigating parameters were also present.

THEORETICAL FRAMEWORK

In the recent times, there has been a shift from the focus on the role of private sector in development to that of the public sector and specifically to the improvement of performance and general welfare of citizens (Smoke, 2001). At the heart of this focus is the debate on centralization versus decentralization. Whereas each of the systems of governments have

their own strengths and weaknesses, there has been an increasing preference for decentralization across the world in the last two decades (Bardhan, 2002; Ligal et al., 2005) although as Kee, classical philosophers such as Rousseau, Montesquieu and de Tocqueville propagated for a shift from a central governance. Kee fittingly defines fiscal decentralization as "the devolution by the central government to local governments (states, regions, municipalities) of specific functions with the administrative authority and fiscal revenue to perform those functions"

Decentralization as a system of governance is founded on the theory of fiscal decentralization. The theory was first developed in 1972 by Wallace Oates (Oates, 2006; Martinez-Vazquez, 2011) and posits that local governments are more efficient than central governments in providing certain public goods provided the cost of such goods are the same in both jurisdictions and that there is heterogeneity in tastes (Bardhan, 2002; Oates, 2006).

The circumstances for the adoption of fiscal decentralization vary from one country to another and the objectives are possibly to enhance efficiency, appease a separatist region, among others (Martinez-Vazquez, 2011). In Kenya, devolution is enshrined in the Constitution (chapter 11), and is a governance system dear to Kenyans considering the push for *majimboism* (regionalism) that dates back to pre-independence Kenya. As spelt out in Article 174 of the CoK 2010, the objectives of devolution are inter alia, the promotion of social and economic development and the provision of proximate, easily accessible services throughout Kenya as well as equitable sharing of national and local resources throughout Kenya. The fiscal decentralization theory therefore, helped to elucidate decentralization in Kenya and in particular, the effect of devolution on access to water in Wajir County.

RESEARCH METHODOLOGY

Research Design

Research design is the comprehensive plan or blueprint for data collection and analysis in research (Bhattacherjee, 2012). It encompasses all plans for proper data collection and analysis. As a result, this study used descriptive research as the preferred research design. This was because it was suitable in understanding a population's characteristics, thoughts and attitudes (Creswell, 2014) and was appropriate for collecting data from a large population (Bhattacherjee, 2012). This study used a representative sample of the population of the county to determine the effect of devolution on access to water. Being a descriptive survey, a true picture of the state of water access in Wajir County since devolution was given.

Target Population

Pandey and Pandey (2015) define population as "the entire mass of observations, which is the parent group from which a sample is to be formed." Such a population has common observable characteristics (Mugenda & Mugenda, 2003). From these definitions, the target population of this study was the total number of household heads in all the 88,574 households in Wajir County as representatives of consumers of water services as established in the 2009 Kenya Population and Housing Census. The study also targeted all the 5 county water management officials based at the county headquarters.

Sample and Sampling Techniques

Bhattacherjee (2012) defines sample size as the actual units or subsets selected for purposes of observation and inferences making from the population of interest. In choosing an appropriate sample size, a researcher is influenced by population size, purpose of the study, and the allowable sampling error (Israel, 2003). Cognizant of these considerations this study aimed at studying a suitable sample size that was accurate and representative of the actual population. In this regard, the study used the Krejcie and Morgan table to determine the sample size, applying a 5% degree of accuracy and 95% confidence level. Using the Krejcie and Morgan table as shown in table 3.1, the study sample size was 384 household heads as representatives of water users in the county. The researcher used simple random sampling technique to select these household heads. The use of random sampling ensured that biasness in selecting the sample was eliminated and all household heads under study were given a chance to participate in the study.

Instruments of Data Collection

The choice of method of data collection is influenced by three factors. These are; the objectives of the research, the population and concepts to be measured (Leeuw, 2008). This study employed questionnaires as the data collection instrument because questionnaires were the preferred tool based on their ease in administration and preparation **(**Pandey & Pandey, 2015). Questions in the instrument were both open-ended and closed-ended for purposes of getting additional information and ease of analysis respectively. Considering that most of the respondents were not be literate due to the high illiteracy levels of Wajir County, some questionnaires were researcher-administered. However, the researcher was careful not to influence bias. Where respondents were literate, they were given time to respond and the filled questionnaires picked later by the researcher.

Data Collection Procedures

To undertake data collection of the study, the researcher obtained research permit from the university and the National Commission for Science, Technology and Innovation (NACOSTI). With these research permits and an introduction letter that also indicated the objectives of the study, the researcher developed rapport with respondents and set the stage for data collection. Once the respondents consented to take part in the study, the researcher allowed the respondents to fill the questionnaires and where the respondents were not literate, the researcher administered the questionnaire. Participation in the study was voluntary and the researcher respected the decisions of respondents who declined to participate after being informed of the importance of their participation to the study. The researcher ensured that questionnaires were properly filled and returned on time.

Data Analysis

Upon completion of data collection, responses from the respondents was carefully coded, edited and analyzed with appropriate data analysis techniques and presented in easy to understand form such as percentages, tables and charts. The data obtained from the open ended questions were summarized in to themes and simple summaries generated. The Statistical Package for Social Sciences (SPSS) was the appropriate data analysis tool because

of its ease in use and clarity of analysis. In addition, Excel was used to augment SPSS. Pearson correlation analysis was used to determine the association/correlation between the study variables while the regression analysis was undertaken to help the researcher quantify the effect of each independent variable on the dependent variable. A Multiple regression analysis was to show the link between the study variables since it was suitable in establishing cause and effect relationship (Kothari, 2004) between the independent variables resource allocation by county government, collaboration of national and county governments and technology adoption by county government on one hand and the dependent variable access to water on the other hand. The multiple regression equation was:

$$Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e$$

Where: Y = Access to water in Wajir County; β_1, β_2, β_3 and β_4 = Beta coefficients; β_0 = Constant Term; X_1 = Resource allocation by county government; X_2 = Collaboration of national and county governments; X_3 = Technology adoption by county government; ε = Error term

RESEARCH RESULTS

The study sought to establish the effect of devolution on access to water in arid and semi-arid areas of Kenya, particularly Wajir County. In attaining this objective, three specific objectives were drafted namely; to determine the effect of resource allocation by the county government on access to water in Wajir County; to investigate the effect of collaboration between national and county governments on access to water in Wajir County and to establish the effect of technology adoption by the county government on access to water in Wajir County.

Resource Allocation by County Government and Water Access

The study sought to determine the effect of resource allocation by the county government on access to water in Wajir County. The study found that allocation of resources particularly funds for various activities, equipment and skilled personnel was a major concern that greatly impacted water investments in the county. The study found that the county had initiated various water sources in different areas since its establishment though the number was still small in each area. The study also found that generally, the amount, consistency and timeliness of resource allocations towards water infrastructure investments in the county had increased significantly with devolution though more needed to be done by the county government. The study further found that the level of resource allocation was linked to water access in Wajir County since it affected the level of new water investments, maintenance of existing water sources, led to improvement in water infrastructure and achievement of water security in some areas besides increasing the frequency/number of supplies of trucked water. It also reduced the strained use of one water source by both animals and people and contributed to reducing disparities in water provision within the county besides enabling the county to employ more water staff and acquire more water equipment. The regression results indicated that resource allocation by the county government positively and significantly affected the access to water in Wajir County. This meant that enhanced allocation of resources would result to enhanced access to water by households in the county.

Collaboration between County and National Government and Water Access

The study also investigated the effect of collaboration between national and county governments on access to water in Wajir County. The study established that there was in deed collaboration between these governments towards water provision to households through collaborations in water sector investments. This collaboration was evidenced through the consultations held by these governments in undertaking mega water projects and also in minimizing the duplication of projects, release of funds by the national government which also undertook projects which the county could not meet the budget requirements and extensive data/information sharing regarding water concerns in the county between these governments. The national government also provided technical expertise by developing the capacity of county water staff. The study discovered that collaboration between county and national governments positively and significantly affected water access through enhanced water investments, reduced duplication of projects which led of resource savings, timely and increased funding of water investments, reduced time in implementing water projects and also the undertaking of mega water projects that benefits extensive areas.

Technology Adoption by County Government and Water Access

The study further sought to establish the effect of technology adoption by the county government on access to water in Wajir County. The study found that generally, the county government had adopted technology in enhancing water provision in the county but to a moderate extent. The study also found that the county had attempt to use the appropriate water technologies towards water access by households in the county though the residents were largely not consulted in selecting the technologies used. The study further established that the county had adopted diverse technologies towards promoting water access in the county which included hydrogeological technologies, modern water storage technologies, use of satellites to map underground water resources, solar technology in pumping water from boreholes, underground water storage systems, use of trucks to ferry water to villages, water drilling technologies-use of modern drilling rigs, water harvesting technologies, water kiosks, metered water systems and water piping technologies. The study found that technology adoption by the county government positively and significantly affected the access to water by households in Wajir County since it reduced the cost of water, reduced the distance to water sources, it minimized the wastage of water and also enhanced the success of borehole yield due to proper mapping of water resources.

INFERENTIAL STATISTICS

In order to establish whether there was a significant association between resource allocation by the county government, collaboration between county and national governments and technology adoption by the county government and the water access by households in Wajir County, Pearson correlation test was undertaken. This test was crucial in determining the predictor variables to be included in the study model. The interpretation of the strength of the association was undertaken in line with Sedgwick (2012) as follows: +/-.00 to .19 is very weak, +/-.20 to .39 is weak, +/-.40 to .59 is moderate, +/-.60 to .79 is strong while +/-.80 to 1.0 is very strong. The test was undertaken at 0.05 significance level.

Table 1: Correlation Matrix

		Water Access	Resource Allocation	Collaboration between County and National Governments	Technology Adoption
Water Access	Pearson Correlation	1			
	Sig. (2-tailed)				
	N	304			
Resource Allocation	Pearson Correlation	.775**	1		
	Sig. (2-tailed)	0.000			
	N	304	304		
Collaboration between County and National Governments	Pearson Correlation	.672**	.534**	1	
	Sig. (2-tailed)	0.000	0.000		
	N	304	304	304	
Technology Adoption	Pearson Correlation	.725**	.549**	.654**	1
	Sig. (2-tailed)	0.000	0.000	0.000	
	N	304	304	304	304

** Correlation is significant at the 0.01 level (2-tailed).

The correlation results presented in Table 1 showed that there was a strong positive and significant correlation between resource allocation by the county government and water access by households in Wajir County as shown by ($r=0.713$, $p=0.000$, $p<0.05$). The findings also revealed that the collaboration between the county and national governments was strongly, positively and significantly correlated with water access by households in Wajir County as supported by ($r=0.672$, $p=0.000$, $p<0.05$). The findings further found that the correlation between technology adoption by the county government and water access by households in Wajir County was strong, positive and significant as shown by ($r=0.725$, $p=0.000$, $p<0.05$). The findings implied that there was a strong positive and significant association between devolution and access to water by households in arid and semi-arid areas of Kenya particularly Wajir County.

Regression analysis on the other hand was conducted to establish whether devolution significantly affected the level of access to water by households in arid and semi-arid areas of Kenya with a focus on Wajir County. The regression analysis enabled the researcher to quantify the effect of resource allocation by the county government, collaboration between county and national governments and technology adoption by the county government on access to water in Wajir County.

The model summary results are as outlined in Table 2. The results showed that devolution as exemplified by resource allocation by county government, collaboration between the county and national governments and technology adoption by county government explained a significant proportion of the changes in access to water in arid and semi-arid areas in Kenya particularly Wajir County. This is supported by the coefficient of determination (R square) of 0.749 which implied that 74.9% of the changes in water access in Wajir County was attributable to changes in resource allocation by county government, collaboration between the county and national governments and technology adoption by the county government. The rest of the changes in water access in the county, 25.1%, was explained by other factors not included in this model.

Table 2: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.865a	0.749	0.747	0.502546

a Predictors: (Constant), Technology adoption by county government, Resource allocation by county government, Collaboration between the county and national governments

Analysis of variance test was carried out to help determine if the model used to show the relationship between devolution and access to water in Wajir County was significant or fit. The fitness of the model was assessed by analyzing the F statistic and its associated p value. The study findings as presented in Table 3 showed that the model used to link the study variables was significant given (F=298.447, p=0.000, p<0.05). The findings implied that resource allocation by county government, collaboration between the county and national governments and technology adoption by county government were satisfactory variables in explaining access to water in arid and semi-arid areas in Kenya especially Wajir County.

Table 3: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	226.121	3	75.374	298.447	.000b
	Residual	75.766	300	0.253		
	Total	301.886	303			

a Dependent Variable: Access to water
b Predictors: (Constant), Technology adoption by county government, Resource allocation by county government, Collaboration between the county and national governments

The regression estimates that assisted the researcher in determining whether the predictor variables had significant effect on the dependent variable are outlined in Table 4. The findings showed that resource allocation by county government positively and significantly affected water access by households in Wajir County as shown by (β = 0.505, t= 13.630, p = 0.000). This implied that a unit increase in resource allocation by the county government would result to increased access to water in Wajir County by 0.505 units. The findings of this study were in line with that of Owino (2018) who found that inadequate financing of investments in the water and sanitation sector by both the national and county governments affected the access to water by the citizenry. The findings also supported that of a study by Zakayo (2017) which revealed that resource allocation particularly finances greatly influenced the implementation of water projects and hence, access to clean water. The

findings were also agreed with those of Orina (2014) which revealed that limited resources available was the most common hindrance to achieving expanded access to clean water.

The findings also showed that collaboration between the county and national governments had a positive and significant effect on access to water in Wajir County given (β = 0.203, t= 4.926, p = 0.000). This implied that a unit increase in collaboration between the county and national governments would result to increased access to water in Wajir County given by 0.203 units. The findings were consistent with that of Memon and Skelton (2007) which showed that the existence of a cordial relationship between the central government and devolved governments improved access to water by citizens in devolved units since it enhanced the allocation of resources for the implementation of water projects. The study results also agreed with that of Kamugisha (2014) who argued that the relationship between the central government and devolved governments led to enhanced water access due to exchange in technical experts which enhanced implementation of water investments.

The findings further revealed that access to water in Wajir County was significantly affected by technology adoption by the county government given (β = 0.394, t= 8.114, p = 0.000). A unit increase in technology adoption by the county government would result to an increase in access to water in Wajir County by 0.394 units holding all other factors constant. The findings were in line with those of Ardakanian and Jaeger (2011) who found that water technologies could contribute to more efficient use of water resources by positively impacting water resources assessment, reduction of water losses, waste water treatment, and efficiency of water utilities which enhanced water access among households. The findings also concurred with that of Dickinson and Kristof (2013) which showed that the use of information and communication technologies for monitoring contributed to sustainable rural water services by meeting the information needs of sector stakeholders. The findings further agreed with that of Gupta (2004) who noted that the use of technology in construction of bulk pipelines and water treatment plants greatly improved the quality and access to water to households. Based on the findings presented in Table 4.29, the following model was fitted:

Access to water in Wajir County = -0.589+ 0.505 Resource allocation by County Government + 0.203 Collaboration between County and National Governments + 0.394 Technology adoption by County Government

Table 4: Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-0.589	0.128		-4.585	0.000
	Resource allocation	0.505	0.037	0.491	13.630	0.000
	Collaboration between the county and national governments	0.203	0.041	0.196	4.926	0.000
	Technology adoption by county government	0.394	0.049	0.327	8.114	0.000

a Dependent Variable: Access to water

CONCLUSIONS

Based on the study findings, the study concluded that devolution had transformed the level of water access by households in arid and semi-arid areas in Kenya particularly Wajir County. The study also concluded that resource allocation, collaboration between the county and national government as well as technology adoption by county government were major channels through which access to water by households in counties was enhanced. The study further concluded that resource allocation by the county government had the largest effect on access to water in Wajir County. The study concluded that effective devolution of water services would greatly enhance the level of water access in arid and semi-arid areas Kenya though supplementary efforts by the national government in water investments in these areas could not be ignored.

RECOMMENDATIONS

Several recommendations based on the study findings and as guided by the research objectives were made. The study recommends that there is need for continuous budgetary allocations by counties within the arid and semi-arid areas particularly Wajir County towards sustainable water infrastructure projects so that the necessary resources needed in carrying out these projects can be acquired. The study recommends that the county government of Wajir County should diversify its resource mobilization strategies in order to mobilize enough resources to supplement the funds and other assistance offered by the national government towards water sector investments and other activities in the county. The study recommends that county should make water investments which have the capacity to generate income for the county so that the incomes coming from these investments can be invested in other projects. The study further recommends for proper water resource plans to enable the county to be able to consistently release resources to the water department so that projects do not stall due to untimely and inconsistent disbursements.

The study recommends that the county water department should frequently organize consultative meetings to discuss major water issues facing the county and draft guidelines that guide the involvement of the national government in the various water infrastructure investments in the county to minimize any conflicts that may arise. The study also recommends that the national government should enhance the technical support government to counties in the arid and semi-arid areas due to the complex water concerns in these counties where the county management is ill-equipped to handle such cases. The study further recommends that the national government should increase the number of mega water projects in Wajir County so that extensive areas can be served by one water source as the county government undertakes other projects.

The study recommends that the county government of Wajir should set up a budget from where the county can constantly acquire emerging water technologies that improve water service delivery and address the particular water challenges resulting from specific climate conditions in the county. The study recommends that the county government can make requests to the national government to support the adoption of technologies that the county on its own cannot adopt towards water access in the county. The study further recommends that the residents should be involved in the process of acquiring water technologies and they can

be educated on the simple technologies that they can exploit on their own such as water harvesting which could go a long way in enhancing access to water among households. The study recommends that the county government can undertake benchmarking studies to identify the technologies that have been successful in other areas but were yet to be adopted by the county. The study also recommends for proper analysis of the adaptability of a particular water technology to the water needs of the county so that the adoption of any technology is well informed and is not based on trial and error for greater success rates and to ensure no resources are lost through adoption of technologies that are not viable.

REFERENCES

Adele, B. J. (2008). *Intergovernmental relations and political opposition in Nigeria Fourth Republic, 1999-2004*. Lagos University State Ojo, Nigeria

Ardakanian, R., & Jaeger, D. (2011). The contribution of water technology to job creation and development of enterprises. *Knowledge Series No. 8; UNW-DPC, Bonn, Germany*.

Bardhan, P. (2002). *Decentralization of Governance and Development*. The Journal of Economic Perspectives, Volume 16, Number 4, 1 November 2002, pp. 185-205(21). American Economic Association.

Bhattacherjee, A. (2012). *Social science research: Principles, methods, and practices" Textbooks Collection.* Book 3.

Bulle, A, (2015). *Drivers Influencing Delivery of Decentralized Health Services in Kenya: A Case of Wajir County*. The Strategic Journal of Business and Change Management, Vol 2 (66) September 10 2015.

Busieney, C, (2014). *Water and Sanitation Services: From National Government to County Governments*. International Journal of Engineering Trends and Technology (IJETT) –Volume 17 Number 3 –Nov 2014.

Creswell, J, W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches.* (4th ed.). SAGE Publications, Inc. Los Angeles

Daily Nation, (Thursday May 21st 2015), *"Governors fight to retain health function".* Nation Media Group.

De Leeuw, E, D. (2008). *Choosing the method of data collection.* In de Leeuw, E,D, Hox, J,J, & Dillman, D,A, (Eds) 2008. *International Handbook of Survey Methodology*. CIP.

Dickinson, D., & Kristof, B. (2013). Using ICT for monitoring rural water services: From data to action. *Working Paper 4, IRC International Water and Sanitation Centre.*

Edwin R. Van Teijlingen and Vanora Hundley, 2001. *The Importance of Pilot Studies* in Nigel Gilbert, 2001. Social Research Update. University of Surrey, Guildford.

Ekpo, A. H. (2004). Intergovernmental fiscal relations: The Nigerian experience. *10th Year Anniversary of the Financial and Fiscal Commission of South Africa, Cape Town*, 10-12.

Gupta, R. (2004). The role of water technology in development; A case study in Gujarat, India, In Dr. Reza Ardakanian, R. & Jaegar, D. (Eds), (2011). *The Contribution of Water Technology to Job Creation and Development of Enterprises*, UNW-DPC, Bonn, Germany.

Heymans et al., (2013). *Devolution in Kenya: Opportunities and Challenges for the Water Sector*. Water and Sanitation Program.

Human Rights Watch (1993), Divide and Rule; State-sponsored ethnic violence in Kenya. New York.

Kagwanja, P., & Mutunga, W. (2001). Is Majimbo Federalism? Constitutional Debate in a Tribal Shark-Tank *The Nation* (Nairobi), 20 May 2001**.**

Kamugisha, D. J. (2014). The liaison between central and local governments: Is it inclined in a symbiotic fashion to ease service delivery in Tanzania. *International Journal of Social Sciences and Entrepreneurship, 1*(10), 274-291.

Kee, J, E. *Fiscal Decentralization: Theory as Reform.* Available online at: https://www.researchgate.net/profile/James_Kee2/publication/251886012_FISCAL_DECENTRALIZATION_THEORY_AS_REFORM/links/55ef07f108aedecb68fd918e.pdf Accessed on 3rd January, 2017

Kenya National Bureau of Statistics, County Statistics. Available online at: http://www.knbs.or.ke/index.php?option=com_content&view=article&id=176&Itemid=645. Accessed on 17th January, 2017

Kikuvi, K. M. (2016). Determinants of successful implementation of water and sanitation projects in Kenya: A case of informal settlement in Mombasa County, Kenya. *Unpublished MA Project, University of Nairobi.*

Ligal et al, (2005), *Fiscal decentralization in Nepal; Status and the Way Forward. Decentralization Advisory Support Unit/Danida*.

Luedeling, E and De Leeuw, J, (2014). *Wajir Water; Decision modeling for the Habaswein-Wajir Water Supply Project in Northern Kenya*. World Agroforestry Centre, Nairobi.

Martinez-Vazquez, (2011), *The Impact of Fiscal Decentralization; Issues in Theory and Challenges in Practice, Asian development Bank.*

Materu, S. F. (2015). *The post-election violence in Kenya. Domestic and international legal responses.* T.M.C. Asser Press.

Memon, A., & Skelton, P. (2007). Institutional arrangements and planning practices to allocate freshwater resources in New Zealand: a way forward. *NZJ Envtl. L.*, *11*, 241.

Mugenda, O. M., & Mugenda, A. G. (2003). *Research methods: Quantitative and qualitative approaches.* ACTS, Nairobi.

Namoit, A, J, (2012). The expected economic impact of devolution of resources to the counties: case study of Turkana County in Kenya. *Unpublished MBA Project, University of Nairobi.*

Nyanjom, O, (2011). *Devolution in Kenya's new Constitution*. Society for International Development. Nairobi.

Oates, W, E. (2006), *On the Theory and Practice of Fiscal Decentralization*. Institute for Federalism and Intergovernmental Relations.

Orina, L. K. (2014). Factors influencing accessibility to water for domestic use in Kenya; A case of Kipkaren Division, Nandi County. *Unpublished MA Project, University of Nairobi.*

Orina-Nyamwamu, C, *From a Centralized System to a Devolved System of Governments: Past, Present and Future Dynamics*: Paper Presented at the FES Conference on State of Implementation of the Constitution of Kenya since 2010. Available online at: http://www.fes-kenya.org/media/publications/From%20A%20Centralized%20System%20To%20A%20Devolved%20System%20Of%20Governments%20-%20Cyprian%20Orina-Nyamwamu.pdf Accessed on 29th June 2017.

Osman, A. D. (2012). Groundwater quality in Wajir (Kenya) shallow aquifer: An examination of the association between water quality and water-borne diseases in children. *Unpublished PhD Dissertation, La Trobe University Bundoora, Victoria 3086 Australia.*

Owino, B. (2018). Enhancing access to safe water and improved sanitation services in Kenya: Are we on track? Retrieved from: http://devinit.org/wp-content/uploads/2018/12/Enhancing-access-to-safe-water-and-improved-sanitation-services-in-Kenya.pdf

Pandey P., & Pandey, M. M. (2015). *Research methodology: tools and techniques*. Bridge Center, Romania.

Regional Centre for Mapping of Resources for Development website. Available at: http://41.215.39.118:83/web/wajir/lib/download_map_and_data/WaterSources.xls

Republic of Kenya, (2015). Ministry of Devolution and Planning, *National Policy for the Sustainable Development of Northern Kenya and other Arid Lands*.

Republic of Kenya, 2015, County Government of Wajir, *Wajir County 2015/16 Budget Summary.*

Republic of Kenya. Ministry of Devolution and Planning (2013). *Wajir County Development Profile*. The Government Printer, Nairobi.

Republic of Kenya. Ministry of Devolution and Planning, (November, 2015). *Ending drought emergencies: common program framework.*

Republic of Kenya. Ministry of Water and Irrigation (2007). *The Draft National Water Services Strategy (2007 – 2015).*

Samantha, M. (2011). The water crisis in Kenya: Causes, and solutions. Available online at: https://www.american.edu/cas/economics/ejournal/upload/Global_Majority_e_Journal_2-1_Marshall.pdf

Smoke, P, (2001). *Fiscal decentralization in developing countries; a review of current concepts and practice*. United Nations Research Institute for Social Development.

Society for International Development, (2004). *Pulling Apart; Facts and Figures on Inequality in Kenya.* Society for International Development, Nairobi.

Tavakol, M, & Dennick, R, (2011). *Making sense of Cronbach's alpha*. International Journal of Medical Education

The National Council for Law Reporting (2010).*The Constitution of Kenya*. Nairobi.

The Standard, (Tuesday, March 29th 2016). *"Governors want more say in water projects."* Standard Group Limited.

The World Bank (2016), Available online at: http://www.worldbank.org/en/topic/watersupply/overview#1

Tifow, A. (2013). Factors influencing sustainability of rural water supplies in Kenya: Case of UNICEF supported rural water projects in Lake Victoria South and Lake Victoria North Water Services Board Regions). *Unpublished) dissertation, University of Nairobi, Kenya*.

UNESCO (2006). *Kenya National Water Development Report*. Available online at: http://unesdoc.unesco.org/images/0014/001488/148866e.pdf

United States Agency for International Development, (2011), *Devolution in Kenya Study; Policy Analysis and Programming Strategies*. Management Systems International, Washington.

Zakayo, M. M. (2017). *Factors influencing the implementation of water projects under the devolved system of governance in Kenya: A case of Meru County Government* (Doctoral dissertation, University of Nairobi).