

**DEVELOPMENT OF PUBLIC PROCUREMENT STRATEGY FOR THE
PROVISION OF POTABLE WATER INFRASTRUCTURE TO LOW INCOME
URBAN AREAS (LIUAs) IN NIGERIA**

By

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**DEPARTMENT OF QUANTITY SURVEYING
AHMADU BELLO UNIVERSITY, ZARIA**

SEPTEMBER, 2017

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Dedication

This thesis is dedicated to my family.

Declaration

I declare that the work in this thesis entitled “**DEVELOPMENT OF PUBLIC PROCUREMENT STRATEGY FOR THE PROVISION OF POTABLE WATER INFRASTRUCTURE TO LOW INCOME URBAN AREAS (LIUAs) IN NIGERIA**” has been carried out by me in the Department of Quantity Surveying under the supervision of Prof. Ahmed D. Ibrahim, Prof. Yahaya M. Ibrahim and Dr. Abdullahi Ibrahim.

The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this project thesis was previously presented for another degree or diploma at this or any other Institution.

Name of Student

Signature

Date

Certification

This thesis entitled “**DEVELOPMENT OF PUBLIC PROCUREMENT STRATEGY FOR THE PROVISION OF POTABLE WATER INFRASTRUCTURE TO LOW INCOME URBAN AREAS (LIUAs) IN NIGERIA**” by Kaltume Aliko MOHAMMED, meets the regulations governing the award of the degree of Doctor of Philosophy of Ahmadu Bello University, Zaria, and is approved for its contribution to knowledge and literary presentation.

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Abstract

The successful public procurement of infrastructure is an essential element in the achievement of sustainable development. This success is dependent on the procurement strategy adopted. The ability of a procurement strategy to achieve the project objectives is based on the strategy being specifically tailor made to the infrastructure type and the context of the procurement. Research has shown that water is a key element in achieving the Sustainable Development Goals because it plays a part in achieving fourteen of the seventeen goals. With the majority of the world's poor living in urban areas with limited access to clean drinking water. Its infrastructure is clearly the most essential. Nigeria has the fourth largest low income urban population. These limited resources that Nigeria has to effectively utilise them to provide this essential service and provide sustainable development for its citizenry. The study was aimed at developing a public procurement strategy for the provision of potable water infrastructure to low income urban areas in Nigeria. The Research carried out was the case studies of water infrastructure procured for the Millennium Development Goals Nigeria for MDG Goal 7 in Kaduna, Anambra and Ogun states. The research population was made up of three key components; the contractors, the clients and the communities. The client and contractors were interviewed to ascertain the effectiveness of the existing strategy in terms of achieving their project goals, critically analyse the strategy and propose improvements. The communities participated in the focus group to ascertain their assessment of the existing strategy, their role in the process and propose improvement. The research found that only one public strategy was identified to be used by the Client Organisation which was based on competitive tendering and the traditional procurement process. Although it had some advantages such as competition, it did not achieve both the primary and secondary goals of the procurement process and hence was deemed ineffective. Some of the limitations identified of the current strategy included; political interference, lack of community involvement, inadequate design, transparency, no feedback mechanism, sustainability and maintenance issues .Consequently, a strategy framework was developed after a critical analysis of the problems and the context in which they emerge, and the various possible solutions to the problems were identified and evaluated. The developed strategy framework which consisted of the five stages (need definition, design, tendering, construction and operation) and three resource assessment gateways. The framework inculcated the importance of defined primary and secondary project objectives, a clear and distinct role for the community and other stakeholders, effective risk distribution, and provided a more holistic flexible sustainable strategy that could be implemented for immediate use under current laws or the planned reform. The study recommends that when developing an effective procurement strategy, achieving all specific goals of key stakeholders and an effective community and stakeholder management system should be given priority.

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Abbreviation

FGN	-	Federal Government of Nigeria
FME	-	Federal Ministry of Environment
FMWR	-	Federal Ministry of Water Resources
ICE	-	Institute of Civil Engineers
ICRC	-	Infrastructure Concession Regulatory Commission
LIAU	-	Low Income Urban Areas
MDA	-	Ministries, Departments and Agencies
MDGs	-	Millennium Development Goals
NIAF	-	Nigeria Infrastructure Advisory Facility
NIQS	-	Nigeria Institute of Quantity Surveyors
OECD	-	Organisation for Economic Cooperation and Development
OGC	-	Office of Government Commerce
PPP	-	Private Public Partnership
RICS	-	Royal Institute of Chartered Surveyors
SDGs	-	Sustainable Development Goals
UN	-	United Nations
UNDESA	-	United Nations Department of Economic and Social Affairs
UNDP	-	United Nation Development Programme
UNHSP	-	United Nations Human Settlement Programme
UNMP	-	United Nation Millennium Project
WHO	-	World Health Organisation

CHAPTER 1

1.0 INTRODUCTION

1.1 Background

Procurement has been used by the public sector for realising projects and programmes, including those in the infrastructure sector. It is considered an important tool for achieving performance improvement in the construction industry (Ibrahim, 2008). Procurement determines the overall framework and structure of responsibilities and authorities for guiding participants within the development process (Love, Skitmore and Earl, 1998) and it encompasses all development stages from the identification of the need for a product to the delivery and subsequent maintenance of the asset (Institute of Civil Engineers (ICE), 2008; Ibrahim, 2008). Literature also indicates that the scope of procurement encompasses the cultural, economic, environmental and political issues raised by the process (Sohail, 2001; United Nations Millennium Project (UNMP), 2003; United Nations Development Programme (UNDP), 2004; Institute of Civil Engineers (ICE), 2008; Ibrahim, 2008).

The procurement method chosen to provide an asset was used to effectively solve the erstwhile time, cost and quality paradigm (highest quality, at lowest price, in shortest time) which has now been overtaken by the value for money paradigm (Hackett, Robinson, Statham, & Langdon, 2007). The selection of the most suitable procurement method is critical for both the clients and the projects participants (Ibrahim, 2008). Watermeyer (2011) emphasised that procurement strategies should be designed around a set of system objectives. The primary objectives require that the process be fair, equitable, transparent, competitive and cost effective while the secondary objectives include the engagement of stakeholders throughout the process. Ibrahim (2007) had also indicated that to ensure the success of any

procurement strategy, the nature, type and environment of the proposed development must be taken into consideration and that tailored strategies should be designed for each infrastructure type against the use of generic and universal strategies. For example, specific strategies have been developed for procuring various infrastructure types such as Oil and Gas Facilities (Mohamed, 2007), Healthcare facilities (Ibrahim, 2010), Roads (Mudi, Lowe, and Manase, 2015).

There is greater recognition amongst development policy makers that access for the poor to a range of infrastructure services will be necessary to eradicate poverty (United Nations Human Settlements Programme (UNHSP), 2011; Richardson and Durose, 2013). The use of effective strategy for providing basic infrastructure will go a long way to improve the squalid conditions in low income urban areas (LIAUs). A significant population of the world's poor live in these areas helping to achieve the targets of the Sustainable Development Goals (SDGs). The provision of potable water to these areas are essential as it impacts survival. Consequently, a suitable procurement strategy that will ensure the provision of potable water infrastructure to low income urban areas in Nigeria will assist in ensuring the achievement of target 7C of the MDGs. The target aimed to reduce by half the proportion of the population without sustainable access to safe drinking water and basic sanitation. Although the target was not met, a positive significant impact was made. Consequently a SDG on the provision of potable water was included in the Sustainable Development Goals Agenda. The Sustainable goals built upon the framework of the MDGs but with an expanded scope and parameters in terms of funding, benchmarks and stakeholder involvement (United Nations (UN), 2015).

1.2 Statement of the Problem

Existing literature on the procurement strategies of infrastructure in Nigeria include: for the provision of other infrastructure such as Health and Road (Ibrahim, 2008; Mudi, Lowe, and Manase, 2015); for the criteria for the selection of appropriate strategies for infrastructure (Ademola, Eyi-tope and Gbadebo, 2012); for specific strategies such as Public Private Partnerships (PPPs) (Akinsoye, 2010; Danraka, 2014; Amobi, 2013; Bamidele, Adenusi and Osunsami, 2014) and for the provision of infrastructure to rural areas (Ogungbemi, Bubou and Okorhi, 2014); but there is no existing literature for the provision of potable water infrastructure in Low Income Urban Areas in Nigeria.

Water Infrastructure is one of the most important elements of infrastructure (Fitch, Odeh and Ibbs, 2005). Unfortunately, it is the least profitable and hence does not attract the private sector. As a result, there is limited applicability of the Public Private Partnerships (PPPs) by government (Organisation for Economic Co-operation and Development (OECD), 2003; Nigeria Infrastructure Advisory Facility (NIAF), 2009). Networked water systems have extremely high capital costs well in excess of other infrastructure services and are mostly financed with loans, for as long a term as is commercially available. These high costs coupled with inadequate tariff structures has led to a shortfall in the provision of potable water infrastructure to the communities that can least afford it. The private companies' motivation is profit and will only supply to the areas where profit can be made. The government on the other hand are incapable of providing it to the areas that are least able to pay for it (OECD, 2003).

Research carried out in Asia and South America, on the provision of infrastructure in low income urban areas have reported that strategies developed with some sort of partnership

with the communities in these areas tend to be more successful than those without. This has led to the strong thrust for procurement strategies that entrenched the principles of community partnership procurement (CPP) (Sohail and Baldwin, 2001; UNDP, 2003; Burra, 2005; Das and Takahashi, 2009; Asia Pacific Ministerial Conference on Housing and Urban Development (APMCHUD), 2010). Studies on these strategies found that there were considerable gains in terms of cost and time but nothing significant in terms of the quality (Sohail, 2003; Cities Alliance (CA), 2005; Mankong, 2005). The main conditions that made CPP effective were identified to include: that the communities had to have some sort of organised structures; the projects were small in size, not complex, required only onsite training and capacity building and finally required long term relationships. Unfortunately, in Africa in general and particularly in Nigeria none of the conditions have been met.

Nigeria cannot achieve the SDGs without providing clean potable water to its populations that are dwelling in these areas. The Federal Ministry of Water Resources of Nigeria (2010) had estimated that it will need to spend over ₦900 billion (Nine Hundred Billion Naira) to provide water infrastructure, which government clearly cannot afford from its coffers.

The alternative, therefore, is to adopt partnership with the private sector and other stakeholders to provide these services. Earlier researches (Sohail and Baldwin, 2001; UNDP, 2003; Burra, 2005; Das and Takahashi, 2009; APMCHUD, 2010; FGN, 2010; FMWR 2010) from other countries have shown that in order for projects of this nature to work the communities needs to play a role whether active or passive, in the procurement process. Yet, the barriers and challenges hindering the attainment of the investment objectives under the subsisting arrangement have not well documented. Neither has the feasibility of involving communities in the procurement process explored. For efficiency, a strategy that integrates

the communities into the process of procuring potable water to the target segment of the society with clear delineation of roles and responsibilities whilst ensuring the attainment of value for money will also be critical.

1.3 Justification for the study

The role of water in the achievement of sustainable development has just been recently identified as essential in the sustainable development research (UNDESA, 2013). The earlier lack of reliable and credible data on water had impeded the planning and provision of sustainable water management. The novelty of this knowledge has been reflected in the relative invisibility of water linkages to the other SDGs until recently (UN, 2015). Subsequently, investments in water has been identified as an enabler and entry point for equitable and sustainable socio-economic development (UN, 2016).

The Water Crisis was rated the number one (1) global risk based on its impact (as a measure of devastation) as announced by the World Economic Forum in January 2015. Without clean drinking water, the population would be susceptible to disease, stunt growth in children and also result in the attendant complications. Global trends predict that all population after 2050 would occur in urban areas (UN, 2015). The World Bank (2008) predicts that over 90 percent of population growth occurs in the developing world, with 70 million people joining the urban poor every year. The current population of the world's urban poor is over 600 million people (Joint Monitoring Programme, 2015).

With over 70 million people, Nigeria has the fourth largest population of low income urban communities after China, India and Brazil (UN, 2011). The outcomes of the huge investments incurred in the provision of potable water infrastructure to this segment of the

society has remained abysmal. The identification of the barriers and challenges hindering the attainment of the investment objectives from the subsisting arrangements for procuring potable water infrastructure to the target segment of the society will facilitate the development of an effective strategy for reversing the poor delivery performance. The mechanisms for involving communities, whole life costing considerations and appropriate allocation of risks should also facilitate the attachment of value for money form the investments. All these conditions ultimately yield themselves to become an immediate significant problem to the Country. How does the government use its limited resources to provide an essential service which is directly tied to the country's ability to provide sustainable development to its citizens? This research provided a framework of a strategy that answers the question above. The strategy provided will seek to achieve all the identified stakeholders' goals. Clearly providing the roles and responsibilities of each identified stakeholder.

1.4 Aim & Objectives

1.4.1 Aim

The aim of this research is to develop a public procurement strategy for the provision of water infrastructure in low income urban communities (LIUAs) with the view to ensuring effective delivery of potable water.

1.4.2 Objectives

The objectives of the study are to:

- i. articulate existing strategies for procuring infrastructure;
- ii. identify procurement strategies available for the provision of potable water infrastructure in low income urban areas;

- iii. evaluate the effectiveness of current procurement strategies as vehicles for the provision of potable water infrastructure to LIUAs;
- iv. assess stakeholder involvement in the process and its relationship with the effectiveness of existing strategies; and
- v. develop an effective public procurement strategy for the provision of potable water infrastructure in LIUAs.

1.5 Scope

1.5.1 Scope

The scope of the research is the public procurement of water infrastructure to low income urban areas as defined by the United Nations Millennium Goals. The only water infrastructure type used by the government for Low Income Urban Areas (LIUAs) were boreholes. The projects under review were commissioned from 2006 and 2012. The mandate of the MDGs included the provision of water to both rural and urban areas. The water projects were not uniformly dispersed in terms of geographical spread. Therefore within the period of 2006-2012 which was under the purview of this research it was not possible to get a case study for each geopolitical zone. The research opted to select three cosmopolitan communities from the three main ethnic blocs; Kaduna (North West), Ozubulu (South East) and Oredgebe (South West) when they were assessing the communities for the research but the other two (2) stakeholders namely Contractors and the Client Organisation not so limited.

1.5.2. Limitations

The Limitations of the research carried out are as follows;

- i. There was an uneven distribution of MDG Goal 7 water projects among the 6 geopolitical zones, therefore not every geopolitical zone was represented in the communities used in this research
- ii. The literacy level and the inability of the researcher to speak the local languages of the communities affected the quality of the responses that are acquired from the focus groups. For example some of the descriptive phrases did not have exact meanings when translated into English and the closest meanings were adopted. In order to reduce the impact of this limitation an interpreter was employed from the communities to interpret to those who were better able to express themselves better in their language.

1.5.3. Assumptions

The research was conducted on the assumption which would otherwise have made the applicability of the results and conclusion to be questionable. It is assumed that all the projects under consideration went through the same procurement process.

1.6 Theoretical Framework

Theories are formulated to explain, predict, and understand phenomena and, in many cases, to challenge and extend existing knowledge, within the limits of the critical bounding assumptions. The theoretical framework is the structure that can hold or support a theory of a research study. The theoretical framework introduces and describes the theory which explains why the research problem under study exists (USC, 2014).

The following are the themes that were addressed in this research;

- i. The role of the construction industry in the achievement of sustainable development and through an effective procurement of infrastructure (Doczi et al,

2013, Watermeyer, 2013, World bank 2005, UNMP, 2010, Ajibola et al, 2013, UNHSP, 2011; Hawkins and Wells, 2007; FGN, 2010; Ibrahim , 2009).

- ii. Procurement as key to improving the performance of construction industry (Kolo and Ibrahim, 2010; Adogbo et al, 2010; Akintan and Morledge, 2013)
- iii. Key objectives of procurement; (ICE, 2008; Watermeyer, 2013; UNHSP, 2011; Hawkins and Wells, 2007).
- iv. The importance of community/ stakeholder involvement; (Sohail and Baldwin, 2001; UNDP, 2003; Burra, 2005; Das and Takahashi, 2009; APMCHUD, 2010; FGN, 2010; FMWR 2010).
- v. The need for tailor made strategies as against generic strategies; (Office of Government Commerce (OGC), 2008; Ibrahim 2007, Ibrahim, 2011; Dreschler, Vrijhoef and Ridder, 2007; Hawkins and Wells, 2007; Ratnasabapathy and Rameezdeen, 2007; Watermeyer, 2013)
- vi. Key considerations for successful procurement strategies; (Diaz- Cayeros et al, 2013; Uduku, 2013; Ibrahim 2008; Bielaczyc, 2006; Hawkins and Wells, 2007)
- vii. The place of gender equality in sustainable development; (Bandiera and Natraj, 2013; Muiro, 2008, Adogbo, 2013, UNDP, 2012, Snow, 2013).

CHAPTER 2

2.0 LITERATURE REVIEW

2.1 Sustainable Development

According to the International Institute of Sustainable Development (2007), the turning point in 'moral conscious' of the world came in 1962 with the Rachel Carson report. The report highlighted the damaging activities of agricultural pesticides and their impending catastrophic impact on our environment. This report triggered the development of sustainable development concept. The term itself became popular as a result of the Brundtland Report in 1987. The Brundtland report defined sustainable development as '*development that satisfies the need of the present without comprising the ability of our future generations to satisfy theirs*' (Brundtland, 1987). Sustainable development aimed to define viable schemes combining the social, economic aspects of human activity.

This new thinking was further inculcated at the Earth Summit in 1992 at Rio de Janeiro. The summit was historic as it would set precursor for international cooperation for the betterment of the world. The earth summit also produced the Agenda 21 document. Agenda 21 highlighted poverty as a complex multidisciplinary problem with both international and national origins (UNDESA, 2014). After the Rio 1992 Conference there was a significant increase in poverty levels globally. As a direct consequence, the United National General assembly in 1997 decided that poverty eradication should be the overriding theme of sustainable development for coming years (UNDESA, 2014).

2.2 Millennium Development Goals (MDGs)

In the year 2000, the largest ever gathering of the leaders of member states of the United Nations signed a declaration to end poverty and provide sustainable development for the world. This declaration led to the commissioning of the Millennium Development Goals (MDGs). The Millennium Goals were aimed at improving the living conditions of the world's citizens and remedying the major global imbalances by 2015. The Millennium Development Goals consisted of eight goals that contained 18 numerical and time-bound targets and 48 indicators (UNMP, 2005). These goals included those on combating poverty, hunger disease, illiteracy, environmental degradation and discrimination against women.

A significant amount of research has been carried out on the MDGs which has included discussions about the MDG concepts, costing and feasibility. One area that has been the subject of academic discussion is the usefulness of the goals and the suitability of the choice of indicators (Easterly, 2009; Saith, 2006; James, 2006; Biccum, 2005; Gaiha, 2003; Satterthwaite, 2003). Other researchers have taken a more practical approach by seeking to find out how to achieve the goals or to look at if indeed the goals themselves are possible to achieve (Bourguignon *et al.*, 2009; Chakravarty and Majumber, 2008; Clemens, Kenny and Moss, 2007; Reddy and Heuty, 2005; Roberts, 2005; Atkinson, 2004).

The MDGs have also been criticized by researchers for the following reasons; they are donor-driven, use a one-size-fits-all concept, focus on quantity rather than quality, and do not address issues such as risk and vulnerability that are seen as increasingly important looking ahead (European Think-Tanks Group, 2010) . There is consensus that it is better to have the goals as opposed to not having them at all. Other studies have focused on the impact of the

MDGs in terms of adoption, allocation of the resources and how the impacts have measured against the projected goals (FGN, 2011; Manning, 2009; Fukuda-Parr, 2008).

In studies that have focused on the impact of the MDGs there is consensus that so far there has been significant impact at global level but at national levels the impacts are less obvious and there is a need for further study (UN, 2013; UNDP, 2011). The Table below sets out the strengths of the MDGs as well as their weaknesses as set out by Kwahja in 2010.

Table 2.1 Critique of Millennium Development Goals

The strengths of the MDGs	The weaknesses of the MDGs
<ul style="list-style-type: none"> • As a ‘rallying call’ for development actors; • As a common/shared understanding of what development is seeking to achieve (and the placing of poverty reduction at the centre of development rather than GDP growth alone); • Their instrumentality as a set of targets and indicators to guide and motivate development policy decisions, and at the same time – in principle – the accountability that flows from saying you will do something and then measuring if you have done it; • The pressure they have exerted for more data on poverty; • Their legitimacy because they are UN-based, and have an in-built sense of global solidarity and ability to galvanize the international community in development as a joint-project (especially in MDG 8) of all UN Member States, a partnership between donors and recipients, to achieve specific and measureable progress. 	<ul style="list-style-type: none"> • Their incomplete/reductionist conceptual basis for defining what is poverty and development as incomplete human development outcomes alone rather than capabilities/opportunities to achieve those outcomes, and inter-related, their lack of pathology (or conceptual rigour) in that they have no unifying theory on the underlying or structural causes of poverty and thus lack a pathology/means for poverty reduction beyond inputs/outcomes; • Their weakness on social justice underpinnings - the MDGs are implicitly inter-generational (note the 25 year timeline 1990-2015; and many of the MDGs are about children) - but there is very limited attention to intra-generational or inter-generational equity and rights issues (such as inequalities, marginalization, vulnerability, and exclusion, nor to ‘procedural rights’ such as participation, non-discrimination and access to information); • A perception that they are a donor-led, reductionist agenda that pays little attention to locally defined and owned (and richer, fuller) definitions of progress and development; • Their overemphasis of material wellbeing - and a lack attention to relational and cognitive aspects of poverty dynamics and how what people feel and think in part determines what they can do and be; • Their potentially distorting impacts – i.e. targeting of the near poor (easier to help and reach) rather than the most poor; • A growing sense that the world has changed – the MDGs were born in a world of relative stability, strong growth and buoyant aid budgets. If vulnerability/resilience becomes the norm (climate adaption; volatile markets for food and fuel, etc.) we need something more in tune with resilience (for example, social protection; low carbon development/adaptation; voices of the poor in governance to mediate inevitable conflict over resources, etc.).

Source: Kwahja, 2010

For the purposes of this research the focus of the research is Goal 7 which looks at improving access to safe and clean potable water for the world’s poor.

2.3 Post 2015 and Sustainable Development Goals (SDGs)

The Millennium development goals were not achieved by 2015 although significant strides had been made. Some countries did achieve some goals such as achieving universal basic education and global partnerships (UN, 2015). In 2013, the MDG report for Africa predicted that , Africa was on track to achieve 3 goals, namely: Goal 2 achieve universal primary education, Goal 3 promote gender equality and woman empowerment and finally Goal 6 combat HIV, TB, malaria and other diseases. Although, Africa was the second fastest growing region between the years 2000-2012, the growth recorded was not enough to achieve the set targets. The Table 2.2 shows that although significant progress was made in four of the goals only one goal was achieved by the 2015 deadline.

Table 2.2 Millennium Development Goals Scorecard for Africa

GOALS	PREDICTION
Goal 1: Eradicate extreme poverty and Hunger	Not Achieved but Significant Progress
Goal 2: Achieve Universal Primary Education	Achieved
Goal 3: Promote gender equality and empower women	Not Achieved but Significant Progress
Goal 4: Reduce child mortality	Not Achieved but Significant Progress
Goal 5: Improve maternal health	Not achieved
Goal 6: Combat HIV/AIDS, TB, malaria and other diseases	Not Achieved but Significant Progress
Goal 7: Ensure environmental sustainability	Not achieved
Goal 8: Global Partnerships for development	Not achieved

Source: UN, 2015

Research has noted that Africa had made significant improvements to the pre MDG status (Furtada, Parr, Goldstein & Stewart, 2013; UN, 2012; Sahn and Stifel, 2002). As a result, criticisms were made. The criticisms included that the current evaluation systems of the MDGs did not recognise efforts made and this would ultimately lead to a regression after 2015. As a result, there was some clamour to extend the principles of the MDGs past the 2015 deadline (World Bank, 2011). How the MDGs would be translated past the 2015 deadline has been the subject of much debate. The main issue was ‘what should succeed the MDGs?’

In the planning of the post MDGs framework, the submissions from the different stakeholders had recommended in terms of providing water sustainably, various proposals were put forward with each proposing different approaches;

- i. Ballagio Report advocated the combination of access to water with access to food.
- ii. Sustainable Development Solutions Network (SDSN) Report had suggested a target covering infrastructure under what might be called rural and urban
- iii. High Level Panel Report for Water advocated that the following should be treated under the new framework; universal access, framework for financial of water services and development of infrastructure. The HRP goal for drinking water is to ‘*provide universal access to safe drinking water at home, in schools, health centres, and refugee camps*’.

Research carried out on the MDGs has highlighted the role of infrastructure in the achievement of the MDGs and also its importance in eradicating poverty. Some of the issues raised in terms of the Post 2015 include whether there should be specific infrastructure goals and targets. Also included should be a clear definition of infrastructure and it entails (Doczi,

Dorr, Mason and Scott, 2013; Asomaniwaa, 2013; Wai, Yusuf and Ismail, 2013, Sheng, 2012; UNMP, 2010).

Although not all the MDGs were achieved there was significant progress which made the MDGs the most successful global development initiative in history. In order to capitalise on the momentum to build on the successes of the Millennium Development Goals, 17 Sustainable goals were adopted for the 2016-2030 which in addition to the areas covered by the MDGs while including new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities (UNDP, 2015).

The SDGs built upon the framework of the MDGs but with an expanded scope and parameters in terms of funding, benchmarks and stakeholder involvement (United Nations (UN, 2015). In other words, the SDGs still maintain the 'spirit' of the MDGs but building in the lessons learnt such as often the key to success on one goal will involve tackling issues more commonly associated with another goal to ensure sustainability of the goals (UN, 2015).

2.4 Role of Construction Industry in MDGS

The Construction Industry has played a crucial role in the attainment of the Millennium Development Goals. In certain cases, it also served as a bottleneck. Ibrahim, Oyedele and Adogbo (2009) stated that industry plays three roles namely;

- i. Provision of buildings and items of infrastructure which were inputs to economic and social growth.
- ii. Stimulates other sectors of the economy.

iii. Provides employment opportunities

For example, the Nigeria construction industry (NCI) employs 8 million Nigerians which account for 25% of Nigeria's workforce. The NCI has been dubbed the sleeping giant because although it has the size, Nigeria has a deficiency in basic amenities and essential public infrastructure (Ibrahim et al, 2009; Office of Senior Special Assistant to the President on the Millennium Development Goals (OSSAPMDG), 2005).

The role of infrastructure cannot be underestimated. According to Watermeyer (2013), the tackling of poverty and underdevelopment of Africa is being hampered by shortcoming in the delivery and maintenance of infrastructure. The researcher also argued that countries in Sub-Saharan Africa typically manage to spend about 2 thirds of the budget allocated to invest in infrastructure which has translated in about 30% of infrastructure Assets being in need of rehabilitation. This problem is one of the numerous problems facing the Nigerian Construction industry. Other problems that have been identified with the Nigerian Construction industry include; rushed nature of project implementation, corruption, inadequate planning and budgetary provision, projects implemented at higher sums, inefficient and poor services delivery, abandoned or non-functional facilities, substandard construction projects which collapse to name but a few (ICRC, 2010; Ibrahim and Haddary, 2010;Ogunsamni, 2013). Researchers tried to provide solutions to the problems by looking at the individual problems such as cost overruns (Okpala and Aniekwu, 1998; Abdulrazaq, Ibrahim and Ibrahim 2012), skills and capacity buildings (Olomolaiye Wahab and Price, 1987, Gangas, 2012), delays caused by claims(Aibinu and Jagboro, 2002) and so on so forth. Of all the possible solutions provided by earlier research only procurement provided a holistic view of the process and also a single attack point.

In the infrastructure sector, procurement determines the overall framework at every stage of the project and the structure of responsibilities and authorities for guiding participants with development process and is considered as the key to performance improvement therefore the selection of the most suitable procurement method is critical (Ibrahim, 2008; Ward, 2011). Earlier research into procurement strategies have highlighted two major theories that will ensure the success of any procurement strategy namely; the nature, type and environment of any proposed development should be taken into consideration when designing the procurement strategy and the use of tailored strategies as against a generic and universal strategy (Ibrahim, 2007; Ibrahim, 2011). It is therefore imperative that each project type should have a suitable procurement strategy that will effectively deliver it. Low income urban areas are characterized by poverty, unclean environment and particularly the absence of basic infrastructure. An effective strategy for the provision of basic infrastructure will go a long way to improve the squalid conditions in low income areas thus helping to achieve the targets of the MDGs. A key type of infrastructure that impacts greatly on the lives of people is potable water. Consequently, a suitable procurement strategy that will provide potable water infrastructure to low income urban areas in Nigeria will assist in ensuring the achievement of target 7C of the MDGs.

2.5 Procurement Overview

Procurement is defined by the National Procurement Strategy for Local Government (2009) as the process of acquiring goods, works and services, covering both acquisitions from third parties and from in-house providers. Public procurement is the process whereby public sector organisations acquire goods, services and works from third parties. It includes much that supports the work of government and ranges from routine items to complex spend areas (e.g.

construction,) (OGC, 2008). Procurement encompasses all stages from the identification of the need of the product to the delivery and subsequent maintenance of the asset. It involves options appraisal and the critical 'make or buy' decision (ICE, 2008; Ibrahim 2008: NPSLG, 2009).

The procurement method chosen to provide the asset should effectively solve the time, cost and quality paradigm (highest quality, at lowest price, in shortest time) which now has been overtaken by the value for money paradigm (Hackett, Robinson, Statham & Langdon, 2007). Apart from the three major considerations for each project, the scope of procurement should encompass cultural, economic, environmental and political issues raised by the procurement process (Sohail, 2001; UNMP, 2003; UNDP, 2004; ICE, 2008; Ibrahim, 2008).

Procurement is defined by ISO 10845-1:2010 as processes, methods and procedures for the establishment within an organization of a procurement system that is fair, equitable, transparent, competitive and cost-effective.

- i. describes generic procurement processes around which an employer can develop its procurement system,
- ii. establishes basic requirements for the conduct of an employer's employees, agents, board members and office bearers when engaging in procurement,
- iii. establishes the framework for the development of an employer's procurement policy, including any secondary procurement policy, and
- iv. Establishes generic methods and procedures for procurements, including those pertaining to disposals.

This standardization of procurement provides an effective road map for clients to use when they formulate their procurement policy. The policy in turn would lead to the development of processes, methods and procedures, and procurement documentation. The standardization of the process will only apply once the client has established what is to be procured and set out a clear procurement strategy that will effectively achieve the procurement objectives. The main objective is the creation of the framework that facilitates fair competition, reduces the possibilities of abuse, improves predictability of outcome and allows the demonstration of best value (Ward, 2011)

The procurement process has been the subject of many researches over the past 2 decades (Sohail, 1999; Sohail and Baldwin, 2001; UNDP, 2001; Hawkins and Wells, 2007; Kajimo-Shakantu and Root, 2007; Ibrahim, 2007; Ibrahim 2011; Watermeyer 2013; Watermeyer, 2013). The studies have addressed the stages of the procurement process, barriers to a more effective process, improvement to the process, developed strategies to improve the process, provide standardization for the process. There have been some divergence on certain issues as the number of stages, the composition of the stages and the positioning of gateways but there has been convergence on what the process is set to achieve and what the main generic stages and activities that form the procurement process. According to OGC (2008) the process consists of 3 distinct parts; planning stage, execution stage and operational:

- i. Pre-Procurement Planning; Effective planning should be carried out prior to a procurement. It is essential as the planning should include consultation with stakeholders to clarify the project objectives and the budget. A complete evaluation of all the needed skills and capabilities should be conducted at this

stage to ensure that the required skills would be present during the execution stage even if it means outsourcing them.

- ii. Execution stage; where actual final product would be created. This stage is where all the strategies delivered in the previous stage would be put into action.
- iii. The operational stage; at this stage Authorities are responsible for achieving Value for Money, normally through fair and open competition. In addition, they must comply with their legal obligations under the procurement rules, and adhere to the certain principles, the most important of these being: equal treatment, non-discrimination, mutual recognition, proportionality and transparency.

Procurement processes, techniques and issues differ greatly across the spectrum (OGC, 2008). Most researchers have identified certain generic activities that occur within every procurement process (OGC, 2008; ICE, 2008).The generic activities include

- i. Need identification; at this stage the project objectives are described, the stakeholders identified
- ii. Design development; the design of the project and the end product
- iii. Tendering;
- iv. Construction / Contract execution
- v. Operations and maintenance

When deciding on what procurement approach to take it is important to consider the nature of the procurement requirement as different factors drive the selection of which approach is best to take (OGC, 2008). According to the Office of Government Commerce (2008) some key factors that can affect the decision on the approach include:

- i. Repeatability: the amount of times a certain procurement would be done determines the approach to take for example, is the requirement a ‘one-off’ project or is something that will be procured at regular intervals?
- ii. Complexity: how complex the project is, in terms of technical specifications, skills required to procure it, will certain skills be needed to maintain it and what range of services would be needed to facilitate its procurement. The complexity of the procurement is also directly linked with the risk of the project. Factors that affect the complexity and risk include;
 - a. the technical and financial makeup of the project,
 - b. the level of innovation required for the project
 - c. Novelty of the project or risks inherent in delivery;
 - d. Long term Vs Short term contracts
 - e. Level of Competition in the process.
 - f. Availability of the capabilities and skills required to deliver the procurement
 - g. The contract type to be used.
 - h. Whether there is a significant integration elements with existing business requirements.
- iii. Value and risk: the value of the procurement product and the risk involved in the procurement also affect what approach to use. For example, in a high value project such as infrastructure, the procuring entity may wish to transfer the associated risks to another party and enter a PPP. It should be noted that procurement can be low in value but may still carry significant reputational risk.

- iv. **Commonality:** the availability and commonality of what is being procured plays a role in what approach to take. For example if the product is a pen which is available and common it would require a different approach from a building which is specialised and less common.

In the procurement of anything and especially in the procurement of construction projects, procurement decisions should always be on the basis of value for money over the life of the facility and not on the initial capital cost alone (Bello, 2013) . There are three core principles and their underlying relationships that must be understood in order to get a concise picture of the intricacies of procurement. These concepts are value for money, procurement strategy and procurement route.

2.5.1 Procurement concepts

2.5.1.1 Procurement Strategy

The procurement strategy identifies the best way of achieving the objectives of the project and value for money, taking account of the risks and constraints, leading to decisions about the funding mechanism and asset ownership for the project. The aim of a procurement strategy is to achieve the optimum balance of risk, control and funding for a particular project (OGC, 2003).

The procurement strategy is all about the choices made in determining what is to be delivered through a particular contract, the procurement and contracting arrangements and how secondary procurement objectives are to be promoted (Watermeyer, 2013). The Table 2.3 looks at the variables which represent the choices needed to be made in any construction procurement process.

Table 2.3 Variables in Procurement

Category	Examples
Source of Funding	Owner financed, public sector Financed, developer-financed, Private Finance Initiatives, Public private Partnerships
Selection method	Negotiation, partnering, Frameworks, selective competition, open competition
Price basis	Work and materials as defined by bills of quantity, cost reimbursement, whole building, a fully maintained facility performance
Responsibility for design	Architect, engineer, contractor, in-house design team, supplier
Responsibility for management	Client, lead Designer, principal contractor, joint venture, construction manager
Supply chain integration	Single source, Integrated, fragmented, competitive, collaborative

Source: Murdoch and Hughes, 2008

The factors that influence the procurement strategy should be considered (OGC, 2008; CIED, 2010):

- i. the project objectives – for example, to provide office space for x people to deliver a specific service
- ii. constraints – such as budget and funding; the timeframe in which the facility is to be delivered; exit strategy
- iii. cultural factors – such as considerations about the workspace environment that will best support the way people work
- iv. risks – such as late completion of the facility; innovative use of materials
- v. the client’s capabilities to manage a project of this type
- vi. The length of operational service required from the facility.

The procurement strategy should contain options analysis and recommendations around a range of issues depending on the precise nature of the procurement. Typically, for a complex procurement, it would include discussion of the contracting process itself; the number and nature of the suppliers required; the length and type of contract; contract and supplier management issues (OGC, 2008).

Earlier research into procurement strategies have highlighted two major theories that will ensure the success of any procurement strategy namely; the nature, type and environment of any proposed development should be taken into consideration when designing the procurement strategy and the use of tailored strategies as against a generic and universal strategy (Ibrahim, 2007; Ibrahim, 2011). Earlier research also noted that procurement strategies must not only aim to achieve the primary objectives of time cost and quality but also aim to achieve secondary but equally important set of objectives such as social, economic, political to name but a few (ICE, 2008).

The characterisation of the different types of procurement strategies are classified in different ways. For example one classification of procurement strategies is based on funding, they include private funding as against government funding. Funding is a very important element of procurement strategies. For example the lack of framework for selecting appropriate funding mechanisms results in costly and inefficient financing of public projects (Camane, 2013). Funding is also essential because it determines whether there will be a project. Funding is also used to categorise procurement. For example, traditional procurement routes tend to be sponsored by the client and in Private Finance Initiative one of the key features is that the projects would be financed by the private sector. Another method of classification is based on the procurement route

2.5.1.2 Procurement Route

The procurement route delivers the procurement strategy. It includes the contract strategy that will best meet the client's needs. An integrated procurement route ensures that design, construction, operation and maintenance are considered as a whole; it also ensures that the delivery team work together as an integrated project team.

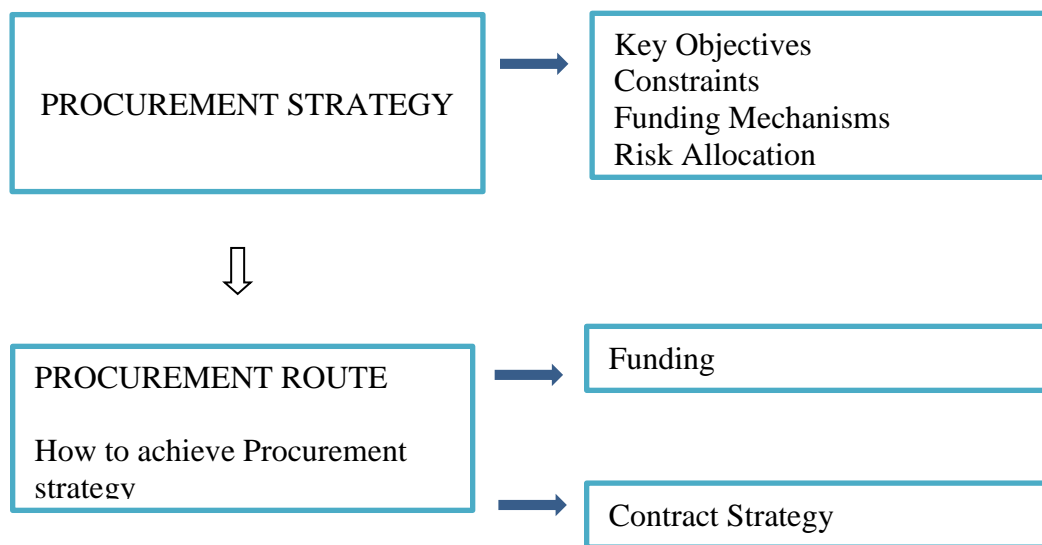


Figure 2.1 Relationship in Procurement
Source: OGC, 2003

Figure 2.1 shows the relationship between the procurement strategy, procurement route and contract strategy. The procurement strategy determines the most appropriate procurement route, including the contract strategy, to fit the project objectives and current circumstances (OGC, 2003). For every construction project the client should have a holistic view of the process from the process design, through to its operation and maintenance of the facility and also have a clear funding strategy. An integrated procurement route should be adopted to deliver the project, where all of these aspects have been considered together (OGC, 2008).

Different types of procurement routes exist but each route has its own proponents, inherent strengths and weaknesses (Watermeyer, 2013). The actual selection of ideal route is difficult as even the most experienced client does not have extensive knowledge and experience of the potential risks and benefits of each route (Tookey, Murray, Hardcastle and Langford, 2008).

The procurement routes in use in construction in Nigeria include Traditional, Design and Build, Project Management, Construction management, Management Contracting, Labour-Only, Direct-Labour, and other integrated procurement systems such as PPPs, Partnering, and Joint Ventures. (Ogunsanmi, Iyagba and Omirin, 2003; Ibiyemi, Adenuga and Odusami, 2005; Ojo, Adeyemi and Fagbenle (2006), Babatude Opawole and Ujaddighe (2010) and Dada (2012).

The traditional procurement route also known as conventional procurement is the most widely used in Nigeria for the provision of infrastructure (Idoro, Iyagba and Odusami, 2007). This procurement route is based on competitive tendering where the lowest price at the point of tender is contracted. The key feature of this process is a distinct design stage, other features include clear definitions of every role and its attendant responsibilities. The route is fully funded by the client. Clients are particularly attracted to traditional procurement because they feel that the process would ensure competition, transparency in decision making and shows accountability in spending public money. According to the RICS (2013) some of the advantages of this route include; familiarity of the parties involved of their roles and responsibilities, the client is the driver in the process, the client has control throughout the process, price is determined at the early part of the process, , there is no need for a contractor to build in a risk premium, the criteria for selection is simplified as the least cost gets

contracted to provide service or product, easy comparison between tenders and the use of provisional sums in elements not fully designed at the time of tender. Despite these stated benefits they also stated that traditional procurement also had the following limitations; due to the distinct and defined stages it takes more time, there are disputes on who takes responsibility for construction defects, it doesn't encourage innovation, there is also no incentive for the contractors to make cost savings as their costs will be covered, it also only recognizes the stakeholders that are directly involved in the process i.e. the client, consultants, contractor and subcontractor (RICS, 2013; Ogunsanmi, 2012). Efforts were made to mitigate these shortcomings by the introduction of different variations of the cost based procurement this still did no major improvements were made.

Consequently, these failed improvements lead to the introduction of integrated procurement systems where the design and construction become the responsibilities of a single organization. Usually the contractor and management orientated procurement systems where the emphasis is placed upon management of the design and construction. These advanced procurement routes did not take into consideration of the operation of the project and therefore maintenance of such projects became an issue in the long run.

The development of Public private partnerships was triggered by external and internal happenings in the construction industry such as the economy and also dissatisfaction within the construction industry. PPP became popular in Nigeria in the last decade for new projects and for old projects as the Federal Government of Nigeria embraced the PPP approach in the Year 2000 to accelerate the active involvement of the private sector (ICRC, 2010; Oke, 2008). The concept of PPP underpinned by governments desire to resolve financial constraints by joining forces with the private sector to increase efficiency and effectiveness

of public sector and facilities whilst ensuring better risk management and increasing certainty of outcome (Ibrahim and Musa Haddary, 2010).

Public-Private Partnerships (PPPs) are way of delivering and funding public services using a capital asset where project risks are shared between the public and private sector. A PPP defined as a long term agreement between the government and a private partner where the service delivery objectives of the government are aligned with the profit objectives of the private partner. The effectiveness of the alignment depends on a sufficient and appropriate transfer of risk to the private partners (Kolo and Ibrahim, 2010; Ibrahim, 2008).

There are many different types of PPP but the most widely used being the Private Finance Initiative. Private Finance Initiative (PFI) projects are public-private partnership (PPP), used to fund major capital investments (HMT, 2008). The private sector in a PFI set up are typically responsible for designing and the construction of the asset, including raising the necessary funding and operating the services that uses the asset constructed. Due to the nature of the various aspects of a PFI, contracts are often awarded to a consortium of companies who are experts in each of those fields required. The Table 2.4 provides an overview of the major differences between the traditional procurement routes and the PFI route.

Table 2.4 Differences between Traditional Procurement and PFI

Public Sector Conventional Provision	Private Finance Initiative Provision
Government is purchaser of assets	Government is purchaser of services
Government generally designs or builds the asset to its own specification.	Private sector consortium generally designs, builds, owns, operates and maintains physical assets.
Government directly meets the cost of designing and building the asset, as those costs are incurred.	Private consortium designs and builds the assets, and funds that work, in the expectation of recovering the cost over the life of the contract through continuing charges that the Government will pay for the service.

Source: The Treasury, 2008

According to the World Bank (2014) the following are the potential benefits of using PPP;

- i. Exploring PPPs as a way of introducing private sector technology and innovation in providing better public services through improved operational efficiency
- ii. Incentivising the private sector to deliver projects on time and within budgets
- iii. Imposing budgetary certainty by setting present and the future costs of infrastructure projects over time
- iv. Utilising PPPs as a way of developing local private sector capabilities through joint ownership with large international firms, as well as sub-contracting opportunities for local firms in areas such as civil works, electrical works, facilities management, security services, cleaning services, maintenance services, etc.
- v. Using PPPs as a way of gradually exposing state owned enterprises and government to increasing level of private sector participation (especially foreign) and structuring PPPs in a way so as to ensure transfer of skills leading to capacitated entities that can eventually export their competencies by bidding for projects/ joint ventures
- vi. Creating diversification in the economy by making the country more competitive in terms of its facilitating infrastructure base as well as giving a boost to its business and

- industry associated with infrastructure development (such as construction, equipment, support services, etc.)
- vii. Supplementing limited public sector capacities to meet the growing demand for infrastructure development
 - viii. Extracting long-term value-for-money through appropriate risk transfer to the private sector over the life of the project – from design/ construction to operations/ maintenance

Despite these potential benefits there have been some shortcomings that have been identified by the somewhat limited research on PPP. Some of the issues raised by Gatehouse (2014) include:

- i. increased scheme development costs due to complex and drawn-out procurement;
- ii. higher revenue expenditure being incurred by the public sector;
- iii. new buildings' design and construction not meeting required or expected standards;
- iv. concern over terms and conditions for staff transferred from public to private sector;
- v. Private sector companies making "super-profits" at the expense of the public sector.

Olatunji (2013) stated in their research that the following were problems encountered with PPP in Nigeria; unstable political situation/ instability of government, corruption of public officials, lack of or poor legal/ regulatory framework, lack of transparency in contract awards, lack of government commitment and support, inappropriate risk sharing and inability of private partner to identify and manage risk.

An intrinsic requirement of all PPP arrangements for infrastructure development is that they should deliver better value for money than comparable alternatives delivered wholly from

the public purse (Ibrahim and Haddary, 2010). It is important to note that PFIs are the most popular type of PPP due to its appeal to governments, there are also other forms of PPP. These types of partnership does not involve the financing of the projects but rather focus on using the technical know-how of the private sector (Sohail, 2003).

Another important element of PPP is risk allocation. Risk should be allocated to those best able to handle them. Equitable risk allocation is not easy given the technical, political, legal and economic complexity of infrastructure projects; the range of constituencies involved. Other limitations of risk allocation include the underestimation of risks which result to their allocation to parties without the knowledge, resources and capabilities to manage them more effectively leading to the earlier mentioned problems stated above (ICE, 2008; Loosemore 2006). Gimsley and Lewis have identified six areas of risks associated with PPP projects namely; public risk, asset risk, operating risk, sponsor risk, financial risk and default risk.

The UK Treasury (2008) gives the following risks that the public sector typically seeks to transfer to the private sector in PFI projects:

- i. cost overrun risk during construction.
- ii. timely completion of the facility. No payments are generally made to the private sector until the asset becomes available, and the contracted service commences.
- iii. meeting required standards of asset delivery. For instance, the private sector is expected to pay for the cost of redesigning the asset, should it not meet required service needs.
- iv. the underlying costs to the operator of service delivery, including the future costs associated with operating and maintaining the asset.

- v. Risk of industrial action or physical damage to the asset, and certain market risks associated with the project.

There are also other types of risk which have to be allocated: Demand risk, the risk that the demand for the property will be greater or less than predicted; the possibility of generating third party revenues; the risk of obsolescence, including the effects of changes in technology; and residual value risk, the risk that the value of the property at the end of the contract will be different from that expected (Treasury, 2008).

2.5.1.3. Value for Money (VFM)

Defined as the optimum combination of whole-life costs and quality to meet the user requirement (OGC, 2008). The limited resources that are available to most governments have ensured that VFM in procurement is key to ensuring the optimum utilisation of scarce budgetary resources hence ensuring that it is the primary driver for procurement (OECD, 2011). It should be noted that the value for money concept in procurement does not necessarily mean selecting the lowest price but rather the best possible cost of ownership (Watermeyer, 2013). It usually means buying the product or service with the lowest whole-life costs that is 'fit for purpose' and meets the required specification.

A critical standing point in delivering value for money through infrastructure projects is to clearly defined objectives, expected outcomes and the parameters (time, cost and risks) (Watermeyer, 2013). According to DFID (2011) the drivers for VFM are skills and behaviours, transparency, internal scrutiny, external scrutiny, value for money tool, systems development and partners. Another important driver of VFM not mentioned by the DFID is competition. A strong competitive market will generally deliver A VFM outcome.

Procurement systems need to be designed around objectives that speak *economy, efficiency, effectiveness and equity* at the same time maintain a wide range of procurement procedures which enable best value for money in a number of different ways (Watermeyer, 2013). When designing a procurement and delivery system to deliver value for money, the following approaches should be taken;

- i. Adopt a strategic approach that is above project level
- ii. Establish trust based engagement with stakeholders throughout the process
- iii. Put in place governance systems which incorporate oversight functions to assess value for money throughout process
- iv. Put in place a rigorous selection process
- v. Differentiate between different procurement routes which place different challenges and require different skill sets.
- vi. Standardize delivery in manner that enables proactive risk management.
- vii. Build relationships built on trust and understanding with private sector
- viii. Put in place reliable data gathering systems
- ix. Develop strong public sector capabilities across the value chain ,planning, delivery and operations
- x. Increase transparency through disclosure of information which is subject to internal and external scrutiny.

2.5.1.4 Whole Life Cycle Costs

“The life cycle cost of an item is the sum of all funds expended in support of the item from its conception and fabrication through its operation to the end of its useful life” (White and Ostwald, 1976). Such life cycle costs of a product can be many times the initial purchase or

investment costs (Woodward, 1997), and according to several sources 70-90 % of these total life cycle costs become defined already in the design phase (Bescherer, 2005; Dowlatshahi, 1992; Lindholm and Suomala, 2005). Yet initial investment costs are most often used as the primary and sometimes the only criteria in purchase decision (Lindholm and Suomala, 2004; Woodward, 1997). In spite of the obvious long-term benefits of the life cycle costing (LCC), its adoption has been relatively slow (Lindholm and Suomala, 2004; Woodward, 1997). Possible reasons for the slow adoption include the lack of standard or formal guidelines and the lack of reliable past data (Ardit and Messiha, 1999; Kopi and Ala-Risku).

2.5.1.5 Contract strategy

The contract strategy determines the level of integration of design, construction and ongoing maintenance for a given project, and should support the main project objectives in terms of risk allocation, delivery, and incentivisation etc. (OGC, 2008).

The selection of the appropriate contract strategy is as much important as selecting other major characteristics of project. Its importance lies in upon its ability improve the supply management to maximise value at minimum cost, and how to develop and implement a best-practice process for the management of contracts. (Dhanushukodi, 2012). Contractual issues have been highlighted as one of the major cause of cost and time overruns in construction there an inappropriate contract strategy would definitely lead to the above mentioned (Amoa-Aban and Allotey, 2014).

Perry (1985) in his study outlines the key components for selecting the appropriate contract strategy for each project:

- i. The project characteristics

- ii. Organisational structure for design and construction
- iii. Types of contracts
- iv. Tendering process including conditions of contract, contract selection and tender analysis.

2.6 Procurement of Infrastructure

The New Zealand Social Infrastructure Fund defined (2009) infrastructure as long term physical assets that operate in markets with high barriers to entry and enable provision and services. Defined broadly by UNHABITAT (2011), infrastructure refers to all inputs into and required for the proper function of the economy. The definition of infrastructure increasingly has moved away from focusing on the physical assets such as roads etc. It now embodies notions of softer types of infrastructure such as information systems and knowledge bases therefore one classification of infrastructure is based on this new thinking with ‘soft’ and hard infrastructure. Hard refers to the physical structures and facilities that support the economy and soft refers to the non-tangibles that supporting the development and operations of the hard infrastructure such as policy, regulation, institutional frameworks, procurement systems to name but a few (UNHSP, 2011).

The more generally acceptable classification of infrastructure characterizes into economic and social infrastructure. Economic infrastructure forms part of the economy’s capital stock used to facilitate economic production which are comprised of 3 main parts namely utilities, public works and transport. Social infrastructure on the other hand, encompasses services such as health, education and recreation. Social infrastructure has an impact on the quality of living, facilities investment in human capital and enhances the level of productivity in economic activities (Wai et al, 2013).

Globally, the procurement of infrastructure had been solely the purview of governments. Most infrastructure projects were traditionally procured using the traditional procurement routes using the Design-bid Build format where lowest price is awarded the contract (He, 2015). The operation and maintenance of the infrastructure was also a government function. The procurement of infrastructure has particular challenges in public procurement, because it is highly complex, customized and often requires long term economic, political and social considerations (Snider and Rendon, 2008; Etache, Limi and Ruzzier, 2009).

In the last two decades there has been a global shift by most countries toward implementing non tradition procurement routes. The most popular of which the Private Public Partnerships. They are popular because it can achieve best outputs by mobilising private sector resources and competencies, and risk responsibility is moved to the private sector (Zhang, 2006). Different countries have different reasons for the shift. For example, the OECD countries already have an extensive infrastructure network. Their primary focus is on maintaining and rehabilitating its existing networks. In ASCE report in 2013, the water infrastructure in the country was in poor to fair condition. This infrastructure was below standard and approaching its end of service life in need of upgrade or expanding.

The current world economy has also forced traditionally wealthy countries to fight for ‘fiscal space’. Fiscal space is the space on their budgets that would normally accommodate infrastructural plans. This fiscal space has become scarce due to the austerity measures in place (Marcel, 2008). For the developing countries, the funding capability of governments cannot keep up with the demands. Developing countries need to develop these extensive networks in order for them facilitate the growth in terms of economy and population .In some

cases the International Funding Institutions require as a condition for funding that domestic spending be cut (Sohail, 2009).

Although many countries have adopted PPP as a default option for the provision of infrastructure, there are still problems with its successful adoption. For example a research, a research carried out in Malaysia scrutinised the PP implementation in the country. Although, the route had a few successful projects, its use was not widespread. The research findings indicated that lengthy delays, no government guidelines, higher participation charge and lack of political will were some of the barriers (Ismail and Harris, 2014). A similar research was carried out in India by International Institute for Sustainable Development in 2014 to debate the extent of success of PPPs in India. It was found that although India had one of the best policy and legal framework for PPPs there were other barriers. These barriers which mainly were linked to implementation which included administrative red tape causing delays, poor risk management, poor implementation of safeguards, financing and deal structuring, lack of capacities & competencies and most importantly the mind-set.

The use of PPPs in Asia in general is on a rise particularly in China with 35% of government spending on infrastructure. The Asia Development bank has predicted that 50% of its operations by 2020 will be spent on PPP infrastructure projects. The OECD (2007) stated that 3.5% of the global GDP will be spent on infrastructure. China also has the highest number of PPP water infrastructure projects accounting for a significant portion of the 885 water infrastructure PPPs around the world costing over \$78.18 million. Despite the use widespread use of PPPs in China research has found that there are still difficulties also with the competencies of the local government, immature regulatory framework, poor risk management, unstable and unpredictable economic conditions (Shrestha *et al.*, 2017).

The common thread of the use of PPP mainly has to do with financing. PPPs in theory are believed to have cost saving and provide value for money, better risk allocation and sustainability. According to the findings of Burger and Hawkesworth (2011) value for money is the driving force of the traditional route and is not necessarily the requirement for PPPs. Other factors influence the use of the PPPs such as financing, effective delivery of product and decision making. In the last decade there has been a line of research that is directly comparing the actual benefits of the traditional route versus the PPP route. These research have found that is significant savings in terms of cost and time but has found that in terms of Quality of the product or service could decrease as a result cost saving decisions made during construction of the asset (Flanagan, 2015; He, 2015; Sohail, 2009).

These new line of enquiry has also highlighted the need for procurement to evolve to meet the more complex projects being embarked upon. These complexities deal with issues such as the allowances for the changing technologies, security, cybersecurity, developments in risk management and a new perspective on whole life costing (Flanagan, 2015).

A common theme in the success of the PPP is effective risk management. Managing risk effectively is a critical success factor. The ability to manage risk through the whole life cycle of the project taking into consideration risk appetite, effective risk identification and information system. Another emerging line of concern in PPP infrastructure procurement is optimism bias. Optimism bias is when the concessionaire has an unrealistic optimistic projection of the earnings. This bias affects the ability of the private sector partner to effectively plan and execute the operation phase of the PPP which lasts 20 or more years

(Zhang, 2005; Estache and Saussier, 2014; Hewage, 2014; Fitch, Odeh and Ibbs 2015; Shrestha et al, 2017).

Another area of current interest is the sustainability. Sustainability in terms of the funding and sustainability in terms of use. Whole life cycle cost are now imperative in the procurement of infrastructure as the person constructing the infrastructure will now have to operate and maintain it for the long term. The IISD (2014) recommended that sustainable criteria and social criteria should form part of the evaluation criteria for PPPs. The recommendation was supported that found an effective social and environmental criteria during evaluation significantly reduced all categories of financial risk on the project.

2.7 Role of Communities in Procurement and Social Development

The Institute of Civil Engineers in 2005 commissioned a series of researches to investigate the role that engineers and the construction industry at large would play in the attainment of the MDGs. One of the studies investigated the possibility of modifying the way in which infrastructure projects are procured in low and middle income countries in order to enhance the delivery of social development objectives, in other words to investigate how procurement procedures could become vehicles to deliver social development through infrastructure projects. Five countries were taken as case studies, Nigeria being one of them. The research's common findings indicated that there were public procurement reforms underway in all the countries, limited mention of social development objectives made in standard bidding documents, social objectives mentioned in multi development bank bidding documents but not enforced, even minimal social obligations may not be met and new procurement strategies were needed to meet MDG targets and private participation. The research identified several factors that inhibited beneficial social impacts some of which was inflexible

procurement strategies, intense competition and selection based on lowest price (Hawkins and Wells, 2007; ICE, 2008). Hawkins and Wells (2009) argued that at this current time that the donor agencies were currently driving the procurement reforms and building capacity.

Procurement that involves the communities has been advocated for in many researches and its success has been documented. There is consensus among researchers that for any sort of project to be successful in its construction or other parts of its lifecycle the communities within which it is located must to be involved, the level of involvement is what is under dispute (Sohail and Baldwin, 2001; UNDP, 2003; Burra, 2005; Das and Takahashi, 2009; APMCHUD, 2010; FGN, 2010; FMWR 2010).

Research has shown that communities should be involved in the process mainly to avoid conflicts and demands for compensation, provide employment opportunities, improve skills and capacity of local people, shirking of contract less common, formalizes relationships, lack of capacity on the municipal to meet demands, political pressure, and less resources are expended (Khan and van Esch, 1999).

The strongest case for community involvement was put forward by Sohail and Baldwin (2001), they argued that if 3 core principles were put in place then the community could be contracted to carry out the works (construction and maintenance of the infrastructure) themselves. The principles were delegation of responsibility for the provision of infrastructure in low income settlements from government to end users, development of a sense of responsibility among end users for the maintenance and management of that infrastructure as a result of their involvement in its provision and finally a commitment from government to provide technical and financial support, training and information required by

the end users to carry out responsibility. In later research it was agreed that there are limitations on the input of the community without further training, the provision of funding and technical support (Sohail, 2007).

Communities are even more essential in Low income urban areas. According to Prahalad (2005) any person earning less than \$1,500 per annum is considered a low income earner and stated that at least 4 billion people worldwide are considered low income earners. Although other researchers do not quite agree with that four billion people are low income earners (Karnani, 2006; Landrum, 2007; Crabtree, 2007), there is a general consensus on a definition. The most widely accepted definition of poverty is any person that earns less than 2 dollars a day (UNMP, 2005).

The Nigerian Government in its vision 2020 policy document has defined an urban area as any area that has a population of over 200,000. Beall and Fox (2007) defined any community that has the following traits as a low income urban community; Reliance on a monetized economy, reliance on the informal economy, inadequate housing, insecurity of tenure, lack of access to basic services, vulnerability to disease, environmental hazards, social fragmentation, exposure to violence and crime and increasing experience of warfare and terrorism . Therefore any area that has these characteristics and a population of over 200,000 will be defined for the purposes of this research as an LIUA. The occupants of these areas are often referred to the urban poor. Research has shown that unity within these areas is necessary to achieve any form development (Belford, 2013; UNDP, 2004).

Also important is the composition of the communities and also the inclusion of the vulnerable members of the communities. For example research has suggested that there cannot be any

type of development without gender equality (Bandiera and Natraj, 2013; Muiru, 2008, Adogbo, 2013, UNDP, 2012). Women are the primary procurers and users of water in developing countries therefore it would be imperative that they play a more proactive role in its procurement (Francis, 2003; UNEP, 1993; Sandys, 2005).

According Chidi (2011), communities have indigenous governance. Indigenous governance is a social and political organization who makes decisions on behalf of their communities according to the imperatives of their unique cultures and world views. They are locally developed, controlled by local, elderly and experienced members of the communities (Chidi, 2011; Diaz-Cayeros, Magaloni and Ruiz Euler, 2013). In designing any social infrastructure framework, the cultural beliefs, practices, and interaction with the outside world should be taken into consideration (Bielaczyc, 2006).

Makwaila (2008) carried out research on the assessment of community participation in water and sanitation in Tanzania. The study found that participation approach leads to water project sustainability only when elements of project sustainability were considered at the early stages. Such elements included operational and maintenance costs, willingness of people to contribute and demands driven. Also capacity building was found to be significant, which included training of community water attendants, and formation of local community based committees or water user groups to carry over the project activities.

2.8 The Role of Women in the Procurement of Water

Over the past decades the role of the woman in sustainable development has been highlighted. Research has shown that women are the primary procurers of water and an average of 40 billion hours is used annually by women to procure water (OECD, 2012). The International

Conference on Water and the Environment Development Issues for the Twenty-first Century held in Dublin, 1992 has “principle 3” which states that “Women play a central part in the provision, management and safeguarding of water.” This principle is especially important for the developing world where millions of women lack access to water for their basic needs (Ray, 2007).

As a result of women’s position as primary procurer of water, they have amassed a considerable knowledge in water resources (UN, 2015). Chatroudry recognized the role of women and actively recruited women for their local knowledge about water and the community’s water needs. It increased technical quality of the water infrastructure.

2.9 Public Procurement in Nigeria

The importance of Public procurement cannot be overemphasised because of its role in the development process, the amount of resources it consumes, and its susceptibility to undue influences (Olusola, Oluwatosin, and Agboola, 2016). When the advent of the democracy in 1999, the government of the day understood that weaknesses in the existing procurement system were contributing to the nagging issue of corruption (Ekwekwuo, 2016; Jacob, 2010).

This prompted them to commission a World Bank Country Procurement Assessment Report which critically analyzed the country’s procurement practices against international best practice. The World Bank Study (1999) which covered institutional and organizational structures relating to the existing procurement regime found that:

- i. Proliferation and ineffectiveness of Tender Boards.
- ii. Lack of professionalism in the execution of the procurement functions.
- iii. Weaknesses in bank financed projects

- iv. Excessive deposit for opening of letters of credit.
- v. Lack of communication strategy.
- vi. Weaknesses in the export, import and tariff procedures.
- vii. Lack of streamlined quality control practices.
- viii. . Lack of knowledge in electronic procurement in the public sector.

The findings of the report highlighted the need to government for a modern and more efficient procurement system. The Budget Monitoring and Price Intelligent Unit (BMPIU) was created as a stop gap initiative initially designed to respond to this findings of the report. The unit was aimed at due diligence in government procurements and awards so as to facilitate fair deals for the government through price monitoring (Olusola et al, 2016). The goal of the BMPIU was to ensure full compliance with the laid down guidelines and procedures for the procurement of capital and minor capital projects as well as associated goods and services with the following objectives (Aduba, 2004):

- i. To determine whether or not Due Process has been observed in the procurement of services and contracts throughout the initiation and execution of such projects.
- ii. To introduce more probity, accountability and transparency into the procurement process.
- iii. To establish and update pricing standards and benchmarks for all supplies to the government.
- iv. To monitor the implementation of projects during execution with a view to providing information on performance, output, compliance with specification and targets in the area of cost, quality and time.

However, stop-gap had limitations which hampered its effectiveness such as the absence of legal framework; collusion by public officials, and most importantly the lack of clear role definitions and best international practice public procurement practices in line with global best practices so as to adequately ensure transparency, probity, accountability and openness (Adewole, 2014; Eze, 2015; Udoma & Belo-Osagie, 2012). Therefore, a more permanent reform measure was required. According to Ezech (2013) every reform should have the following essential components a diagnostic/baseline Study of existing systems with a view to addressing shortcomings; legal and institutional framework; implementation/evaluation of the system (Ezech, 2013).

The Public Procurement Act passed into law in 2007 and was aimed at ensuring transparency, minimization of wastages and leakages resulting from inefficiency in the award and execution of government contracts in Nigeria (Ibrahim, 2008). This was the first of procurement legislation in the country (Ibrahim, 2008; Fayomi, 2013; Ezech, 2014). The Law was based on the UN Commission on International Trade Law Model. The law was well received by the numerous stakeholders and described as ‘one of the most radical and commendable institutional reform agenda that the country embarked upon in recent years’ (Adewole, 2014).

The Act has 13 parts and 62 sections which was aimed at dealing exhaustively with all matters related to public procurement in an orderly and transparent manner (Ibrahim, 2008). The 13 sections dealt with establishment of the National council of Procurement, Establishment of the Bureau of Public Procurement, Scope of application, Fundamentals of Procurement, Organisation of procurement, procurements of goods and Services, Procurement of services, Special and Restricted Procurement, Procurement Surveillance and

Review, Disposal of Public Goods, Code of Conduct, Offenses and Miscellaneous (FGN, 2007).

The scope of the Act includes the Federal Government of Nigeria and all Procurement Entities including all entities outside the foregoing but which derive at least 35% of funds appropriated or proposed to be appropriated for any type of procurement described in the Act from the Federation Share of Consolidated Revenue Fund but with the exception of procurement of special goods, works and Services involving national defense, or national security unless the president's express approval had been first sought and obtained (FGN, 2007).

The primary goal of the public procurement Act 2007 is the "Establishment of National Council on Public Procurement and the Bureau of Public Procurement as the regulatory authorities responsible for the monitoring and oversight of public procurement, harmonizing the existing government policies and practices by the regulating, setting standards and developing the legal framework and professional capacity for public procurement in Nigeria, and for other related matters" (FGN, 2007).

Fayomi (2013) carried out a study to state the recorded achievements of public procurement system in Nigeria and his findings are as the following;

- i. Cancellation of the process for the award of over 250 Federal contracts found to have fallen short of Due Process Compliance (PPC) and a fresh procurement process compliant with the principles of openness, transparency, competition and right cost.

- ii. Reinstatement of many Nigerians and companies who rightly won public contracts by merit but were overlooked at the Government MDAs level and so elevation of the principle of competition.
- iii. The rebuilding of the confidence of average Nigerians in government conduct of public and financial activities
- iv. Good governance of public money and assets resulting in the reduction of corruption.
- v. More optimal resource allocation decisions to achieve clearly articulated public policy objectives through enhanced identification of the costs and benefits of alternative expenditure decisions.
- vi. Improved liquidity management of public funds.
- vii. Improved technical efficiency in managing and utilizing resources through improved information flows more relevant to decision responsibilities of managers.
- viii. Enhanced transparency and accountability of government, providing better historic information as a guide to the future.
- ix. Since the introduction of the policy in 2001, any MDA that did not exhaust its capital vote must return it to the government Consolidated Accounts at the end of the fiscal year.

Even with the recorded successes of the Procurement Act of 2007, there is consensus among researchers that although the procurement act was a step in the right direction, a lot of challenges have arisen in its implementation (Ibrahim, 2008; Ogunsami, 2013; Ezeh, 2014; Fayomi, 2013; Jibrin, Ejura and Augustine, 2014; Olusola, Oluwatosin and Agboola, 2016, NIQS, 2016; William-Elegbe, 2016).

The challenges that have been highlighted by research include the following;

- i. Political interference specifically in terms of
 - a. Failure to constitute the National Council on Public Procurement and the performance of several of its policy formulation and approval functions by the President, the cabinet and others.
 - b. Control of the Bureau through - Non-competitive selection and appointment of principal and other senior officers of the Bureau
 - c. Regular attendance of cabinet meetings by the DG, exposing him to political pressures (subtle, covert, and may be sometimes overt) through constant interaction with minister whose involvement in public procurement decisions the Bureau should regulate issuing of staff regulations, including conditions
- ii. Lack of trained procurement staff
- iii. Long bureaucratic process that slows down the procurement process
- iv. Corruption
- v. Non-compliance by MDAs
- vi. Lack of Corporate Governance and Organisational Cultures
- vii. Lack of community strategy
- viii. Inadequate projects definitions by the procurement entities,
- ix. Shortfalls in professionalism in projects packaging and supervision;
- x. Inadequate documents and documentation accompanying requests for certification,
- xi. Improper pricing system among others.
- xii. Probity and integrity issues dog procurement processes and decisions.
- xiii. Companies have now recognized that there are only two objective rationale for making a decision at the BPP; transparent, open and competitive process on the one

hand and lowest competent cost on the other with no recourse for quality. Which leads to unrealistic pricing of works.

In terms of the construction there were particular assumptions made by the Act that particularly affected its application and effectiveness in procuring value for money. The current procurement approaches has the following identified procurement approaches (Olusola et al., 2016):

- i. It is assumed that each project is procured on an individual basis
- ii. That vast majority of construction works currently undertaken are procured in a ‘one-off’ manner with each party trying to extract maximum reward for minimum risk.
- iii. Little thought is given to the form of supply relationships that must be adopted in the supply chain in order to satisfy client’s needs.
- iv. Parties are forced to start at the bottom of the ‘learning curve’ on a project by project basis.
- v. Certain key concepts/ principles are omitted and or not expressly stated in the act such as whole life cycle cost, value for money

In view of the foregoing, an Amendment of the Act became necessary. Williams-Elegbe (2016) stated was a need for the reassessment of the system in order to determine how to build the capacity necessary to properly manage and conduct the procurement process; as a result of the earlier stated assertion, the following amendments are recommended for evaluation and legislative purpose (Ibrahim, 2008; Ogunsami, 2013; Ezech, 2014; Fayomi, 2013; Jibrin, Ejura and Augustine, 2014; Olusola, Oluwatosin and Agboola, 2016, NIQS, 2016; William-Elegbe, 2016):

- i. Provision(s) to ensure non-interference of political appointees in the procurement process.
- ii. The inclusion of relevant construction stakeholders and/or professional bodies such as NIQS, NIESV, NIA in the National Council of Public Procurement (NCPP).
- iii. Provision(s) to accommodate the evaluation of tendered bid on ‘best value bid’ approach.
- iv. Provision(s) to allow for negotiated tendering, single source procurement and restricted tendering.
- v. Provision(s) to allow for ways of resolving a dispute that does often arise during the execution of a project.
- vi. Provision(s) to ensure effective monitoring of the procurement process to facilitate its efficiency and effectiveness and debar corruption or any behaviour inimical to the success delivery of such projects

The Amendment to the Procurement Act of 2007 has been passed its third reading at the National assembly in 2016. The above mentioned amendments have been implemented in the proposed law.

2.10 Procurement of Water Infrastructure

2.10.1 Water infrastructure

Water infrastructure can be classified as a hard infrastructure. It is also classified as both Economic and Social infrastructure as water is used in economic terms but also potable clean water is essential in the propagation of good health. Access to portable water supply and sanitation remain a basic human need to be satisfied in adequate quantities that meet the least

minimum health standards. Water has cross cutting effects that affect health (infant mortality, maternal mortality, and nutritional values), food security, poverty alleviation and ultimately access to water supply determines the quality of life (FGN, 2010; Bichi and Amatobi, 2013; Camae, 2013; UNDP, 2013). Consequently, the provision of water infrastructure is essential both in economic and social terms (ASCE, 2011).

Water infrastructure like other infrastructure in Nigeria has been procured using the traditional procurement which consist of a competitive tendering strategy, with government funding and contracting the firm with the lowest tender. Research has shown that this procurement strategy to be ineffective as targets have not been met in terms of the finished products and also in providing to the intended beneficiaries (UNDP, 2004; FGN, 2010).

Many different problems have been identified as why the current procurement strategies are ineffective for water infrastructure. The first identified sets of problems are those concerned with the funding of these projects and the capacity building. Government due to the sheer magnitude of the infrastructure required cannot afford it and simply government does not have the capacity in terms of expertise to construct and run this infrastructure (FMWR, 2000; Water Aid, 2006; Hawkins and Wells, 2007; Ezeji, 2009; FGN, 2010). In the current set up, the federal and state governments provide basic water facilities (water sources and storage) while the local governments are charged with its distribution to communities. This structure has come under some serious criticisms as the local governments handle the most exigent part of the water provision are the least equipped to handle such, in terms of trained manpower, inadequate funding and political interference (FMWR, 2000; Water Aid, 2006; ICRC, 2010).

Due to these particular set of problems the government turned towards PPP as a solution. The impediments of PPP included the need to have an effective regulatory body and also a clear and structured national policy (ICRC, 2009; NIAF, 2009a; ICRC, 2010). The essential component of best practice in regulating state owned and municipal water utilities stated by the UN is that sector regulation has to be embedded in an adequate and consistent institutional framework in order to have positive impact on performance (Berg, 2013). It also states that the regulatory system goes beyond the regulatory agency and the water utility provider to include the stakeholders that are in position to support, block or blunt reforms that would improve performance. Without broad institutional support even the most technically proficient regulator would fail. Thus ultimately a sound regulatory system requires coherence, creativity, real time collaboration consultation and credibility.

As a result the government set up the Infrastructure Concession Regulatory Commission (ICRC) as a regulatory body and drafted the national water supply and sanitation policy in January 2000 which was updated in 2004. This policy set out in clear terms the responsibilities of all the stakeholders' (federal, state and local governments) and had the objective to provide sufficient potable water and adequate sanitation to all Nigerians in an affordable and sustainable manner through participatory investment by the 3 tiers of government, the private sector and the beneficiaries (the communities) (FMWR, 2000).

ICRC within a few months of its inception commissioned inquiries into all abandoned projects to ascertain whether these projects would be viable using PPP. The report for the Dadin Kowa Dam highlighted another problem that was quite unique to the procurement of water infrastructure, the issue of pricing (How much to charge for providing a litre of water?) and cost reflective tariffs for some services (NIAF, 2009a). Research has shown that people

do not see water as a commercial product hence they are unwilling to pay for it (NIAF, 2009b). With low demand and high supply the price of the good then falls and this would mean that the concessionaire would be selling at a loss hence making it unattractive for most private investors. Other problems that could affect the applicability of PPP in this political interference, wastage of resources, lack of experience in PPP and availability of finance.

Despite all these shortcomings PPP provide the best chance for Nigeria to close its infrastructural gap and PPP is becoming more and more popular with varying degrees of success with the promise of a robust regulatory body and structure now in place. Relative merit of private sector of private sector participation in water and sanitation sector has been extensively debated (Sohail and Cavill, 2009). Water infrastructure is the least profitable and hence does not attract the private sector, hence limiting the government's application of PPP (OECD, 2003; NIAF, 2009). Networked water systems have extremely high capital costs, well in excess of other infrastructure services and are mostly financed with debt, for as long a term as is commercially available. Coupled with inadequate tariff structures has led to a shortfall in the provision of potable water infrastructure to the communities that can least afford it, as the private companies will only supply to the areas where profit can be made and the government on the other hand are incapable of providing it to the areas that are least able to pay for it (OECD, 2003).

The World Bank in its 2011 Water Sector Brief highlighted the following with as the major issues with the global water sector; Unsustainable and inefficient use, ineffective policies, deteriorating water quality, and excessive reliance on the public purse.

2.10.2 Nigerian water sector overview

According to the World Health Organisation, 1.8 million people die annually from water borne diseases; 90% being children less than 5 years old, with these deaths concentrated largely in developing countries such as Nigeria. About 194,000 of children under 5 years old die annually in Nigeria due to cholera, diarrhoea and other related water borne diseases, translating into the water-related death of 868 children on a daily basis in Nigeria (WHO, 2007).

Although Nigeria has adequate surface and ground water to meet its demands for potable water though the temporal and spatial distribution of water make it scarce in some locations especially in the North. Numerous efforts have been made by the three tiers of Government in Nigeria, External Support and donor agencies, to enhance potable water supply and sanitation to all citizens. However, there still exists a wide gap between the demand for, and supply of potable water (FGN, 2010, FMWR, 2003, FMWR, 2000).

The present national water supply coverage is about 57% consisting of about 60% for urban towns, 50% for semi-urban towns and 55% for rural areas. Also, the national average for sanitation is about 42%, the target coverage that government aims to achieve is 75% for urban areas. 70 million people in Nigeria are without access to potable water supply, this represents about 6% of the world's population who do not have access to safe drinking water (FMWR, 2007; Ali, 2012). According to Ali (2012) factors that are responsible for low access to safe drinking water include; Poor water supply infrastructure, poor technical capacity of communities to maintain water supply facilities and lack of appropriate regulatory framework on potable water supply.

Urban Population With or Without Access to Improved Sources of Water Services in Nigeria

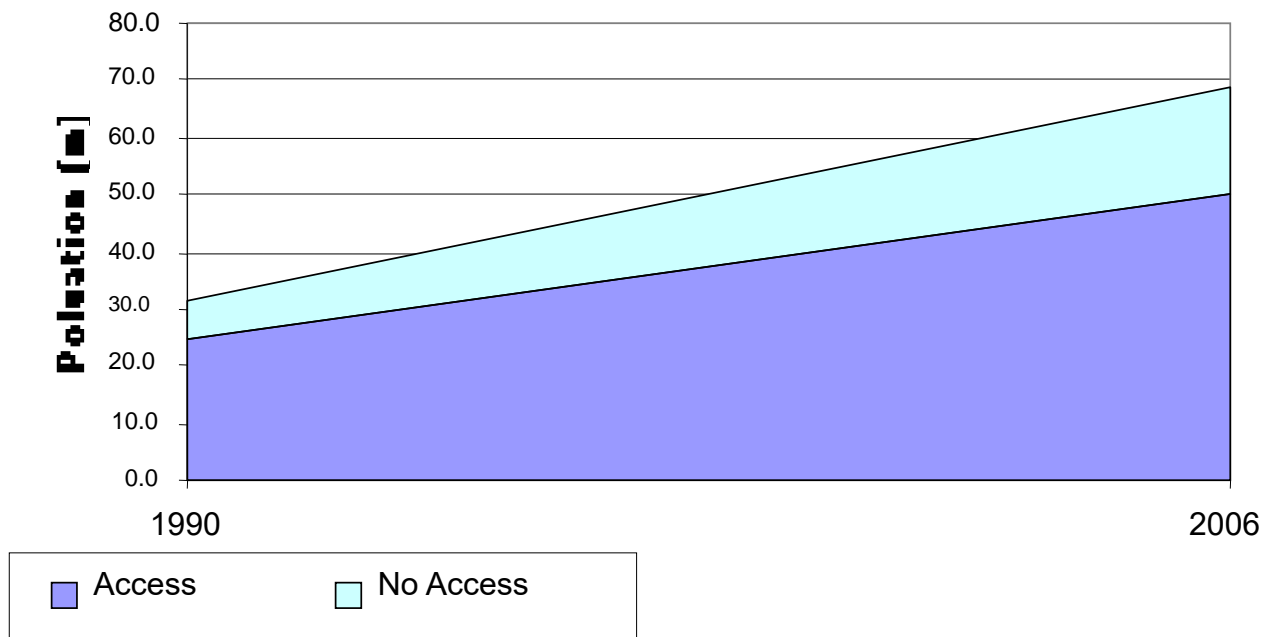


Figure 2.2 Urban Population with or without improved Water Services in Nigeria
Source: Ali, 2012

Under the current structure, the three levels of the Nigerian Government share responsibilities for the provision of water supply and sanitation.

The first level namely the federal level is the Federal Ministry of Water Resources who are responsible for formulating and coordinating national water policies, allocation of water resources between states and approving water resources development projects. The 12 River Basin Development Authorities are under the ministry and are in charge of planning and developing water resources, irrigation work and the collection of hydrological and hydro-geological data. They also provide multi-purpose dams which supply bulk water for potable

water supply. The national Water Resources Institute, also under the ministry, is responsible for training Professionals and technicians for the sector (FMWR, 2010).

The next level are the States whose responsibility for provision of potable water supply is vested in the State Water Agencies (SWA) created by the all the states of the federation and FCT for the purpose. Each SWA is established under an edict to develop and manage water supply facilities for urban and semi-urban areas within its respective state and to meet sound financial objectives. The SWAs are responsible to their State Government through the State Ministry of Water Resources or Public Utilities. Some States also established Small Towns Water Supply Agency and Rural Water Supply Agencies to cater for provision of water supply to small towns and rural areas respectively (FMWR, 2010).

At the Local Level, each local government has water supply and sanitation unit that is responsible for provision of rural water supply and sanitation facilities in their areas although they have limited resources and skills to shoulder the responsibility. This structure could not achieve the set goals as evidenced by the declining average from 47 % to the predicted 42 by 2020. (FMWR, 2007 FGN, 2010). The Nigerian water sector is being threatened by the following threats; urbanisation funding gaps, capacity building limitations, operations and maintenance inefficiencies, policy inconsistency and explosive population growth (Ezeji, 2009; Water Aid, 2006; FGN, 2010).

In view of the above, the Federal Government of Nigeria in 2000, embarked upon reforms in the water sector. The desired reform in the water resource sector is centred on a number of key imperatives (FGN, 2011);

- i. Harnessing the current and potential opportunities and addressing operational challenges within the water resources sector with a view to ascertaining the nature and level of investment required in the sector.
- ii. Ensuring the supply and utilisation of water in the country meets acceptable quality and standards.
- iii. Establishing the means to acquire, collate, manage and disseminate hydrological, hydro meteorological and hydro geological information for each of the river basins in Nigeria.
- iv. Harnessing the power generation potentials of dams across the country for better improvement.

Berg (2013) argued that sector regulation has to be embedded in an adequate and institutional framework in order to have any positive impact on performance. Getting the governance structure and the substantive actions right is essential. The need for an legal and institutional framework has also been echoed in similar research (Hawkins and Wells, 2002; Akbiyiki and Eaton, 2007; NIAF, 2009; ICRC, 2010; Ezeji, 2009; Water Aid, 2006; Sourani and Sohail, 2011; FGN, 2011; FMWR, 2000; FMWR, 2007).

The Federal Ministry of Water Resources then released their action plan targeted at strengthening the legal and institutional framework. The aim of the enabling legal framework is to ensure that;

- i. Water resources in the country are put to beneficial use to the optimum level
- ii. Ability to use Private funding and expertise

- iii. Funding from both Public and Private sector participation in the development of the water sector would be prudently managed in order to serve the best interest and welfare of the people
- iv. Indigenisation of the construction of hand pump
- v. Encourage partnerships with firms to build capacity and train local employees
- vi. Partnerships with ministries such as Education, Health etc.

For the high income areas and government reserved areas of the cities, the major sources of water supply are piped water. In middle income areas, the supply consist of yard taps, protected hand-dug wells and water tankers. For the low income areas, the vendors are often the only choice or open wells dug by individual householders (Bichi and Amatobi, 2013). Urban piped water is subsidized with flat rate tariffs kept low in order to make water available to the poor. The people who are actually benefiting from subsidized water are the relatively well-off people; the poor are generally not connected to a piped water supply (NBS, 2010). As a result many of the urban poor end up buying water from water vendors who charge them higher rates.

The quality of the water that is provided by these vendors is below acceptable standards (Bichi, 2013). The water quality falls into two categories – general water quality and drinking water quality. General water quality deals with raw water in its natural form that can support aquatic life as well as the ecosystem. Drinking water quality is raw water that has been treated and is of a quality fit for human consumption. Standards are required for all water, surface and ground water, in all of its uses in order to protect water as a usable resource (FMWR, 2000). Therefore, the reforms that are required not only have to improve the coverage of

water supply but also have to include improve the quality of the water to reach acceptable international standards.

In order to ensure the supply of improved and adequate water to communities within the design period of any water supply system, due consideration should be given by the designers and planners to the following parameters:

- i. **The population number:** A reliable forecast of the expected number of people utilizing this service is important. This can be extrapolated from the community document, also relevant is the growth rate and/ or any other factors that might affect the numbers to be served.
- ii. **Population served by type of borehole:** In the case of a hand pump; one hand pump serves 500 persons in emergency and 250 person in normal situation. For a mechanized borehole the number is 500 persons in normal situations and 800 persons in emergency situation (MDG,2007; ICRC, 2010).
- iii. **The Life cycle of components:** The life cycle of each component should be identified and their maintenance period agreed upon at the beginning of the design stage as the life span of the different components varies. For example, the life cycles of the components such as pipes are likely to be more durable than the pumps. The components should also be chosen based on the life cycle cost and how often they would need to be replaced. The designers should also take into consideration the special needs of this particular type of community which requires the borehole to be high usage and low maintenance. Boreholes could initially be designed for 20 years more or less; therefore the components should be designed for the same period with a regular replacement of components (ICRC, 2010).

- iv. **The per capita water demand:** The per capita daily water demand should be in line with the government development strategy. In Nigeria, the current daily water demand is set at 20 liter per capita per day (l/c/d). The Government of Nigeria aims to reach to 50 l/c/d by 2015. As achieving 50 l/c/d requires huge amount of budget allocation, it is advisable to maintain the minimum per capita of 20 l/c/d for some time to come in the future (FMWR, 2007).
- v. **The quality of water:** The quality of water (in terms of physical, chemical and bacteriological content) is very important as it has a significant impact on the population. Nigerian law requires that water must meet a minimum requirement, therefore the designers must comply. Tests must be carried out to test the fluoride, sulphate and nitrate content in the groundwater sources to ensure that the national standards are achieved. The tests must be done and the results acceptable before the borehole can be used by the community (Ince, Karaca and Onus, 2010; Akundu, 2011).
- vi. **Distance to improved water supply facilities:** there is consensus around the world that water sources should be situated within a certain distance from the community it serves. The International Red Cross states that the distance of the water supply facility should not be greater than 500m during emergencies and 1000m during normal times from community (ICRC, 2010). The United Nations as part of its Post MDG agenda stated that the water source should not be more than a 30 minute walk for the community (MDG, 2013). As the United Nations is universally accepted the research recommends that the distance from the water source should not be more than 1 mile from any member of the community. This based on the fact that an adult human can

walk 3 miles in an hour (Hausdorf Ashkenazy, Peng, Inanov, Stanley and Goldberg, 2001).

- vii. **Choice construction technology options:** An issue raised by the research is the sustainability of the process. Therefore without compromising the quality, quantity and sustainability of the system, a low-cost option should be prioritized. Several researchers have developed cheaper options for the construction of boreholes (Van der Wal, 2010; Danert, Carter, Adekile and Macdonald, 2009; Marechel, 2011).
- viii. **Geophysical Survey:** Borehole drilling must be preceded by a geophysical survey at the potential site to reduce the risk of encountering dry boreholes. Prior to this research no geotechnical tests are done. This new process makes it compulsory. These tests are important because they ensure the viability of the project.
- ix. **Hydro-geological classification of aquifers:** The knowledge of hydrogeological classification of aquifers in the various parts of the country and the quantity and quality of the groundwater in the various aquifers is vital (Nwanko, Danrimi and Nwanko,2011; Ince,2010; Marechel,2010) .

Potable Water Sources to Nigeria households include Treated Pipe Borne Water, Untreated Pipe Borne Water, Bore Hole, Hand Pumps, Protected Well/Spring, Unprotected Well/Spring, Rainwater, Streams/Pond/River/Rainwater and Tanker/Truck/Vendor. (NBS, 2010). The Table 2.5 shows clearly that the majority of urban dwellers acquire the water used for domestic uses from boreholes which accounts for close to 40% which is almost double the coverage of the next popular water source. It highlights the importance of boreholes in the provision of water, statistically it means every 2 out of 5 urban dwellers have boreholes

as their main source of potable water. Therefore the design of boreholes and their effectiveness is essential to a sustainable water source for these communities.

Table 2.5. Sources of water for domestic used in Nigeria’s urban areas as of 2011

Characteristics of water supply sources	Percentage Urban coverage
Pipe into dwelling	16.9
Pipe to yard/plot	3.7
Public tap/stand pipe	0
Borehole	39.8
Protected well / spring	18.2
Rain water	0.7
Bottled water	6.0
Unprotected well / spring	5.1
Tank truck / cart & small tank	5.5
Surface water (river/lake/pond/stream/dam)	4.7
Others	6.0
Total	100.0

Source; NBS, 2012

According to the ICRC (2010), at the design of the borehole aims to achieve the following:

- a. **Structural stability to prevent borehole collapse:** The design will depend on the stability of the aquifer strata. For example, a borehole in fissured hard rock need only be cased over the thickness of the overburden. The remainder can be left open, as the formation will not require support. A borehole in unconsolidated formations will, however, require casing and screens to prevent collapse.
- b. **Prevention of ingress of fine material:** Fine material (such as sand) in the water is undesirable. It may damage the pump and it will silt up the well. Therefore a combination of screens, gravel packs or geotextiles are used to prevent material from the aquifer formation entering the borehole.

- c. **Low hydraulic resistance to flow into the borehole:** Resistance to flow of water from the aquifer into the well will restrict well yield. The correct screen length, position, slot size of aperture and material will minimize losses due to friction, encrustation and corrosion. It is necessary to ensure that the screen is placed against the proper aquifer zone.
- d. **A reasonable lifespan:** A borehole should last for 20-30 years, and many last longer. The correct selection of casing/screen materials should ensure that the borehole will not collapse or severely corrode within that time.
- e. **Good quality water:** The borehole must be sealed at the top to prevent surface water from contamination by the borehole water or saline water from saline zone. This is usually achieved with a cement slurry or cement/bentonite grout seal.

Another line of action would be to involve the communities. If the communities are educated on the value of water then they would be more willing to pay for it. Research has also learned that in instances where communities are involved in the procurement of infrastructure they are more prone to be involved in its maintenance (Sohail, 1999; Sohail and Baldwin, 2001; UNDP, 2001; Hawkins and Wells, 2007; Kajimo-Shakantu and Root, 2007).

CHAPTER 3

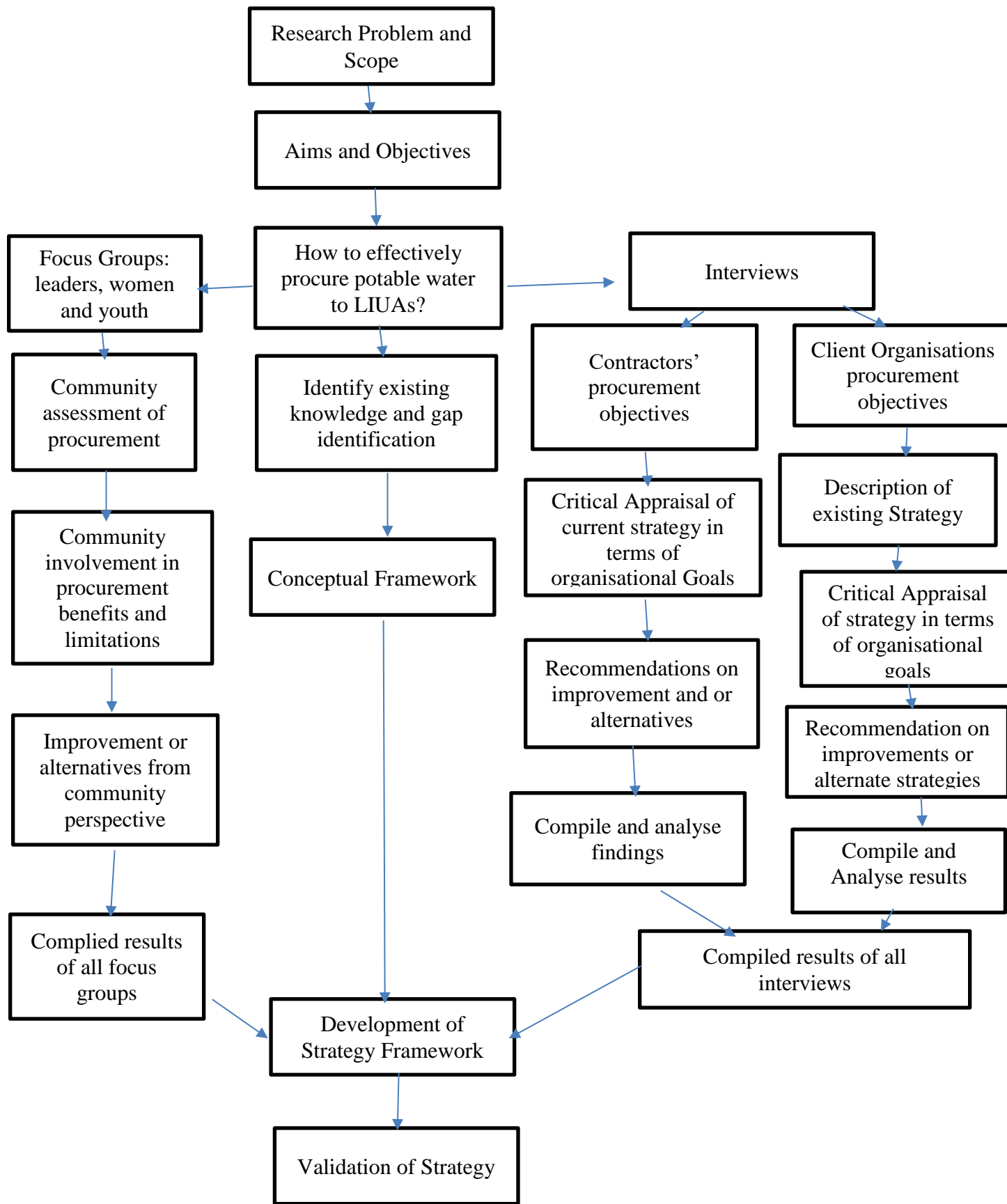
3.0 METHODOLOGY

3.1 Research Philosophy

There are three main reasons why the exploration of philosophy is imperative in terms of research methodology (Easterby-Smith and Thorpe, 1997). These are:

- i. It helps refine and specify the research methods to be used to clarify the overall research strategy to be used
- ii. It will enable and assist the researcher to evaluate different methodologies and avoid the use of those inappropriate for the research to be carried out
- iii. It may help the researcher to be creative and innovative in either selection or adoption of methods previously used.

Figure 3.1 shows the schematic diagram of the research undertaken and is based on the research carried out by Ojo in 2011.



3.2 Research Paradigm

Denzin and Lincoln (2003) describe a research paradigm as ‘an interpretive framework’. For this research there are 2 main philosophical considerations for this research, Ontology and Epistemology.

Ontology is defined as ‘the science or study of being’ and in the social sciences is believed to encompass ‘claims about what exists, what it looks like, what units make it up and how these units interact with each other’ (Blaikie, 1993). It is defined by the School of Philosophy of University of Aberdeen (2007) as “the branch of Metaphysics which studies the nature of existence”. Ontology defines our perceptions on the nature of reality that is whether there exists an objective reality or whether our reality is subjective as perceived by our minds.

It follows then that each person has a number of deeply embedded ontological assumptions which will affect how we view what is real and whether we are more inclined to attribute the meanings behind each phenomenon to one thing over another. Therefore it is necessary that each and every underlying assumption be identified and considered, as if not the researcher may be blinded to certain aspects of the investigation or certain phenomena, since they are implicitly assumed, taken for granted and therefore not opened to question, consideration or discussion (Smith, 2003).

Epistemology is defined as the branch of philosophy that deals with the nature, origin and scope of knowledge (Crossan, 2003). Epistemology considers views about the most appropriate ways of enquiring into the nature of the world (Easterby-Smith, Thorpe and Jackson, 2008) and ‘what is knowledge and what are the sources and limits of knowledge’ (Eriksson and Kovalainen, 2008). Blaikie (1993) describes epistemology as ‘the theory or science of the method or grounds of knowledge’ expanding this into a set of claims or

assumptions about the ways in which it is possible to gain knowledge of reality, how what exists may be known, what can be known, and what criteria must be satisfied in order to be described as knowledge.

3.2.1 Philosophical Position of Research

The two contrasting epistemologies are the positivist and interpretivists (also known as post positivism and phenomenological).

Post Positivism; Post positivism argues that there is a fundamental difference between the subject matters of natural and social sciences. In the social world, individuals and groups understanding of situations are based upon their individual experience, memories and expectations. Meaning therefore is constructed and (over time) constantly re-constructed through experience resulting in many differing interpretations (Crossan, 2003).

As the social world is subjective, according to this paradigm, the different interpretations of individuals create the collective social reality. Under this paradigm, therefore, it is seen as important to discover and understand these meanings and the contextual factors that influence, determine and affect the interpretations reached by different individuals (Denzin and Lincoln, 2003). Since Post Positivism believes that knowledge is subjective, it aims to make sense of, draw meaning from and create their realities in order to understand their points of view, and to interpret these experiences in the context of the researcher's academic experience (Hatch and Cunliffe, 2006).

The study adopts the post positivism epistemological position. The research is primarily dependent on the perceptions, experiences and the expertise of the different stakeholders. It

then uses the data collected to create a more effective strategy. It seeks to achieve a better understanding of the process in order to improve it.

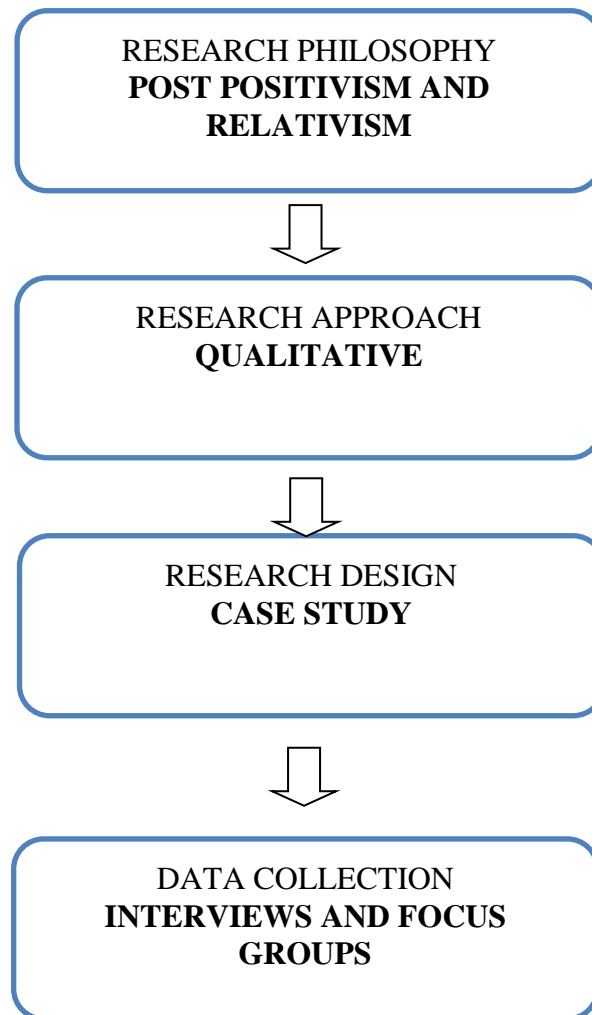
Relativist

The Ontological considerations are Realist view or the Relativist view .Relativism argues that since any such external world is inaccessible to us in both principle and practice, it need not be postulated or considered (Cromby & Nightingale, 1999). According to Westacott (2005) although there are many different kinds of relativism, they all have two features in common.

- i. They all assert that one thing (e.g. moral values, beauty, knowledge, taste, or meaning) is relative to some particular framework or standpoint (e.g. the individual subject, a culture, an era, a language, or a conceptual scheme).
- ii. They all deny that any standpoint is uniquely privileged over all others.

The research adopted the relativist ontological position. The research undertakes an analysis of the effectiveness of the current procurement strategy which takes the different perspectives of the different stakeholders. It allows the contextualisation of the research.

3.2.3 Overview of the Research



3.3 Research Approach

The two approaches to research are the qualitative and quantitative. Qualitative research is orientated towards analysing concrete cases in their temporal and local particularly starting from people's expression and activities in their local contexts (Flick, 1998). Qualitative research puts emphasis on understanding the 'why', not the 'how' of its topic through the analysis of unstructured information. Qualitative research is used to gain insight into people's attitudes, behaviours, value systems, concerns, motivations, aspirations, culture or lifestyles

(Ibrahim, 2007; Tobin, 2006; Denzin and Lincoln, 2003). Quantitative Research is the analysis of phenomena which is based on measuring or counting. Methods of data collection include surveys, content analysis and experiments where the data collected are numerical and the methods of analysis are statistical (Holliman 2009).

Table 3.1 Comparison of Qualitative and Quantitative Research

Characteristics	Qualitative research	Quantitative research
Purpose	<ul style="list-style-type: none"> To describe and explain To explore and interpret To build theory 	<ul style="list-style-type: none"> To explain and predict To confirm and validate To test theory
Objective	<ul style="list-style-type: none"> Study issues in-depth and detail and seeks to gain insight and understand people's perceptions 	<ul style="list-style-type: none"> Gather factual data and study relationships between facts and relationships in accordance with theory
Theory	<ul style="list-style-type: none"> Theory can be causal or non-causal and is often inductive – concerned with development of theory from specific instances 	<ul style="list-style-type: none"> Theory is largely causal and is deductive - associated with verification of theory and hypothesis testing
Process	<ul style="list-style-type: none"> Holistic Unknown variables Flexible guidelines Emergent design Context-bound Personal view 	<ul style="list-style-type: none"> Focused Known variables Established guidelines Statistic design Context free Detached view
Research Procedures	<ul style="list-style-type: none"> Research procedures are particular, and replication is very rare 	<ul style="list-style-type: none"> Procedures are standard, and replication is frequent
Data Collection	<ul style="list-style-type: none"> Informative, small sample Observations, interviews, documents 	<ul style="list-style-type: none"> Representative, large sample Standardized instruments – questionnaires, laboratory experiments, etc.
Data characteristics	<ul style="list-style-type: none"> Soft data, descriptive, less structures, analysed using non-statistical methods 	<ul style="list-style-type: none"> Hard data, structured, large sample size, analysed using statistical methods
Data Analysis	<ul style="list-style-type: none"> Analysis proceeds by extracting themes or generalizations from evidence and organizing data to present a coherent, consistent picture. 	<ul style="list-style-type: none"> Analysis proceeds by using statistics, tables, or charts and discussing how they show relates to hypothesis
Reporting Findings	<ul style="list-style-type: none"> Words Narratives, individual quotes Personal voices, literary style 	<ul style="list-style-type: none"> Numbers Statistics, aggregated data Formal voice, scientific style
Outcome	<ul style="list-style-type: none"> Exploratory and/or investigate and findings are contextual 	<ul style="list-style-type: none"> Conclusive findings used to recommend a course of action
Strengths	<ul style="list-style-type: none"> Data gathering methods seen as natural than artificial Ability to look at change process over time Ability to understand people's meaning Contribute to theory generation 	<ul style="list-style-type: none"> Provide wide coverage of the range of situations Fast and economical Where statistics are aggregated from large samples, they may be considerable relevance to policy decisions
Weaknesses	<ul style="list-style-type: none"> Data collection can be tedious and require more resources Analysis and interpretation of data may be more difficult Harder to control the pace, progress and end-points of research process 	<ul style="list-style-type: none"> Tend to be rather inflexible and artificial Not very effective in understanding process Not very helpful in generating theories

Source: Ibrahim, 2007

Triangulation was also used in the research. Triangulation refers to the use of more than one approach to the investigation of a research question in order to enhance confidence in the ensuing findings (Ibrahim, 2007). Most social research is founded on the use of a single research method, and as such may suffer from limitations associated with that method or from the specific application of it. Triangulation offers the prospect of enhanced confidence (Bryman, 2011). Triangulation as a strategy is used for confirming results and to demonstrate how findings are based on information acquired from multiple sources (Hancock, 2006). It allows the research to follow more chains of evidence and have multiple views from the different sources. Consequently, the research will have the advantages of both approaches and minimize their weaknesses.

Denzin (1970) extended the idea of triangulation beyond its conventional association with research methods and designs. He distinguished four forms of triangulation:

- i. *Data triangulation*, which entails gathering data from different data sources so that collation of different data collected at different times and in different social situations provide a richer and more robust research.
- ii. *Investigator triangulation*, which refers to the use of more than one researcher in the field to gather and interpret data.
- iii. *Theoretical triangulation*, which refers to the use of more than one theoretical position in interpreting data
- iv. *Methodological triangulation*, which refers to the use of more than one method for gathering data.

Data triangulation and methodological triangulation was used in this research to increase the validity of the findings of research. Data triangulation is evident in the use of the different

sources of data collected i.e. the community, the contractors and the client organization. Methodological triangulation was used in the use of Focus groups, Interviews and the Revalidation Questionnaires.

3.4 Research Design

Different Researchers have looked at different designs (Miles and Huberman, 1994; Cavaye, 1996; Darke, Shanks and Broadbent, 1998; Hussey and Hussey, 1997; Powell, 1997; Leedy and Ormrod, 2001). The designs include an experiment, surveys (often used where large volumes of data are involved with quantitative methods of analysis), grounded theory, ethnography, action research, modelling, operational research, and finally, case studies (UOB, 2008).

3.4.1 Case study

Yin (1994) defined a case study as “an empirical inquiry that investigates a contemporary phenomenon within its real-life context.” A case study offers an opportunity to study a particular subject, in depth, or a group of people, and usually involves gathering and analyzing information; information that may be both qualitative and quantitative. Case studies can be used to formulate theories, or be:

- i. Descriptive; where current practice is described in detail)
- ii. Illustrative; where the case studies illustrate new practices adopted by the subject of the research)
- iii. Experimental; where difficulties in adopting new practices or procedures are examined)
- iv. Explanatory; where theories are used as a basis for understanding)

The research carried out is Descriptive in nature, as it looked at what the current practice was for the Procurement of Water Infrastructure to LIUAs. It described in detail what the current processes were and how effective the current procurement strategy at achieving the pre-set goals.

This research project was conducted based on the guidelines as supplied by Myers (1997) who suggested the case study method should involve at least four stages of work:

- i. Determining the present situation: achieved through the semi-structured interviews
- ii. Gathering information about background to the present situation: in this study achieved through interviews (pilot study) and literature review.
- iii. Gathering more specific data: achieved through further interviews, and focus groups
- iv. Presenting an analysis of findings and recommendations for action: achieved through the production of the final research report.

Three case studies were conducted for the research. This was aimed at increasing validity and improving the richness of the findings. Another reason was that Yin (1994) suggested that the use of only one case can be justified if at least one of the following criteria is met and none of the criteria were met;

- i. The case is a critical one for confirming, challenging or extending a theory, because it is the only one that meets all the conditions
- ii. The case is rare or extreme and finding other cases is highly unlikely
- iii. The revelatory case provides unusual access for academic research.

3.5 Sampling

A sample is “a smaller (representative) collection of units from a population used to determine truths about that population” (Field, 2005). Due to the sizes of the population under

research it becomes necessary due to costs and other constraints to take a sample of the population. Generally in qualitative studies, samples are generally much smaller than those used in quantitative studies. Studies have highlighted that for qualitative research there is a point of saturation. Saturation is a point of diminishing return to a qualitative sample, more data does not necessarily translate to more information (Guest, Bunce and Johnson, 2006). Due to the nature of the data collected, one occurrence of a piece of data or a code, ensures that it becomes part of the analysis framework (Mason, 2010). Frequencies are rarely important in qualitative research, as one occurrence of the data is potentially as useful as many in understanding the process behind a topic. This is because qualitative research is concerned with meaning and not making generalised hypothesis statements (Flick, 2002; Mason, 2010; Crossman, 2016).

Research carried into the saturation point of non-probability qualitative research has recommended that six (6) interviews is sufficient to provide sufficient information (Guest, Bunce and Johnson, 2006; Morse, 1994, Nielsen and Landauer,1993). Couch and Mckenzie (2006) advocated for smaller qualitative samples. Recommending less than 20 samples per research. Sampling strategies are divided into two main groups: **probability** and **non-probability sampling**.

Table 3.2 Sampling Strategies

Probability Sampling	Non-Probability Sampling
<p>Where the researcher has a significant measure of control over who is selected and on the selection methods for choosing them. Sampling methods allow for representative cross-sections, or particular groups to be identified or targeted.</p> <p>Main Methods:</p> <ul style="list-style-type: none"> ➤ Simple Random Sampling: (selection at random by the researchers from a choice of subjects) ➤ Systematic Sampling: (selecting by the researchers at numbered intervals, e.g. every one person in five in the target group) ➤ Stratified Sampling: (sampling within particular sections of the target groups, e.g. you target a specific number of people based on the percentage of the total group that share the same characteristics. Cluster Sampling: (surveying a particular cluster of the subject group) 	<p>Where the researcher has little initial control over the choice of who is presented for selection, or where controlled selection of participants is not a critical factor.</p> <p>Main Methods:</p> <ul style="list-style-type: none"> ➤ Convenience Sampling: (sampling those most convenient; those immediately available) ➤ Voluntary Sampling: (the sample is self-selecting; they come forward voluntarily in response to an appeal) ➤ Purposive Sampling: (enables you to use your judgment to choose people that are presented or are available that best meet your objectives or your target groups). ➤ 'Snowball' Sampling: (building up a sample through informants. You start with one person – who then suggests another & so on) ➤ Event Sampling (using the opportunity presented by a particular event, e.g. a conference, to make contacts) ➤ Time Sampling (recognizing that different times or days of the week or year may be significant and sampling at these times or days).

Source: University of Bradford, 2008

Non probability sampling was used for this research due to the size of the Population and the nature of the data that was required for the research. Within the parameters, purposive sampling provided the best sample for this research. The case studies chosen allowed the researcher to explore the diversity of the cultures of the focus groups.

3.6 Population

The population for this research were the stakeholders of the water infrastructure procured by the Ministry of Environment for the Millennium Development Goals Nigeria in order to fulfil Goal 7 in areas that have been deemed Low Income Urban Areas in Nigeria. The population was made up of three distinct groups; the contractors, client organisations, and the communities. Each component population was sampled. The Millennium Development

Goals in Nigeria by the end of 2012 had procured 8,481, 850 water infrastructure consisting solar powered boreholes, hand pump boreholes, motorised boreholes and small town water supplies. The water infrastructure type procured for the areas identified as LIAUs were motorised and solar powered boreholes. The number of borehole beneficiary communities in this population is 193 spread over 18 states of the Federation.

Three samples were collected from 3 different populations. The first sample population was for the Client Organisation. Only 2 public bodies were in this population namely Federal Ministry of Environment and MDG Nigeria (Office of the Senior Special Advisor to the President on MDGs). Both organisations are represented.

The second population was the Contracting Firms. The total population was 76 firms. A sample of 6 was used in this research in line with stated saturation point of qualitative research. The third population was the communities. The population size was 193. A sample of three (3) communities was chosen with (8) participants in each focus group. The total participants were twenty four (24) people. The communities were chosen primarily to reflect three (3) distinct cultures to ascertain whether there were cultural dimensions.

3.7 Data Collection Methods

Data collection is the process of gathering and measuring information on variables of interest, in an established systematic fashion that enables one to answer stated research questions, test hypotheses, and evaluate outcomes (University of Northern Illinois, 2005). All research carried out has an element of data collection regardless of what field the research is being carried out, data collection is essential. While methods vary by discipline, the emphasis on

ensuring accurate and honest collection remains the same (Ibrahim, 2007; Tobin, 2008, Gill et al, 2008).

3.7.1 Interviews

The purpose of the research interview was to explore the views, experiences, beliefs and/or motivations of the Contractors and the Client representatives on the effectiveness of the current strategy and possible improvements. Qualitative methods, such as interviews, are believed to provide a 'deeper' understanding of social phenomena than would be obtained from purely quantitative methods, such as questionnaires (Gil, 2008). Semi structured interviews were used by the researcher whom had a set of standardized questions and areas to be covered. The interviewer was allowed to omit or add to some of these questions or areas, depending on the situation and the responses of the interviewee. The advantage of this data collection technique for this research was it usually yield richest data, details, new insights, allowed in-depth exploration of issues. It allows the interviewer to experience the affective as well as cognitive aspects of responses, provided the interview an opportunity to explain or help clarify questions, and finally allowed the interviewer the flexibility to change the style of administration for each interviewee. The disadvantage of interviews include a large volume of information that make it difficult to transcribe or attribute to the research, may be influenced by interviewees.

Two groups were interviewed for this study. Group A was the client organisations and Group B were the contractors. The semi structured interviews questions were as follows;

Group A

- i. Kindly state your profession, role in your organisation and your years of experience in the water sector.
- ii. Please give a detailed explanation of the current strategy and process used to procure water infrastructure in low income urban areas with particular reference to the stages and the activity flows.
- iii. What were your organisational objectives in this particular procurement strategy?
- iv. Provide a critical analysis of the effectiveness of the current strategy in achieving your organisational objectives? Particularly mentioning strengths and weaknesses of the current strategy.
- v. What possible improvements or alternatives do you recommend should be made to improve the current strategy?

The questions for group B; Contractors were as follows;

- i. Kindly state your profession, role in your organisation and your years of experience in the water sector.
- ii. Are you aware of the government procurement strategy for the provision of water to low income urban areas?
- iii. What were organisational objectives in this particular procurement strategy?
- iv. Please critically appraise the effectiveness of this strategy in terms of achieving your organisational objectives? With particular emphasis on its strengths and weaknesses.
- v. What the proposed improvements or alternatives you would recommend to the current procurement strategy?

3.7.2 Focus Groups

A focus group is a group discussion on a particular topic organized for research purposes. This discussion is guided, monitored and recorded by a researcher who plays the role of moderator or facilitator (Gil, 2008). Focus groups can be a useful way of finding out what the main issues and concerns of any group are. The interactions within the group help bring up issues that would not ordinarily have come to light if it were in single interviews i.e. the group dynamics can in some cases make people audacious in articulating their opinions (UOB, 2008).

Focus groups are used for generating information on collective views, and the meanings that lie behind those views. They are also useful in generating a rich understanding of participants' experiences and beliefs (Morgan, 1998) Suggested criteria for using focus groups include (Bloor et al, 2001, Gil, 2008; UOB, 2008):

- i. As a standalone method, for research relating to group norms, meanings and processes
- ii. In a multi-method design, to explore a topic or collect group language or narratives to be used in later stages
- iii. To clarify, extend, qualify or challenge data collected through other methods
- iv. To feedback results to research participants.

Focus groups were conducted in Anambra, Kaduna and Ogun States with communities identified as living in Low Income Urban Areas that had been beneficiaries of Boreholes procured by the Ministry of Environment on behalf of the MDGs. The focus groups were used essentially to examine the current role of communities in the procurement process, what

roles they played in the effectiveness of the strategy, impact of social cultural objectives of procurement, their assessment of the success of the strategy, and their role in improving achievement of procurement goals

The teams were consisted of eight (8) members each. According to Elliot (2005), the ideal number of participant of focus groups. Eight people generate sufficient discussion but does not allow some participants to feel left out. Each group had representatives of the 3 core groups identified by literature. These groups were community leaders, women and youth.

3.7.3 Questionnaires

Questionnaires are the most popular data collection technique in Social Science research (Bryman, 2001). The different types of questionnaires provide flexibility that many researchers find attractive. The flexible nature of the Questionnaire is that the questions can be open (a question is posed, but space is left for the respondent's own answer) or closed (where a limited number of alternative responses to the set question are provided) (Ibrahim, 2007).

Questionnaires were used in this research to validate the strategy. The industry validation which was aimed at the validation of the aim and objectives of the Strategy, usefulness of the Strategy to achieving the goals of each respective stakeholder and the industry in general, the structure, philosophy and approach to the Strategy, the key elements in the major issues which are essentially important to the content of the Strategy. Advantages of using this technique in this context include it is relatively easy to administer, can cover the different parts of the strategy and can be analysed in a multitude of ways. Twenty (20) questionnaires were administered by the Researcher in person and over the telephone. The respondents were representatives of the communities, contractors, client representatives and engineers with

experience in the water engineering industry. Ten (10) of the respondents had participated in the interviews and focus groups.

3.8 Analysis

Content analysis is a widely used qualitative research technique. Rather than being a single method, current applications of content analysis show three distinct approaches: conventional, directed, or summative. . The major differences among the approaches are coding schemes, origins of codes, and threats to trustworthiness. The three major types according to Hsieh (2005), are as follows;

- i. Conventional content analysis, coding categories are derived directly from the text data.
- ii. Directed approach, analysis starts with a theory or relevant research findings as guidance for initial codes.
- iii. Summative content analysis involves counting and comparisons, usually of keywords or content, followed by the interpretation of the underlying context.

The researcher used a comparative content analysis (Summative content analysis) for the interviews and focus groups. A prerequisite for successful content analysis is that data can be reduced to concepts that describe the research phenomenon (Cavanagh, 1997; Elo & Kyngäs, 2008; Hsieh & Shannon, 2005). Usually, some aspects of the process can be readily described, but it also partially depends on the researcher's insight or intuitive action, which may be very difficult to describe to others (Elo & Kyngäs, 2008; Graneheim & Lundman, 2004)

For the analysis of the validation questionnaire an arithmetical mean was used. The questions were rated on a scale of 1-5, where 1- strongly disagree and 5- Strongly agree. For the purposes of the research a weighting of over 3.50 is favourable meaning that majority of the responders agreed with the statement.

3.9 Ethical Considerations in Research

Ethical concerns may emerge at all stages of research. Saunders, Lewis and Thornhill (2003) outlines the main issues to consider, although the ethical issues surrounding these items are not always clear-cut. Therefore, special care was taken to ensure that the ethical considerations were adhered to including;

- i. The rights of privacy of individuals were recognized
- ii. Voluntary nature of participation –the individuals had a right to withdraw partially or completely from the process
- iii. Clear consents of the participants were sought at the beginning of the interviews and focus groups.
- iv. Maintenance of the confidentiality of data provided by individuals or identifiable participants and their anonymity
- v. The participants were informed that the interviews and focus groups would be taped and they were asked for permission.
- vi. The researcher behaved politely and mindful of the cultural norms of the communities and tried to maintain objectivity throughout the process.

CHAPTER 4

4.0 EVALUATION OF CURRENT PROCURMENT STRATEGIES FOR THE PROVISION OF POTABLE WATER INFRASTRUTURE TO LOW INCOME URBAN AREAS IN NIGERIA

4.1 Evaluation of Current Strategy by Client and Contracting Organisations

4.1.1 Characteristics of Interviewees

4.1.1.1 Client Organisations

Group A consists of members of the MDG unit of the Federal Ministry of Environment. The interviewees are in charge of all water infrastructure procured on behalf of MDG in any part of Nigeria. The interviewees have educational backgrounds in relevant water engineering (water and civil engineering) and development economics. Each of the engineers had been in practice for over 10 years. The interviewees were all interviewed individually. It should be noted that only one interviewee (the Head of the MDG water unit) was directly responsible for the procurement of water infrastructure for all MDG projects therefore his perspective was particularly rich in detail. Due to the fact that he was the only participant in all stages of the process. The characteristics of the interviewees in terms of their background profession, organisation and rank are shown in Table 4.1.

Table 4.1 Overview of Group A

S/No	Rank	Background profession	Organisation
1	Head, Water Projects, MDG unit	Water Engineering	FME
2	Chief Engineer	Water Engineering	FMWH &UD
3	Technical Assistant	Development Economics	MDG
4	Field officer	Civil engineering	FME

Source: Field Survey (2013)

4.1.1.2 Contracting Organisations

The second group consists of the contractors. All the contractors have over 5 years of experience in the water engineering sector. All the interviewees were interviewed individually. The characteristics of the interviewees in terms of their background profession, organisation and rank are shown in Table 4.2.

Table 4.2 Overview of Group B

S/No	Rank	Background profession	Organisation
1	Managing Partner	Water Engineering	Contractor A
2	Managing Director	Water Engineering	Contractor B
3	Managing Director	Civil Engineering	Contractor C
4	Managing Partner	Quantity Surveying	Contractor D
5	Managing Director	Civil Engineering	Contractor E
6	Managing Director	Engineering	Contractor F

Source: Field Survey (2013)

Due to the fact that strategic issues are dealt with by the highest level of management, it became imperative that the managing partners of the contractor firms were interviewed. The initial interview sessions lasted on average 60 minutes and the follow up interviews lasted 20 minutes.

4.1.2 Evaluation of Current Strategy by Client and Contractor Organisations

In analysing the interviews using the constant comparative analysis principles, the opinions of the participants have been homogenised but where necessary, the opinion of a specific interviewee or group of interviewees are highlighted. In complying with the confidentiality

requirements, the researcher has, as much as possible, tried to keep the identities of the interviewees anonymous.

4.1. 3.1 Client Organisation

i. Current Strategy for the Procurement of Water

Currently, the only bodies mandated to procure water for the Nigerian Population are the various levels of the Government including low income urban areas (peri urban areas). The proposed reforms to the current water sector legislations make provision for private organisations to provide water.

Until these new reforms become law, only one strategy is used for the procurement of water to these areas. The strategy used for the procurement of water to LIUAs is the traditional route based on competitive tendering. Elements of this strategy include government funding, lowest price criteria for tender, significant contractor risks and the use of the traditional procurement route.

The current aim of the strategy is to provide good quality infrastructure within a specified period (usually 8 weeks) at a specified price. The basic criteria of the strategy are that it should fulfil cost, quality and time objectives. Although some mention is made of the social criteria but it implied that the social criterion is the provision of the product itself.

Boreholes are primarily the infrastructure provided into these areas. Due to the fact that these areas are mostly unanticipated, they do not form part of the master plan and therefore there are no plans for the expansion of the current infrastructure into these areas. Boreholes provide an easier and immediate solution to the problem. The type of borehole provided depends on the geographical location, capacity required, the depth proposed, and allocation.

ii. Model of Current Procurement Process.

From the data collected from the interviewees a model of the process was developed. Figure 4.1 shows the current procurement process for the provision of potable water infrastructure (Boreholes).

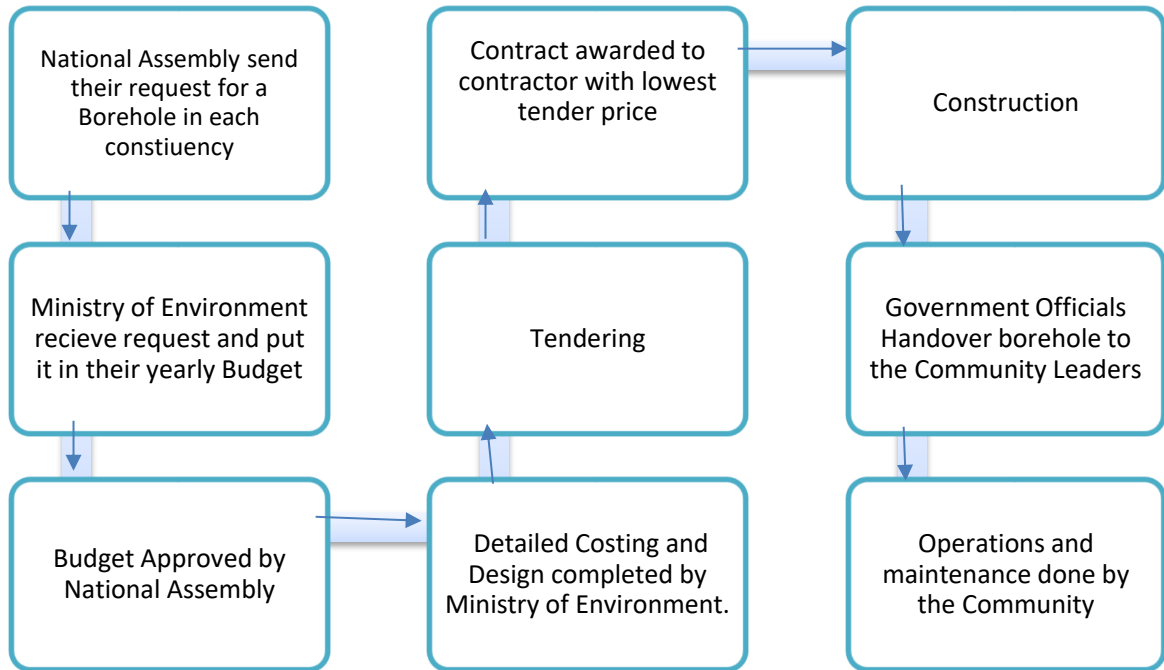


Figure 4.1 Overview of Current Procurement Process

Identification of Need; There was some disagreement between the interviewees with respect to who is the initiator of the procurement process. The Ministry officials' states the process starts when the Ministry of Environment writes to the National Assembly to make a submission of their proposed constituency projects (in this case water projects). The MDG representative argued that the process starts as soon as the National Assembly makes the submission. In procurement literature, the process starts when there is an identification of

need therefore the process starts in relation to this research when the National Assembly members identify a need in their communities.

Planning and Design; Based on the submission from the National Assembly, the Ministry of Environment (ME) then prepares a preliminary design and also a preliminary cost estimate which is then returned to the National Assembly for appropriation. After the appropriation of the project, the ME then does a detailed design and costing of the project.

Tendering; With the final design done, the tendering phase of the project begins. This process is governed by the Public Procurement Act 2007. The project is advertised in 3 national dailies. There are 2 stages in the tendering process. The first stage tests the technical capability of the contractors and the second stage to tests their financial aspects of their bids. They are scored based on the tendering criteria which include. Each contractor must get a minimum score of 80% to be considered.

The contract is awarded to the contractor that fulfils the criteria and provides the lowest bid. One of the interviewees argued that the contract is awarded based on it being the closest bid to the Ministry's in house estimate. It was agreed that the reasonable lowest bid gets the contract. The tendering process is handled in house within the Ministry of Environment by the technical unit of the MDG and the procurement process.

Construction; The contract is then awarded by the legal department. As soon as the contract is awarded, the sponsor from the national assembly is informed so that he can form a liaison with the end users (community). The project engineer and the contractor then meet with the community leaders. These Community Leaders will provide the land upon which the project will be situated. This is the first time; the 3 main stakeholders in the process will meet.

As soon as the land is made available, the contractor starts the construction. For projects over ₦50 million, the head office will mandate a site visit and have special interest in the progress of works. Generally, for projects less than N 50 million, the head office goes on project monitoring tours and pick at random what states and projects to visit. It should be noted that 70% of the projects are under the ₦50 million.

For all the projects the day to day supervision is carried out by the field offices located in the 36 states of the federation. These field offices then report to the Head of water infrastructure MDG unit in Abuja. All the interviewees stated that the government does not have the capacities in terms of manpower to supervise the project as needed.

Operation and Maintenance; After the completion of the construction phase, the borehole is handed over to the end users. The end users are trained by the contractor on how to operate the borehole and the maintenance requirements of the boreholes. For the first 6 months, the contractor maintains the borehole. The contractor hands over the maintenance to the community after the completion of the limited defects liability period.

After this handover, the borehole and its operations become the business of the community. One interviewee stated that in a few cases there are examples of where the Local government authority takes over the maintenance and operations. After the handover the client and the contractor do not have anything more to do with project. There is no follow up by the two parties and no assessment or no feedback into the system.

- iii. Critical Appraisal of Current Strategy for Procuring Water in LIUAs by the Client Organisations

In principle, the interviewees agree that the current strategy has some strengths. These strengths include;

- i. All the interviewees stated that in the prevailing circumstances such as the procurement act and weak anti-corruption laws under which the construction industry operates in Nigeria, competitive tendering was good for procurement of water infrastructure to LIUAs. They believed due to the competition the prices were more realistic and that the government was getting value for the money.
- ii. In majority of the projects, the time, cost and quality objectives of the strategy were met.
- iii. Conforms with the requirements of the Public Procurement Act 2007 in terms of competition and lowest price gets the contract.

Weaknesses of Current Strategy

Political interference; The interviewees stated that one of the weaknesses was that the strategy allows for an ‘excessive’ amount of political interference. Political interferences occur in the different phases of the process. Examples given include;

- i. The selection of which projects to be executed is based not on the need of the communities but based on the judgement of its importance by their National Assembly representatives. It also depends on how politically relevant their members are. An example of which was the concentration of resources in a particular area of a state. Usually found in the case where the representative is a politically relevant and as a result more boreholes are located in his constituency than are needed.
- ii. There were also reports of interference in terms of selecting the contractors to carry out the projects. Examples of which include the political sponsors of the projects have

a preferred contractor to carry out work in their constituency or cases where the politicians use these projects as a way of scoring short term political points with their supporters.

- iii. There were cases of politicians that would hijack the tendering process. As for the contractor to be paid his retention, the community leaders have to sign a release form. There were cases where for political reasons the sponsor would stop the community leaders from signing so as to compel the contractor to do additional works free of charge.

Budgetary issues; All the payments to be made on the projects executed are subject to their inclusion in the Appropriation bill of the relevant year. Insufficient amounts were budgeted for such works hence making full payment impossible for that year's budget.

The nature of budget implementations made it sometimes impossible to pay contractors within the stipulated times. The rate of budget implementation for the years 2009-2014 has consistently been below 40% (Budget Office of the Federation, 2014).

Sustainability Issues; The interviewees unanimously agreed that the funding for the construction for these projects could not be sustained beyond the 2015 deadline. They stated that government had competing interests and did not have adequate available funding to carry out works at the same pace as the MDG programme. Hence there **was** a definite need for alternative means of funding and maintenance of such projects.

MDGs were being financed from the Paris Club debt relief gains of 2005 but the MDGs lifespan ended in 2015. The Nigerian government cannot afford to carry on such projects in

the same manner and at the same rate. This highlighted the need for the Nigerian government to find an alternative sustainable funding source for development after the 2015 deadline.

Also in terms of the capacities (knowledge, technological and human resource) the government cannot maintain the momentum. The MDG also carried out regular capacity building and training for the people involved some of these were not carried over into the SDGs s. In terms of the supervision of the construction and procurement also there is a gap in capable manpower. These inadequacies in numbers of qualified supervisory teams restrict the government from taking on any sort of roles in the maintenance and operation stages of the procurement process.

Community Participation; One of the weaknesses of this current strategy is the exclusion of the end users in the early stages (need identification, design and tendering) of the process. The community is only informed of the project after the award of the contract. Yet they are expected to maintain and operate the borehole. The interviewees felt that the following issues are a direct result of the exclusion of the host community from the planning stages of the process;

- i. Design problems. All the interviewees stated that the designers do not visit the site before they design because there is no site. On numerous occasions, they say, on arrival at site the design has to be modified or even changed because the conditions of the site do not relate to the original design. An example was that the design depth was 150m on arrival at site 220m was needed. Another example was that, on arrival to site it was found that there was already a sufficient water source; the only thing required was a plant to treat the water available.

- ii. Maintenance. The interviewees stated that if the community was brought in earlier they would have a say in what projects are needed in their communities. If they had been given a choice in the type, capacity and quality of borehole, they would be more likely to maintain it. The bad maintenance culture in the country made it so that all the attention is focused on the construction and little attention is made on the life cycle costs, operation or maintenance. Although after handover, officially the client organisations have no role to play in the operation of the boreholes. They have had reports from the communities in an unofficial manner of reports of breakdown of the boreholes due to poor maintenance and also over use.
- iii. Compensation and Location of site. The current strategy is based on the premise that community provides the land for the project free of charge. Due to the short notice given to the community, there are always issues with citing the project. There often seems to be gap between the communities' expectation and government policy as most land owners then demand compensation for land provided. In most cases where the land owners realise that no compensation is to be paid they withdraw the permission for use of the land for the project which leads to cases of changing sites. There were also reported cases where the neighbours demand payment for damage done to their structures due to the construction process of the borehole.

Proposed improvements and Alternatives to the Current Strategy recommended by Client Organisations

The interviewees believed that with the following improvements the effectiveness of the strategy would be greatly improved;

Community involvement: The interviewees suggested that the beneficiary communities should be involved in the procurement process. Their involvement was argued to have potential effect of improving the quality and functionality of the designs. This was further argued to be capable of resulting in gains in terms of time, cost and quality. At present, it was reported that no assessment of the social and environmental impacts of the procurement process are being carried out and also that no targets in terms of social or environment gains are set.

The involvement of the community was also seen as being capable of decreasing the fragmentations currently witnessed in the process. This would greatly improve the fluidity of the process.

Role of Local Government: Some of the interviewees advocated for a role for the local government authorities in the maintenance stage of the process. Examples of successful collaborations between some local governments have been seen in Katsina state. In such cases the local government maintains the boreholes and the community handle the day to day operations of the boreholes. This is complementary to the local government roles in legislation as the sole distributor of water to the end users.

Subsidies: An interviewee advocated for the subsidy of the water. The interviewee recommended that the federal government should subsidise the cost of the maintenance and operations. The interviewee felt that the members of these communities cannot afford to pay the viable rates needed to continuously supply water. He stated the cost of maintenance of the bore would start from a minimum of N50,000 annually. Maintenance costs should cover consumable or renewable parts of the boreholes such as the filters and energy costs.

Funding: Due to the obvious fact that the government cannot sustain this level of initial investment, the interviewees advised government to look at Private Public Partnership as a possible solution. One of the interviewees stated that he did not think that any private organisation would put their money in these areas as he felt there was no guarantee that they would recover their costs due to the nature of the inhabitants of the community. Another interviewee recommended that the government study the principles of social infrastructure PPP used around the world and apply them here.

4.1. 3.2 Evaluation of Current Strategy by Contracting Organisation.

Group B consists of the contractors that are involved in the process. From Diagram 4.1 of the current strategy, it is shown that the contractors are only involved in the following stages of the process namely; tendering, construction and operation (only for the defects liability period).

The contractor's criterion for an effective strategy is one which provides prompt payment. a good quality product within a specified period. The main goal of the contractors was to receive prompt payment as and when due. The majority of contractors felt that the current strategy was not effective as they were not paid on time or what they were due or in some cases for both.

i. Appraisal of Current Strategy by Contractors

The Contractors interviewed stated that the current strategy had some Strengths such as;

- i. Open tender; they felt that the fact that anyone could tender for a job and be treated fairly and equally was a positive development.

- ii. They felt that if due process was followed the process would be very transparent which would inspire confidence in the process and would also result in the person best able to deliver being contracted to provide the project which would improve the quality standards of the industry.

Problems with Current Strategy

Lack of Transparency; A source of concern for all the interviewees was the transparency of the tendering process. These transparency fears undermined the credibility of the process and also undermined the confidence of the contractors on the fairness of the process. They felt that they were spending money (tender costs) to put in a realistic tender but they felt that they were not being given a fair assessment. Issues of transparency that raised concerns include;

- i. The scoring sheets were not available to them. They did not know on what criteria their tenders were being analysed
- ii. Requests for information on the process were not attended to
- iii. Political interference in the process was at times very visible.
- iv. Lack of professionalism of the teams handling the tendering process. The contractors felt they didn't know what they were doing.

Design; The interviewees all at one time or the other had an issue with the design of the project. This was a source of worry to the contractors as most times these problems with the design affected their profits, as most times the contingency sums were inadequate to cover the discrepancies in design. Examples given include cases where the difference between the depth required on site and those in the drawing was almost 100m, this had implications on the casings, the pump machine and also the tank installed. Another example, the initial was

the geotechnical report from the Ministry's archives initially used to design the borehole was not accurate for where the borehole was to be sited, so a complete redesign was done, with cost and time implications for the contractor because he had already mobilised to site.

Payment; The main issue for the contractors was the late payment. In some cases the contractors had not been paid for over 18 months after the completion of the project. One interviewee stated that he was in business to make money and if it takes 2 years to get paid for a project that lasted 8 weeks he doesn't know how they expect people to tender for another MDG project again. It should be noted that most of the contractors have previous relationships with the Water Unit. They are repeat contractors. This is as a result of highly technical nature of the provision of water infrastructure.

Community issues; The contractors stated that the problems encountered with the host communities was a source of concern for them. The following are some of the issues raised;

- i. There was no clear community structure. Some of the contractors' stated that in some projects there is no clear community leadership structure. After the contractor had been introduced to one set of community leader, another set would crop up and make demands on the contractor. Other problems included situations where the sponsor of the project had problems within the community, the fall out is felt by the contractor.
- ii. Compensation. Under the contract the contractor should not pay any compensation for the land or for any damage to adjoining buildings. But when they get to site they are forced to do so as to maintain a good relationship with the community.
- iii. Fragmentation of the process. Due to the fragmented nature of the process. There is no real cohesion between the contractor and the community. There were cases were

the contractors stated that there was an adversarial relationship between them and the community. They felt community took out their resentment of the exclusion on the contractors

- iv. **Training.** The interviewees are required by the contract to train the end users how to use and how to maintain the borehole. The interviewees stated how difficult it was in some cases to be able to do this due to the internal politics of the communities
- v. **Security.** During the operations stage, one of the interviewees stated that security was problem. He stated that after installing the pump it was stolen after a few weeks and he was legally bound to replace it. He argued that if the relationship with the community was on a better standing, his project would have been more secure. As the local security scheme would have taken a special interest. Another interviewee argued that after the community initial handover, the community should take over the security of the borehole.

Proposed improvements to Current Procurement strategy recommended by Contractors

Payment Guarantees; The interviewee felt that government should provide some sort of guarantee to ensure that the contractors are paid within a reasonable period. It was agreed that at the end of the defects liability period the contractor should be paid in full. One interviewee stated that due to the technical and specialist nature of the projects, there was a limited number of contractors that carry out these works. If they were allowed to go bankrupt then the standard with the industry would go down and prices would go up also.

Increased transparency; To increase the confidence of the contractors in the process, the government would have to take steps to increase the transparency of the process. They can

achieve this by following due process, resisting political pressure, providing the relevant information when requested for, and being very clear on the selection criteria.

Community involvement; The community needs to be more involved in the process particularly in the pre contract stages. This will improve the relationship between the community and the contractor. The relationship between the contractor and the community should be mutually beneficial and devoid of distrust as they are all working towards the same goal. The interviewees believed that a better relationship between the two parties will reduce the costs and also will ensure that the project will be completed on time as this will do away with the time spent negotiating with the community on minor issues.

4.1.3 Discussions of Evaluation of Current strategy by Client and Contracting Organisation

Table 4.3: Participation in Current Process

PHASES OF PROCESS	CLIENT	CONTRACTOR
Identification of Need	✓	
Planning and Design	✓	
Tendering/ contractor selection	✓	✓
Construction	✓	✓
Operations and Maintenance	-	-

The Client organisations as seen in Table 4.3 participate in 4 of the 5 stages of the procurement process. Their participation allow the organisations to have a more holistic view of the procurement process than the other participants in the process. The client organisation is the developer and implementer of the procurement strategy. The main elements of the procurement strategy should include a clear precise statement of;

- i. The project objectives
- ii. Risks and constraints
- iii. Decisions on project funding
- iv. Asset ownership

- i. Project Objectives

Both the groups interviewed only defined their project objectives in terms of the traditional paradigm of cost, time and quality. Research has shown that project objectives should include not only the traditional three but also social, economic, political and environmental objectives (ICE, 2008). It is also very important that the socio economic objectives be developed and taken very seriously as this particular project type is a social infrastructure. The client interviewees acknowledged that these projects were social infrastructure and the provision of water was a social duty but they had failed to capture the potential positive impacts of these projects on the host communities. These projects could provide employment, build capacities, and improve health of the community and foster unity (Hawkins and Wells, 2007).

Therefore, it is imperative that the project objectives be expanded to include the other aspects that are impacted by the procurement. This means that the current objectives of the current strategy are inadequate.

- ii. Risks and Constraints

Risks; The allocation of risk to the party best able to handle it is crucial in the procurement process. Under the current strategy, the client bears the risk in terms of cost, time and the contractor bears the risk in terms of land and design issues etc. This distribution of risk is not equitable to the different stakeholders as the stakeholders are mandated to take risks that they are least able to carry. For example, the contractors are expected to take all construction risks but they are unable to effectively mitigate the risks earlier in the process. In the long run has proved as a hindrance in achieving project primary and secondary objectives.

Constraints

There are a few constraints as mentioned by the two groups. These constraints are;

- a. Public Procurement Act 2007; the procurement of any project which derives at least 35% of the funds appropriated or proposed to be appropriated from Federation share of Consolidated Account is subject to the provisions of this Act (FGN, 2007). The exceptions to this Act are the procurement of items which are directly linked to national security. Projects under this Act must have open tendering, competitive tendering; provide value for money, fitness for purpose, be timely, efficient and transparent. The theory was deemed good but in the implementation there are flaws, misunderstandings of the concepts, implications in the costs of tendering for client and contractor organisations, and ultimately time costs as well.
- b. Water industry Reforms; currently the water sector is undergoing reforms. The government has in the last 10 years released National Water Policies with the most recent policy released in January 2017 to accelerate the reforms. Bills

in the national assembly include SB 358 River Basins Development Authority (Est.Etc.) (Amendment) Bill 2017, National Water Resources bill and Amendment to the Water Resources Institute Act. These reforms are aimed at un-bundling an integrated monopoly provider, changing ownership structure and allowing entry by new providers in some market segments (Ojo, 2011). Until these reforms are completed the government has the monopoly on the supply of water therefore any changes must accommodate the current situation. The proposed legislation has been in the national assembly since 2005 but is yet to be passed.

- c. Capabilities; both groups have agreed that there is a gap between the capabilities of human resources and funding that is required and what we have. The client organisations have acknowledged they don't have the manpower, facilities to sustain their current role and also take up a more prominent role in the operations stage. At present there are several international bodies that are partnering with the MDGs to build capacities but after 2015 there will be no more. The contractor organisations picked on this gap and this gap is lowering their confidence in the process. The process must be sustainable
- d. Specialist nature of industry; the contractor organisations are very conscious of the fact that these projects are highly technical. This will affect the competitive nature of the sector and also requires a different strategy than the one currently being employed for all MDG projects. The client organisation is yet to fully understand the nature of the sector and the implications for procuring within it.

iii. Decision on Funding

The Federal Government of Nigeria cannot afford to continue the projects at the speed and quantity they are being procured now. Even at this rate the government is still behind and not meeting the targets it has set which calls for an acceleration (FGN, 2010). The projects procured on behalf of the MDGs at present are paid for by the debt relief gains and also Aid. This will end in 2015. Therefore a sustainable form of funding must be developed.

Sources of sustainable funding are limited. Therefore the government need to start looking at private finance. This will be subject to the implementation of the reforms. The nature and perceptions of the low income urban areas make them areas where investors are hesitant to invest in (NIAF, 2008A). This provides a challenge. But with the introduction of forms of PPP for the provision of social infrastructure, this challenge can be overcome in terms of private funding, technology and human resources.

iv. Asset Ownership

After the handover of the project both the client and the contractor do not have dealings with the project. The project then becomes the property of the community. Both groups do not have any real knowledge of what happens to the borehole afterwards as there is no follow up or assessment of the process or strategy.

From the interviews there is no clear transfer of the project to the community. This raises many issues. For example;

- i. Who legally owns the borehole?

- ii. Who are the recognised members of the community?
- iii. Do you hand it over to the community leaders?
- iv. Who are the community leaders?
- v. Is the transfer legally acceptable?

These questions need to be answered and the asset transfer must be done in a comprehensive and legal manner as it will assign responsibility to that person or persons to manage the asset in line with the achievement of the project objectives.

Community involvement; There was consensus among all the interviewees that the community should have a more prominent role in the process. Involvement by the community would improve the effectiveness of the process. If the community was brought in earlier in the process then there would be improvements in;

- i. Design; a more tailored design would be created. This would ensure that the project would be appropriate in terms of its function and also in its practical use. A tailored design would also ensure that all superficial parts of the current design would be designed out.
- ii. Less adversarial relationships which would ultimately mean less time spent on land disputes, also it would mean that the contractor would not have to pay out of their own pockets for land compensation. It could also mean cheaper labour and materials as if the materials are bought within the community it would mean less transportation costs.

4.2 Evaluation of current strategy by the Communities

4.2.1 Community Characteristics

The communities of the case studies chosen were the communities in Unguwar Yelwa in Kaduna state, Ozubulu in Anambra state and Oredegbe Road in Ogun state. All the communities were beneficiaries of boreholes as part of the Millennium Development Goals' slum upgrading projects. These projects are all situated in peri urban areas. The case studies were specifically chosen in different parts of the country so as get a more diverse sample.

Table 4.4 Overview of Case Studies

Community	Kaduna	Ogun	Anambra
Borehole type	Solar	Motorised	Motorised
Target Beneficiary (persons)	500	500	500
Location	Residential	Residential	Market
Handover Year	2012	2012	2010

The projects had been completed and were in operation. A time lag of at least 3 months was allowed so as to allow the impact of the finished boreholes on the community to be fully experienced. The focus group consisted of members of the community. There were eight participants in each focus group. They included representatives of the youth, the women and the community leaders.

Table 4.5 Focus Group Compositions

Community	Kaduna	Anambra	Ogun
No of women	2	1	1
No of youth	3	2	2
No of Community leaders	3	4	5
Total no of Participants	8	8	8

The focus group sessions lasted for 90 minutes. At the beginning of the focus group the participants were given a background of the research, what was expected of them and also a definition of what the procurement process is (in relation to this research). They were informed that their views and the reasoning behind their answers are of the utmost importance to the research. The results are presented by the perspectives of the 3 main categories of participants; the community leaders, women and youth.

4.2.2 Appraisal of current strategy by Communities

i. Impact of Borehole on the Community

Community leaders;

- a) Impact on all tiers; the community leaders felt that all impact of the borehole was felt by all tiers and sections of their community. In Anambra, the borehole had only worked for one year before it stopped working. The leaders felt that when it was working it had impacted positively but the borehole had just been fixed when the focus group was done.
- b) Access to clean treated water; the community in Kaduna did not have access to clean water. The other major source of water was River Kaduna which they doubted its quality for drinking. Hence this is the first time the community has access to clean water. The two other communities had access to water which was sold to the community. The leaders stated that the prices were exorbitant for the community.
- c) Increase in exposure to technology; the community leaders in Kaduna were happy to have a solar powered borehole as they felt it increased the community's exposure to technology.

- d) Unifying factor; the leaders noted that the borehole also decreased the number of disputes in the community. As the borehole was equally accessible to all members of the community, it reduced the quarrels over supply. It also served as a unifying factor to the community who have come together to maintain it. It also serves as a social meeting point.
- e) Need for more boreholes; All the community leaders were happy with the boreholes provided and its positive impacts on the community but noted that the capacity of the boreholes installed could not cater for the total number of the people in the community.
- f) Some community leaders felt that although their communities had felt some positive impact from the boreholes, they felt that it was not a priority and stated that if they had been consulted before the beginning of the project then they would have asked for other infrastructure in place of water.

Women

- a) In Kaduna, the women did not have access to bathing and cooking water before the boreholes were installed. Hence the provision of the facility had greatly impacted them as it reduced the stress of collecting the water. The tedious process of finding potable water to be used by their families had also been negated. They were very happy that they would no longer have to trek miles or use polluted water. The women in all the communities stated the proximity of the borehole to them made it easier for them to collect, carry and use for other chores.
- b) Quality of water; all the boreholes installed had water treatment plants which have greatly improved the quality of the water. In Kaduna the women particularly were

impressed with the good taste and clarity of water. The poor quality of the water that had been available had been responsible for high incidences of sickness and skin diseases. The women also noted that the water previously used caused a high rate of sickness which has been greatly reduced due to the installation of the boreholes.

- c) Dry season had meant suffering; the dry season was a trial for the women of the community in Kaduna previously as at that time all the wells dry up and the river is the primary source of water. Therefore at this time of the year it was a period of difficulty which they felt had been lifted with the boreholes installed.
- d) In two other communities where water had been available, the major impact for the women was simply that the water was available and it was free. This lowered their cost of living allowing them to spend money on other important items such as education etc.

Youth

- a) Better quality of water; the youth felt most impacted by the better quality of the water. Its taste and quality they felt were of superior quality than what was previously available to them.
- b) Less stress on the women; they felt another impact was that it meant less stress on the women of the community. As they felt the women spent less time and effort in acquiring water for their domestic needs.
- c) Access to technology; giving the community access to the technology of the borehole is an added impact. The youths claim that a large majority of the community dwellers have never had access to such devices and it is good for the community.

- d) Water is life; the youth stated that water is life. The impact of potable drinking water has affected all facets of their lives. The youth in Anambra were particularly unhappy with the short life of the borehole and attributed it to the failure of government to manage the procurement process effectively.

ii. Community Involvement in Procurement

The members of the focus group were asked whether the community should be involved in the procurement of water infrastructure in their communities. They unanimously answered yes. They stated that they would be interested in the following capacities

Community leaders;

- a) A case was put forward for the community to install the boreholes themselves. But provided that the government fund the procurement process. Most of the community leaders felt this was overstepping the abilities of the community. Alternatively others said that community would enter a partnership with a contractor who would then bid and be given mobilisation; others said that the community should be given a chance to bid for the project and be given a mobilisation fee to get the work done.
- b) Community led procurement; some members of the leadership felt that the procurement process should be community led procurement. That is the community should be the catalyst for the process. This means that the community should be the driver of the process and initiate the process.
- c) The leaders in all the communities felt that the quality of the borehole could be improved. They felt that better materials could be used for the project. The leaders therefore felt that the community should be part of the process to ensure that the best quality materials were used in the project.

- d) Supervision; the most supported role that the community leaders preferred. They canvassed for this role because they felt that they were in the best position to monitor, check the quality of materials used, to mobilise other sections of the community etc.

Women

- a) The women also concurred that there is a role for communities in the procurement of this infrastructure. They noted that any role played by the community would be one that does require any financial contribution by the community. The women stated that the members of the community were low income earners and therefore could not afford the amounts used for the project.
- b) Acquisition of technical experience; they also argued that the community if given technical training and experience could play a bigger role in the process.

Youth

- a) The youths also agreed with the other groups that the community should play some role in the procurement process and also felt that the community could not play any role in the financial aspect of the process.
- b) Machine and spare parts; the youth felt that the community should also be a part of the provision of material procurement. As this would provide knowledge, training and employment for the youths of the area
- c) Social amenities

iii. Level of Community Participation

All members of the focus stated agreed that they could only play a limited role in the process.

- a) Difficult to raise funding; the members of the focus group agreed that the community could not and would not be able to raise the money needed for the initial cost of the borehole projects. Therefore they ruled out any involvement by the community in fund raising.
- b) Liaison; the community felt that there should be a liaison between the community, the government and the contractors. They noted that certain issues could have been avoided if the community had been involved from the inception of the project, issues like compensation for land, location, type of borehole, maintenance and operational problems.
- c) Supervision; the community felt very strongly that the community should be the party to supervise the works during the construction phase of the procurement process. They felt they were the best equipped to ensure that value was achieved. Although it is important to note that they conceded that they did not have the technical expertise to supervise the technical aspects of the project at this stage. They felt that particularly they could ensure the use of good quality materials make sure that what is specified is what is put in place.
- d) Design; although the current borehole that was put in place has greatly improved their quality of living it is still inadequate to fully cater for the number of people in the community. This has led to the community rationing the use of the borehole and other restrictions to ensure that the borehole is not overworked and destroyed. Therefore the community requested that they be part of the design of the project so as to have a say in its capacity and also to integrate certain features that the community had to construct after the borehole was handed over

- e) Skill development; the community also requested that their involvement should involve some sort of skill development for the people of the community. After such a project has taken place in a community there should some skills developed within the community.
- f) Location of project; the location of the project within the community should be solely done by the community. The community should singlehandedly pick the site of the placement of this infrastructure. Although at the current time, the communities pick the location, they communities require a more democratic process in its selection.
- g) Dynamic nature of population; as earlier stated that the community at present accept that they don't have the technical expertise to construct the boreholes on their own. They believe that the nature of the community is dynamic and that in the short term the community might have people that have this expertise and hence can play a more major role in the technical aspects of the construction.
- h) Local content; the principles of local content should apply to the procurement of this infrastructure. That is a certain percentage of manpower, materials; etc should be sourced from the local community.

iv. Capacity and Commitment of Community

Yes the communities had the capacity and the structure to justify level of involvement it wants. All the communities had developed community structures that would allow them to play a more prominent role in the process.

- a) Committee; In Kaduna, a Security and Maintenance committee was set up by the community to maintain and secure the borehole. The committee was set up in line

with the community's belief that so long as the infrastructure is in the community, they shall maintain it. The following are the features of the committee;

- i. Committee is based on schedule of duty
 - ii. They carry out any works related to the Security, health and additional access
 - iii. They set the tariff which is used to maintain the borehole. This is usually a one off fee, ranging between 50 to 100 naira when there is a need for repairs or additional works.
 - iv. Additional features paid by community
 - v. It is a voluntary service to the community
 - vi. Only people of high integrity and good reputation serve as members
- b) The two other communities had also development organisations. These structures were already in existence and just absorbed the borehole activities into their structure while the Kaduna community was solely set up to manage the borehole. The 2 other community structures are democratic institutions where the members are voted to serve a term. They handle anything that has to do with their communities. They also carry out the same functions as the Kaduna committee in addition to their other activities
- c) Of the two boreholes constructed only one is under the management of the committee and it is still in use. The other borehole not under the committee has broken down hence highlighting for the community the import of the committee and its work.
- d) A major issue for the groups was charging community members for the use of the boreholes. All three cases have different approaches

- i. In Kaduna, the water is free in general but if some additional works or maintenance is required then a one off fee is charged. This fee is N5 which is not sufficient but what is affordable. The community leaders then pay for the gap.
 - ii. In Anambra, the members of the market get the water free but anyone outside community pays N10 for 25 litres. This they say is not sufficient to pay for all the costs incurred. This is why when the borehole stopped working they could not afford to fix it.
 - iii. In Ogun, the water so far is free but the community acknowledges that there will be a need in future to start charging for water. They note that there will be resistance as there is a perception that the borehole is government property hence it belongs to all.
- e) The groups to validate their earlier statements that the community cannot afford any financial obligations stated that it was hard enough to get people to pay this one off tariff. As they felt it was government property which they felt did not belong to anybody hence can be used badly. In addition to what is raised by the tariff, the balance of what is needed is paid for by the community leaders.
- f) The roles played by the community committees' included monitoring the users of the borehole, setting conditions of use of borehole, setting conditions of use, prevent tempering, compliant resolution, carrying out additional works, maintenance and security.
- v. Stages of The Procurement Process in which Communities should be involved

Identification of need; Members of the focus group felt very strongly that the community have a very influential role to play in this stage of the procurement process. The different roles that the community should play include the following

- i. The community should be the ones who trigger the process by informing the authorities of the need for the borehole in their community.
- ii. The community should be able to put pressure on the authorities to make sure that the boreholes are done in a timely and efficient manner.
- iii. Other suggestions put forward stated that the identification of need should be a joint responsibility of both the community and the authorities.
- iv. The communities must also be given sufficient notice so that they can find a suitable location for the project and deal with compensation issues.

Design Brief; At the stage of the process, the community felt that they should play a limited role. They acknowledge that they don't have any technical skills to offer. But the communities should have some input in stating

- a. The capacity of the boreholes. The current capacities are insufficient which has led to rationing of the water.
- b. Also the community had also had to undertake additional works in order to make the borehole surroundings healthy and secure and also to distribute the water to a larger percentage of the community. These features should be incorporated into the original design.
- c. They also argued that they should be involved in determining what type of borehole is actually put in place. As they will be the ones left to maintain it.

Contractor Selection/ Tendering; The communities felt that they should for reasons earlier stated have a representative on the contractor selection panel. This would ensure that the

contractor has a good working relationship with the community and also allow the community to supervise the works more efficiently.

Construction; this stage of the procurement process is one of which the community felt that they could make more impact and also be impacted on. This stage should

- a. incorporate the principles of local content,
- b. provide economic benefit to the community,
- c. facilitate skill development and transfer
- d. and also in this time of insecurity allow the community the peace of mind of not welcoming strangers in community.

Operations and Maintenance; This is the phase of the procurement process that the community is the sole actor. The communities felt that this stage should be partnership between the communities and the government. They felt that

- a. Maintenance operations should be handled by the government. Most agreed that it should be the local government.
- b. Operations should be handled by the communities.

vi. Value Added by Community

Community leaders;

- a) Planning; the planning would be made much easier and more effective especially with the help of the communities as they would provide insights that previous planners did not have about the communities. For example location of materials, transport links, sources of labourers etc.

- b) Better value for money; the communities leaders felt they would be able to provide better value for money. For example in the case of using locally sourced materials and manpower.
- c) Better maintenance and operations; involvement of the communities in the process would lead to a better maintenance culture also operations stage. This they believe would be due to the fact that the community would already have been part of the process before its handover to them.
- d) Best location; currently the communities were just told to provide a location after the contract had been signed. This did not allow them to fully appreciate the realities of picking a proper location. Issues of compensation up till today have not been realised and also accessibility to the site also is limited. They feel if they were part of the process they would have found a more suitable location.
- e) No blame game; the communities felt there would be no trading of blame to the other parties if the community are involved the process. They would have a vested interest to make the project work as they would feel they are also stakeholders.
- f) Perception of project; the perception of the project by the community would be greatly improved. The communities see it mostly as the property of government. They don't have any vested interest in ensuring that the borehole is secure. Only the community leaders are actively doing all they can to maintain the project. This is evidenced by the fact it is difficult to get them to pay the tariff so as to maintain the borehole.

Women

- a) The women in generally agreed with what the community leaders had said and added on a few points of their own.
- b) Importance of leaders; the women stated that role of the community leaders in the procurement should not be understated as they serve as a rallying factor for the community. They also serve as an information point to all parties in the procurement.
- c) Right fit; getting the communities involved would ensure that the right fit of contractor would be contracted. This contractor would be able to work effectively and efficiently with the community to deliver the project. He would understand their norms and customs and work with it.
- d) Compensation; the land that the Kaduna borehole is situated on belongs to a widow. She is yet to be compensated for the use of her land. This is a very sore point for the women. Therefore they feel that community involvement would make sure that issues of compensation are taken care of.
- e) Knowledge; the transfer of knowledge between the community and the contractor is another benefit of the involvement.
- f) Awareness; community involvement would raise awareness of the project in the community. This awareness would translate in a lot of benefits. Examples would be the mobilisation of the youths to work at lower wages as a community service; materials bought within the community would be sold at a discounted rate etc.

Youth

- a) The youth agreed with what all the previous groups had said and also built upon them;

- b) Use structures available; with the communities involved they felt that the contractor and the authorities could also use the structures already available within the community. The use of these structures could result in gains in terms of time, cost and in some cases quality.
- c) Security and maintenance; security and maintenance could be greatly improved than what is currently if the communities had been involved in the process. Although the youths acknowledged the good works done by the community committee, they reasoned that if the design had taken into account the realities of the community then the work of the community would have been much easier.
- d) Location; the youths also stressed the role of the communities in the selection of the right location of the borehole. As this would impact the number of people that have access to the facility.
- e) Important that the communities spend time and money to make them feel like stakeholders in the process; the youths particularly stressed that the community would only value the project if they had spent their time or money in the process. Therefore it is essential that the community be vested in the process.

4.2.3 Discussions of Community Appraisals

i. Water and Health

The participants of the focus groups in all three communities expressed their happiness and in cases relief that the potable water source (borehole) had be situated in their areas. The participants reiterated that water was life and clean water was a foundation block of good health.

ii. Position Of Women in the Community

There was general consensus across the focus groups that the borehole would have more of an impact on the lives of the women in the communities. The word phrase ‘no more suffering’ was constantly used. This finding is line with previous research that women are the primary procurers of water in the society (UN, 2015).

Interestingly, the focus group showed the dynamics within the community. An example was, when stating the benefits that were accessed due to the provision of the water source, the most expressed sentiment was that the women would benefit the most as it would be less stress for them, less time spent acquiring water and also the health benefit meaning less time taking care of sick family members. This sentiment underlined the importance of women in the community. The members of the focus groups were appreciative of the role of the women. The youths in particular were very protective of the women

Although the women at the beginning of the focus groups, the women were hesitant to state their views but with the encouragement from the other members of the focus group especially the Community Leaders. It was noted that the women had clear distinct views on the process and the other members of the focus groups were very interested in getting the views of the women.

iii. Community Involvement in the Procurement System

All the focus groups were unanimous in their belief that the community should be involved in the procurement process from its inception to it operations. What was in dispute is the level of community involvement. Some members of the focus groups felt that the procurement process should be community led as the community would be best positioned

to set the procurement objectives. The community leaders in particular were the most vocal about their position for community involvement.

There was also consensus in the three areas in which the community in general should play in a role in the procurement process;

- a. Supervision
- b. Local content strategies
- c. Design

In terms of the capacity and capabilities of the communities to positively contribute to the process the communities did realise that they were handicapped in certain areas hence this limited the scope of their level of involvement in the process. All the members of the focus group stated that they communities did not have the technical expertise or the access to funding to initiate the project. It was suggested that if the contractors that were engaged to provide these boreholes would use local content strategies then the technical proficiency of the community would be raised and hence they would be able to take on more technical roles in the process in the long run. In terms of the operation of the asset, these communities also could not afford to pay the tariffs that would be economical and hence would require some sort of subsidy.

It was also important to note that the communities already had some community structure which helped in the maintenance of the boreholes. These structures if properly managed and engaged could ultimately improve the process as the structure meant there would be a single point of contact with the community when require and this point of contact was legitimate through the eyes of the entire community.

Some of the benefits listed by the communities include; better value for money, better quality of the end product through more thorough supervision, better location of the asset to serve all members of the community, longer life cycle of borehole through better maintenance, and ultimately a better relationship with the different members of the procurement process and its related benefits.

iv. Lack of Feedback Mechanism

Other issues raised of importance was the lack of communication with the client or the contractor before the contract is awarded and once the project had been handed over. So there was no feedback mechanism. In terms of the defects liability period the contractors did not hand over the project for use until the period was over and he or she was not liable for defects encountered after the period. The lack of communication enforces the view that the voices of the urban poor are not heard.

4.3 Summary of Findings of Evaluations of the current Procurement Strategy by the Communities, Client and Contractors

The first step of the strategy development studied at the current strategy in use and also look closely at the procurement process and how the strategy was incorporated. The strategy currently in use was based on the traditional procurement route and the use of competitive tendering. This strategy has been shown to be ineffective. Table 4.7 provides a snapshot of the problems with the current strategy and the strategies that provide ways to solve the problems identified.

Table 4.7 Overview of Findings of Data Collection

STAGE	BARRIERS	REQUIREMENTS	STRATEGY
Identification of need	- Lack of Community involvement	Information on; - Number of users - Uses of water - Water sources present	- Use of a Community Document
Design Brief	- Lack of Community Involvement - Inadequate design	- Provision of Basic parameters for design - Life cycle costs	- Community Consultations - Compulsory Site Visit - Site identification - Complete all land legal issues at this stage - COMPULSORY geological survey - Appoint community liaison officer
Contractor selection/ Tendering	- Lack of community Involvement - Transparency	- Community representation on Tenders Board - Contractor Confidence in tendering process - Use of consultants	- Local content Strategies - Training - Competitive Tendering
Construction	- Lack of Community Involvement - Lack of Payment - Adversarial Relationships - Land issues		- Local Content Strategies - Supervision by CLO - Adequate budgetary provision before start of process
Operations & Maintenance	- No feedback mechanism - No government involvement - Training - Cost of maintenance - Sustainability of the whole process	- Who is responsible for maintenance and operations? - Sufficient numbers of community leaders should be trained - The sustainability of the process - Life cycle costs - Criteria for success of procurement process	- Create feedback mechanism - Local government involvement - Train users - The use of Social PPP - Contractor manuals

Source: Field Survey (2013)

The reoccurring barrier identified by the all the data collected is the Lack of Community participation in the process. The community in this context means all the stakeholders of the project. This barrier is directly or indirectly responsible for inadequate design, short life cycle of the infrastructure, land issues, adversarial relationships between the community and the contractors to name a few.

4.3.1 Community Involvement Strategies

i. Community Document

This is a document that the community should produce. It should contain the basic information on their needs. Information that should be included in this document should include; Name of Community, Location of the community, Population of community, Estimated number of users of the infrastructure, Uses of water; drinking etc, What are the current sources of water to the community?

Due to the nature of these communities there is no expectation that this would be in a sophisticated format. It could be written in a letter format; the most important thing would be that this information is in written format. This information is important as it allows the Ministry of Environment some sort of insight on what is required and they can better articulate the need of the community.

ii. Community Consultations

Under the current strategy it is only compulsory for the designers of the borehole to visit the site for projects over =N=50 million. This means that a majority of the boreholes constructed for these areas are designed without the designers seeing the sites or having any interactions with the end users. This results in the production of inadequate designs.

Therefore one of the strategies to be incorporated into the new strategy is that it would be compulsory that for all boreholes built in these special areas there must be consultations with the community. These consultations should be in form of town hall meetings or where the culture does not permit this, and then the designers should have meetings with the spokesperson of each section of the community. For example community sections that must be represented should include women groups, community leader groups, and youth groups. This provides the designers with a very clear project brief.

iii. Location of the site and Land Issues

One concern of both the communities and the contractors has to do with the land on which the borehole would be situated. This concern can be divided into two main issues; the site location and land owner/ compensation.

Under the current strategy the land on which the infrastructure is located is supplied by the community. Therefore the designers do not have any say on the locating of the infrastructure. As a result, the land provided is usually not fit for purpose as the land provided is usually not as accessible as it should be. Bradley et al (2010) stated that for site selection of any borehole there are many different criteria. There are technical and general criteria (which consist of the political, legal, economic and social criteria).

The technical criteria mainly deals with issues such as the whether there is groundwater in the area, the geological requirements of borehole, quality of water, whether a borehole would be suitable or not. Bradley et al (2010) stated that choosing a borehole site is a critical part of the process of providing a safe and reliable supply of groundwater. The best sites are those in which catchment (natural water input) may be maximized. Such locations are not

necessarily those that receive the highest rainfall (which may occur in upland watersheds). ‘Bottomlands’ – such as river valleys and lake basins – tend to be areas of maximum catchment as both surface water and groundwater migrate towards them under gravity. Fracture zones, although not always directly related to bottomland, can also be good reservoirs for groundwater, and may be located by ground observation or satellite images/aerial photographs, and by geophysical methods.

Another aspect of borehole siting that demands careful consideration in populated areas is the potential for contamination by pit latrines or other waste disposal facilities (Thangaranjan, 2007; Nwanko, Danrimi and Nwanko, 2011; Donald et al, 2012). Because near-surface groundwater migrates downslope, a shallow dug well or a borehole tapping shallow groundwater should be sited as far away as possible (while bearing in mind the human need for proximity to a source of water) and upslope of potential sources of pollution (latrines or sewage pipes, for instance). Deeper aquifers confined by impermeable layers are at less risk of contamination from surface pollutants. One final consideration is the nature of the shallow aquifer. If the host formation is made of fine or medium-grain-sized sand, it will act as a natural filter for particulate pollutants, whereas fissured limestone, with a high rate of water transmission (transmissivity) will carry away pollutants faster and to greater distances from the source. It is estimated as a rule of thumb that most microorganisms do not survive more than 10 days of transportation by underground water (Thangaranjan, 2007).

Land ownership is another main concern. The current process allows for the community to provide the land free of charge. This is international current best practice (UNHABITAT, 2005; MDG, 2007; WaterAid, 2010). This is aimed at getting the community involved in the process. Unfortunately in the case studies studied this approach is not getting its desired effect

as the community are just ordered within a short period to identify a plot for the construction of the borehole and the selection process does not in any way fulfil the criteria mentioned above. The two issues with this problem are; compensation for actual owners of the land and suitability of the land.

A recurring theme in all the case studies is the issue of compensation for the land used for the construction of the boreholes. There seems to be a communication gap between the community and the overseeing ministry. The land for the borehole is to be provided by community free of charge, but this is not communicated in clear terms to the community. This results in the community demanding payment from the contractor and in certain cases disrupting the work of the contractor in order to get their demands met. With the implementation of the community consultations it is imperative that the community be informed of their obligations. In which case the community can provide communal land or the community can levy itself to pay compensation to the owner of the land.

The new strategy proposes that the land issue should be cleared before the contractor is brought in. As a result, at the design stage the land for the project should be identified and all ownership issues should be ratified before the contractor selection stage of the process begins. This would ensure a smoother process and also reduce the friction between the Community and the Contractor.

The second issue is suitability of the land provided, that is whether the land for the project is fit for purpose. The criteria stated below should be provided to the community in order for them to provide what land is best. For example, land chosen should be accessible to all members of the community and with a certain walking distance, therefore the land provided

should not be situated in the extreme ends of the community but it should be centrally located. These criteria should be communicated and properly explained to the community leaders in the community consultations. As mentioned earlier it is important that the site be identified before contractor selection stage and also it should be done before the final design is complete as this allows for geological tests to be carried out and a proper design produced.

iv. Appointment of Community Liaison Officer (CLO)

At the end of the community consultations, the community should nominate an individual to act as the liaison officer for the community. The CLO would play the following roles;

- a. Serve as the interface between the other stakeholders and the community
- b. Shall be responsible for articulating the views of the community
- c. Shall sit as a member of the Tenders Board for the project
- d. Member of the Construction Supervisory team
- e. Shall protect the interest of the community in subsequent stages of the procurement process
- f. Shall provide regular feedback to the community on all developments within the process

The individual allows the contractor to have a single point of communication with the community. The contractors had complained of not having a single point of communication, as many different groups would approach them saying they had the authority to deal with them and this had caused a lot of disruption which proved to be detrimental to the project.

v. Local Content strategies

Local strategies are all strategies aimed at improving the content of use of the resources within the locality (ICE, 2008). These strategies include the following;

- a. The use of local materials; this strategy argues for the use of local materials in the production of the project. For example in this project, the use of pipes that have been produced in the community. This is aimed at supporting the local industry.
- b. The use of local labour; the contractor would have to engage members of the community as laborers on the project. In projects of this kind, there are 2 main types of labour; that is unspecialized labour and specialized labour. The communities acknowledged that they don't have a sufficient number of specialized labour to make it compulsory for contractors to use but argue that they have sufficient unspecialized labour to make it feasible that all construction done in their areas must employ local labour.
- c. Training; it is important that there must be an element of training provided for the community as a benefit of the project. In the current process, the contractor only provides training to a few people (2-5) on how to use the borehole. The community should know also how to operate and maintain the infrastructure. The contractor needs to train people in not only how to use the product but also transfer and develop some skills within the community.

4.3.2 Design Strategies

The findings of this research have shown that the design of the end product is flawed. There are numerous reasons for this. Reasons include designers have no interaction with end users, no geological tests are carried out, the designers have never been to the site of the project

prior to design, and designers have no feedback on effectiveness of their previous designs to name but a few.

The following are issues that were raised by the communities during the focus group that may also be considered when designing a borehole:

- a. A platform should be constructed around the top of the lining.
- b. Disinfection of the borehole is required prior to commissioning of the water supply system. It is important that Communities need to be informed about this as there might be unsubstantiated and false flow of information in regard to disinfection (chlorination of water) (ICRC, 2010).
- c. Surface water diversion ditches should be provided to protect against inundation.
- d. Security features should be built to protect against theft of the pumps etc.
- e. Waste water from the hand pump/borehole needs to be drained away from the platform through a proper drainage apron and soak away pit, evaporation beds (where infiltration is difficult due to texture of the soil) or to nearby individual/ community garden.
- f. With community consensus, the area around the borehole drainage apron should be fenced for the longevity of the system.

4.3.3 Government Involvement Strategies

In the current process the government is the driver of the process and is active in all stages of the procurement process except the Operations stage. Research has shown that the role of government in this procurement should be limited to;

- i. Design of right policy and institutional framework

- ii. Ensure the accountability of the process
- iii. Use targeted procurement in the delivery of capital infrastructure projects to ensure benefits equitably distributed across society.

They can achieve the above by controlling corruption and provision of rule of law, ensuring accountability and playing an effective regulatory role. In Nigeria, the Water Sector is undergoing reforms which when passed would allow the introduction of Public Private Partnerships into the sector (FMWR, 2010). These reforms have been at the National Assembly for the last 5 years, this has stalled the emergence of government as a regulator in the industry as opposed as the major player. The research carried out recommends the use of the various Social PPP models discussed as an alternative to the traditional procurement route used. This would only be possible if the reforms are passed by the National Assembly as the current legislation do not allow the use of these PPPs.

As these reforms are yet to be passed and there is no reliable timeframe for which they would be passed the research proposes that there be a partnership between the Local Government Authorities and the community for the operation stage of the process. Currently, the operation stage is left completely to the party that is least able to manage it successfully, the community. They are under trained and don't have the resources to manage the stage successfully. It was noted by the Ministry of Environment that they don't have the resources at federal level to maintain the boreholes all over the country.

In the current legislation the Local Government is responsible for the provision of water to the end users therefore these boreholes fall under their jurisdiction (FMWR, 2008; FMWR, 2010). Consequently, this research proposes that there is a partnership between the Local Government and the community in the operation of the borehole. There is evidence that this

partnership has been successful. This partnership is based on the model that the community is responsible for the daily operation of the borehole (e.g. security, keeping it clean, and employing an operator etc) and Local Government is responsible for the regular major maintenance of the borehole (which includes replacing components etc.)

Another issue of major concern to the contractors is their payment on time. The research carried out discovered cases, in which the contractors had not been paid up to 24 months after they had handed over the projects. Therefore it is a proposed strategy that no project should be embarked upon until there is a guaranteed provision in the budget for the total contracted amount. If possible the government should provide guarantees to the contractors of payment with the budget year.

CHAPTER 5:

5.0 DEVELOPMENT OF THE PUBLIC PROCUREMENT STRATEGY FOR THE PROVISION OF POTABLE WATER INFRASTRUCTURE TO LOW INCOME URBAN AREAS

5.1 Philosophy of Strategy Framework

The proposed strategy developed was based on the UK Office of Government Commerce (OGC) model which consists of processes and gateways. The OGC model was used because it simplified the process and would allow greater flexibility in terms applicability. The strategy consists of five main stages namely;

- i. Need identification
- ii. Design development
- iii. Tendering/ contractor selection
- iv. Construction
- v. Operations and Maintenance

The strategy consists of three gateways within the process flow. Each gateway provides an opportunity to assess the project against the set criteria. Part of the criteria investigates whether the basic principles of the successful procurement process namely; Fairness, Equity, Transparency, Competitiveness, Cost effectiveness, and promotion of social objectives have been applied diligently. Gateway One assesses the activities in the Need Identification and Design Development stages; Gateway Two assesses the Contractor Selection/ Tendering stage; while Gateway 3 assesses the Construction stage of the process.

At each gateway, there are 3 possible courses of action; i.e. to continue if the assessment is favourable, or to repeat the previous stages when the assessment is not acceptable or to

terminate the process. As the provisions of water to these areas are essential, the most probable course of action would be the first two.

Also built into this new process is a feedback mechanism. At the end of entire process, lessons learnt and all issues generated are fed back into the system to ensure that the next process would have been improved and previous mistakes avoided. In the current process immediately the borehole is handed over to the community, neither the contractor nor the ministry ever visits the facility and find out about its operations. This has resulted for example in the continued use of electrical pumps which require constant electricity that is not available in these areas. Hence limiting the water that is available when in its place a hand pump could have been placed that requires no such energy usage.

5.2 The Strategy Framework

The proposed strategy for procuring potable water infrastructure in LIUAs is shown in Figure

5.1. Stages 1 and 2: Need identification and Design development

The start of any new process of procuring potable water infrastructure begins when the Community produces the Community Document and sends it to their representative at the National Assembly. Their representative then forwards the Community Document to the Federal Ministry of Environment (FME). Upon receipt of the Community document, the FME officials would then communicate with the community leaders and organize a date and venue for the Community Consultations. The Community Consultations would take place which would have 3 outputs; the appointment of a Community Liaison Officer, the selection of the project site and a clear articulate requirement of the Community (Project Brief). At this stage it is very important that the overall aim and objectives of the procurement be clearly set out as this would form the basic criteria for the process.

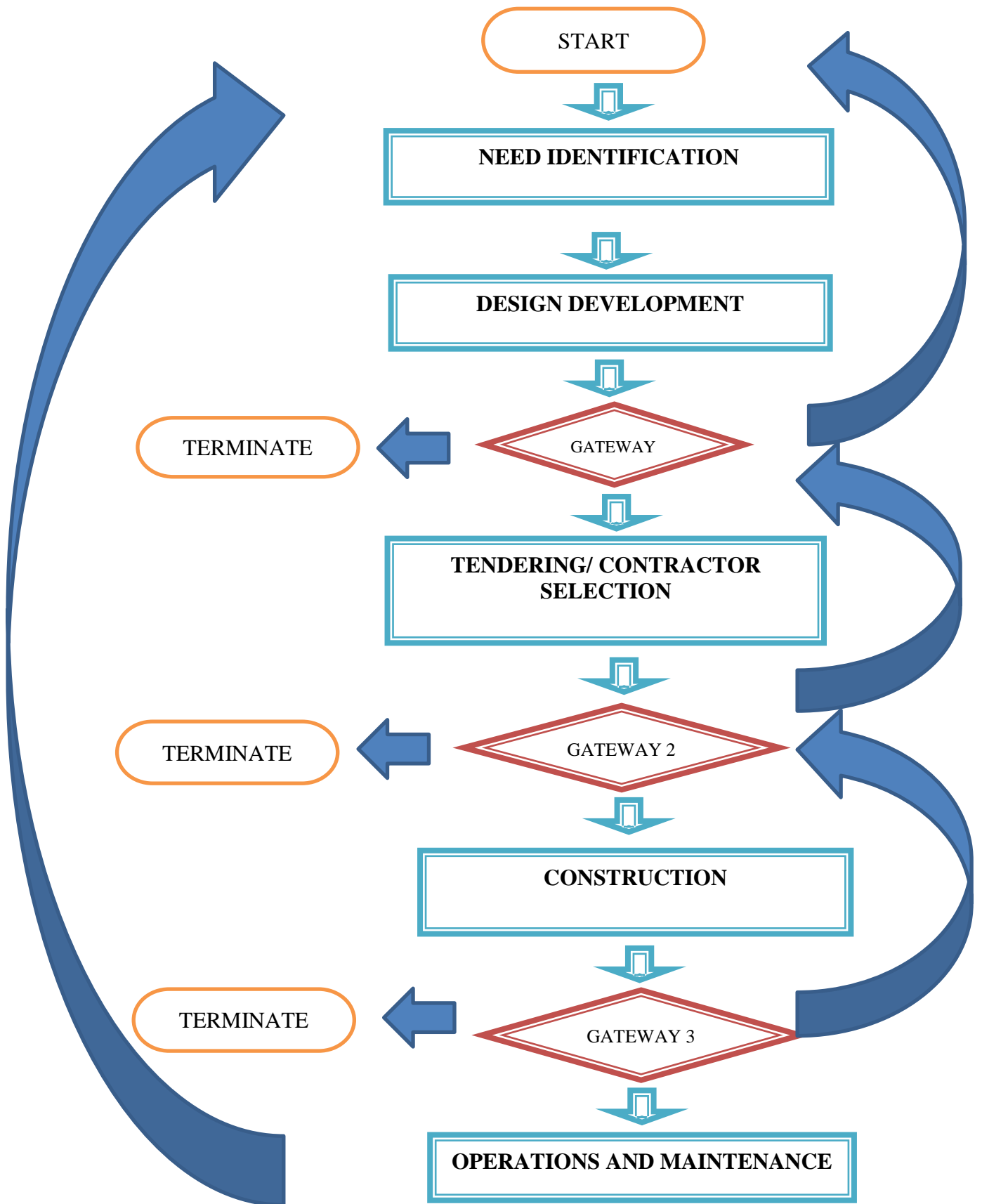


Figure 5.1 Framework of Procurement Strategy for the provision of potable water infrastructure to low Income Urban Areas

Once the site or possible sites had been identified, geological tests are carried out to ensure that the technical requirements have been met. If the land is unsuitable, then other sites should be considered using the criteria stated above. When all tests have been done and acceptable results have been received and all land ownership issues have been resolved. The design process starts.

With the information gathered at the consultations, from the CLO and the technical criteria set, the Design Team (Ministry of Environment) then gets to work to provide a good quality product, within a reasonable time at a reasonable cost that would provide the social objectives to the community. The final design should also get the approval from the community via the CLO. With the design and costing complete, it is imperative that the funding be secured for the full amount before the process goes ahead.

Gateway 1

At the end of the design stage, the first gateway is encountered. This gateway basically assesses whether the project is viable and meets the basic principles and standards set at the identification stage. The following requirements need to be assessed;

- i. Was the community involved?
- ii. Have their needs been articulated clearly?
- iii. Does the design reflect the need of the community?
- iv. Is the design cost effective?
- v. Was the best design possible produced?
- vi. Does the design produce value for money?

- vii. What the social benefits of the Project and how does the design as an enabler to achieve them?
- viii. Is the project viable?

If the assessment is favourable, then the project continues to the next stage and if not two things can happen; either the first two stages are repeated or the project is terminated. Due to the essential nature of these projects it is unlikely that the process would be terminated completed.

Stage 3: Tendering/ contractor selection

Once the process passes through the first gateway, the next stage is the Tendering/ Contractor selection stage. By law, all public procurement must go through competitive tendering unless it is for security purposes. Therefore, the work is advertised and it should be subject to Open Tendering. The CLO must be part of the Tenders Board that assesses all the tenders; this ensures that the interests of the Community would be represented at this crucial stage.

Incorporated into the tendering score sheet should the social objectives of the project. For example, priority should be given to tenders that fulfil the social objectives of the project i.e. tenders that have local content strategies, training elements should be considered even if the not the most competitive in terms of price.

Gateway 2

At the end of tendering stage is the second gateway. This gate primarily ensures whether there was fairness in the process, the most competent was chosen, whether all the project objectives be achieved through this methodology, the process was transparent and value for money was achieved. In terms of importance, this is the most important gateway as it will

define whether the project would be successful and in the long run whether the procurement itself is successful. It is also important because most of the resources in the process would be deployed in the next stage, therefore it serves as a point to stop and reflect whether the deployments of the resources are meaningful. Some of the specific questions that need to be addressed include the following;

- i. Was the tender process competitive, fair, and transparent?
- ii. Was the best person chosen for the project?
- iii. Was value for money achieved?
- iv. Were the social objectives achieved?

Stage 4: Construction

After the selection of the best candidate for the job has been ensured the next stage begins. This stage is the actual construction of the borehole. This stage requires the working together of the different groups; the community, the government and the contractor. In this stage all the major objectives of the entire process must be achieved.

All the Local Content Strategies must be carried out; the borehole must be fit for purpose and meet the basic standards set at the initial stage. The community must also play a supervisory role to ensure that the Contractor is performing according to the Project Plan as they have easier access to the site. The government on its part must ensure the prompt payment of the contractor provided he meets the laid down certification criteria set.

At the end of the construction, there is the usual Defects Liability Period of 6 months. Normally within this period the borehole should be used by the community and any defects

discovered this period would be rectified by the contractor. This still applies and the contractor should also provide a warranty on the product.

Gateway 3

At the end of the Defects Liability Period is the third gateway. The gateway here primarily ensures that the project objectives are achieved and value was received for the resources that were engaged at the construction stage. The issues that need to be addressed at this stage include;

- i. Were the project objectives achieved?
- ii. Was the contractor paid on time?
- iii. Was the best product possible produced?
- iv. Lessons learnt are compiled at this point
- v. Was the community involved?
- vi. Were local content strategies used?
- vii. Was value for money achieved?

Stage 5: Operation and Maintenance

The final stage of the process is the Operations and Maintenance stage. This stage is very vital and the success of this stage depends largely on the previous stages. For example what materials were used in the construction? What type of borehole is installed? Etc. If the previous stages are successful, this stage has a higher probability of being successful too. In terms of time, this is the longest stage. The lifecycle of a borehole is at least 20 years (McLellan,1999). A partnership is proposed in this stage between the Local Government Authority and the Community. Whereby the Community fund and oversee the daily running of the infrastructure and the Local Government funds and oversees the maintenance of the

borehole. The terms of the partnership should be clearly defined and agreed by the parties at the beginning of this stage. During this stage, there should be feedback given back to the Ministry on the lesson learnt from the current process so as it can be improved. At the beginning of this stage, a report should be compiled by all the stakeholders of the process on the lessons learnt. The research recommends that at the end of the first year and subsequently after every 3 years, the community should inform the Ministry of Environment of the progress and any major problems encountered in the operations and maintenance of the borehole. This would allow them to improve the criteria and the project objectives set at the initial stage.

Table 5.1 presents the detailed breakdown of the procurement strategy. It provides a stage by stage break. Stating all the activities in each stage. The stage requirements, outputs and assigns responsibilities for carrying out each activity.

Table 5.1 Procurement Strategy for the Provision of Potable Water Infrastructure in LIUAs

Stage	Activities	Input/ Requirement	Output	Responsibilities
Need Identification	i.	Creation of Community Document	Community Document	Community leaders
	ii.	Submission of Community Document		
	iii.	Organisation of Community Consultations.	Project objectives identification	Community and NASS representation
	iv.	Community consultation		
	v.	Geotechnical test of project site		
	vi.	Land ownership issues resolved	Community Consultation Document providing;	FME
		i. Appointment of Community Liaison Officer	Community, FME	
		ii. Project site	Consultants & FME	
		iii. Project brief		
			Geotechnical tests result	Consultants & FME
Design	i.	Production of Design	Community Consultation Document/ Project Brief	FME, CLO, Consultants
	ii.	Approval of Design		
	iii.	Secure funding		
			Geotechnical Test results	Sufficient funding for project.
Gateway 1	Ensure project viability, clear project objectives, fulfil basic principles of procurement strategy and also effective of design to achieve goals			
Tendering	i.	Tendering process (fulfilling provisions of Procurement Act such as advertising and open tendering)	Final Design	FME, CLO and Consultants
	ii.	Tender evaluation	Tendering evaluation checklist based on project objectives and Provisions of Procurement Act 2007	Public
	iii.	Ensure entrenchment of Local Content and training requirements in proposed construction		
Gateway 2	Ensures fairness, transparency, value for money in the process so far. Definition of success in long run. It also sets out to be deployed.			
Construction	i.	Actual Construction		All
	ii.	Local content initiatives		Community youth
	iii.	Supervision of project		Public
	iv.	Defects Liability Period		
Gateway 3	Assessment of whether project objectives were achieved.			
Operations and Maintenance	i.	Operations		Community leaders
	ii.	Maintenance		Local Government
	iii.	Provision Lesson learnt document	Lessons Learnt document	All
	iv.	Feedback Mechanism	Report submitted at end 1st year and every 3 years subsequently.	Community and FME

5.3 Strategy Validation

Questionnaires were distributed to the stakeholders recognised in the research namely Client Organisation, Contractors, Community (leaders, women and youth) and other industry experts (Engineers that have over 10 years' experience in the Water Engineering Industry). The distribution of the questionnaires was as follows; Community (25%), Contractors (40%), Client organisations e.g. MDG/SDG, FME, FMW (25%), and members of the Industry (10%). All the questionnaires were administered by the Researcher. The aim of the validation was to validate;

- i. validation of the aim and objectives of the Strategy,
- ii. usefulness of the Strategy to achieving the goals of each respective stakeholder and the industry in general,
- iii. the structure, philosophy and approach to the Strategy,
- iv. the key elements in the major issues which are essentially important to the content of the Strategy.

The questions were rated on a scale of 1-5, where 1- strongly disagree and 5- Strongly agree.

The results are as follows:

Table 5.2 Validation Results

Criteria	Average
<i>General</i>	
1. Ease of Use	4.85
2. Clarity	4.90
3. Useful to user	4.25
4. The developed process can help you achieve your project objectives.	4.70
5. The developed process will help eradicate the problems you highlighted previously (only those previously interviewed)	4.50
<i>Effectiveness Criteria</i>	
1. The introduction of community document would ensure that the identification of need provides the right fit for the end product.	4.75
2. Compulsory site visitation and community involvement in the planning stage of the procurement process is essential in achieving project objectives.	4.85
3. Community involvement is essential to the procurement of water infrastructure.	4.80
4. The developed framework incorporates the principles of sustainability of the process.	
a. Feedback mechanism	
b. Resource allocation and availability	3.80
c. Risk Allocation	
5. The developed framework incorporates the ideal amount of community development in the process	4.60

For the purposes of the research a weighting of over 3.50 is favourable. The respondents generally agreed that;

- i. Their organisational/ stakeholder goals would be achieved with strategy,
- ii. Sustainability had been built into the strategy although 20% of the respondents felt the resource allocation and availability were not addressed properly in the strategy.

The research refrained from making any assumptions on the budgetary resource allocation as it was sensitive to the political leanings of the government of the day.
- iii. Community involvement was essential and level of involvement was sufficient.
- iv. Communities were needed to provide an adequate need assessment and design brief.

CHAPTER 6

6.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary of Findings

The key findings of the study are as follows;

- i. only the traditional competitive-based procurement strategy is used for the provision of water infrastructure to the low income urban areas towards meeting the MDGs/SDGs targets by the public sector.
- ii. the prevailing procurement strategy is fragmented entailing the public sector being responsible for funding, design, and supervision of the entire process; the contractor being responsible for the construction of the asset while the community's roles in the process include the provision of land for citing the asset and the maintenance and operation of the infrastructure.
- iii. the main type of water infrastructure being provided to these special areas were boreholes; and includes the borehole itself, a water treatment plant, pipes, a pump, water taps and an overhead tank.
- iv. the prevailing strategy is ineffective and the shortcomings identified are: the lack of timely payment to contractors, political uncertainty, political interference and lack of professionalism, budgetary issues, lack of consideration for sustainability, absence of maintenance culture, poor quality of the construction, exclusion of the communities from the process and non-functionality of the boreholes
- v. the role of the communities was important in adding value and ensuring the success of the projects (See 4.4). The impact and attendant benefits of the infrastructure on

the community include improved quality of life, positive impact on health, less hardship for primary procurers (women), more effective planning of the process through their local knowledge, better value for money through the use of local resources, longer life cycle of the borehole due to the provision of better maintenance and operation, more effectiveness to the service population of the borehole by ensuring the location that is accessible to all members of the community.

- vi. the main barriers to the effective delivery of water infrastructure includes lack of community involvement, inadequate design, lack of transparency, lack of payment to contractors, adversarial relationships, political interference, land issues, lack of feedback mechanisms, no planned maintenance and operation plan, non-provision for cost of maintenance and the lack of sustainability of the whole process.
- vii. an effective procurement strategy for providing water infrastructure to the low income urban areas was developed and validated that integrates all the relevant stakeholders (including the beneficiary communities) throughout the life cycle of the assets and ensures attainment of value for money.

6.2 Conclusion

The examination of the current strategy used for procuring water infrastructure to low income urban areas revealed that the process is fragmented, ineffective and lack in sustainability and impact. Meanwhile, extant literature had established the importance of sustainable and synergistic procurement strategies that evolve from the people for which a project is intended. Consequently, an effective and holistic five-stage strategy was developed which includes maintenance and operations stage as well as feedback mechanism. The strategy also

encompasses the involvement of communities, whole life costing considerations and appropriate risk allocation in order to ensure attainment of value for money.

6.3 Recommendations

In order to ensure maximum impact of the proposed strategy, the following are recommended:

- i. The proposed strategy should be adopted for the procurement of potable water infrastructure to low income urban areas in Nigeria in order to benefit from the provided detailed list of the key stakeholders, the stakeholders' roles and responsibilities, effective risk distribution, framework of the activities to be undertaken, the requirements and desired outcomes of each activity.
- ii. Communities should play a vital role in the procurement of potable water infrastructure in order to obtain benefits that include: more effective planning of the process through their local knowledge, better value for money through the use of local resources, longer life cycle of the borehole due to the provision of better maintenance and operation, more effectiveness to the service population of the borehole by ensuring the location that is accessible to all members of the community.
- iii. The inculcation of sustainability principles into the procurement process for the provision of potable water infrastructure to the target group in terms of funding and payments, design, whole life costing, value for money as well as operation and maintenance plans.

6.3.2 Recommendations for further research

Based on the limitations of this research and other related issues identified from literature, some of the key pertinent issues that require further research are recommended below. These issues are pertinent given the huge investments in public procurement of potable water and the attendant negative effects of unsatisfactory outcomes on the health and wellbeing of citizens.

1. There is need to investigate the most appropriate strategy for involving the communities within the ambit of the existing Public Procurement Act or identifying any amendments required thereto.
2. There is also the need to investigate the cost economics involved in the provision of potable water infrastructure via the proposed strategy both during construction and operational phases of the assets.

6.4 Contributions of This Research

The study:

- i. identified key challenges hindering procurement of potable water infrastructure to low income urban areas in Nigeria to include lack of community involvement, absence of feedback mechanism, lack of consideration for sustainability and maintenance issues.
- ii. established that the current procurement process is based on competitive tendering, is fragmented, excludes whole life cycle costing & value for money and has ineffective risk distribution.

- iii. developed a procurement strategy for the effective provision of potable water infrastructure to low income urban areas that is flexible and guides the stakeholders through the stages of the procurement strategy and provides effective decision making.

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APPENDICES

**AHMADU BELLO UNIVERSITY, ZARIA.
DEPARTMENT OF QUANTITY SURVEYING
VALIDATION QUESTIONNAIRE**

This questionnaire is part of a doctoral research intended at improving the effectiveness of procurement strategies for the provision of water to low income urban areas in Nigeria. You have been selected to receive this questionnaire because you have been identified as a stakeholder in the process. The aim of the questionnaire is to test the validity of the strategy developed as part of the research. You are expected to watch a 10 minute presentation before answering the questionnaire.

The questionnaire consist of 2 parts. The first part is the general criteria in terms of application and understanding. The second part of the questionnaire tests the effectiveness of the strategy. Your answers will be treated as completely confidential by the Research and will only be released as part of a statistical analysis. Individual answers will not be shared.

Please tick the number which corresponds with your level of agreement.

- Where 1- Strongly Disagree,
 2- Disagree,
 3- Neutral,
 4- Agree
 5- Strongly Agree

PART 1: GENERAL CRITERIA

General Criteria	1	2	3	4	5
6. Ease of Use					
7. Clarity					
8. Useful to stakeholder					
9. The developed process can help you achieve your project objectives.					
10. The developed process will help eradicate the problems you highlighted previously (only those previously interviewed)					

PART 2: EFFECTIVENESS CRITERIA

Effectiveness Criteria	1	2	3	4	5
1. The introduction of community document would ensure that the identification of need provides the right fit for the end product.					
2. Compulsory site visitation and community involvement in the planning stage of the procurement process is essential in achieving project objectives.					
3. Community involvement is essential to the procurement of water infrastructure.					
4. The developed framework incorporates the principles of sustainability of the process. <ul style="list-style-type: none"> a. Feedback mechanism b. Resource allocation and availability c. Risk Allocation 					
5. The developed framework incorporates the ideal amount of community development in the process.					

