An Analysis of the Achievement of the Water and Sanitation Target of the Millennium Development Goals in Sub-Saharan Africa

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Abstract

Since 2000, countries around the world have worked towards the achievement of the Millennium Development Goals (MDG). This major research paper will analyze the achievement or non-achievement of MDG Target 7.C of "halving, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation" (United Nations, 2015) in Sub-Saharan Africa (SSA) in general and two case study countries in particular – Nigeria and South Africa. The achievement of target 7.C will play a crucial role in poverty alleviation. Water and sanitation are key elements to several aspects of human health, development and well-being. For example, access to safe drinking water and basic sanitation can help reduce the incidence of diseases resulting from the consumption of contaminated water.

In SSA and the case study countries, while there have been progress in meeting the access to safe drinking water target, the record on meeting the sanitation target is highly unsatisfactory. There are currently 32 percent of the population living without access to safe drinking water and 70 percent of the population who do not have access to basic sanitation in the SSA. The evidence suggests that while there are no physical barriers to meeting the MDG 7.C targets in SSA, the region will not be able to attain the targets primarily due to human induced causes and continuing issues of poor governance, weak legislation, and lack of financial and human resources.

List of Acronyms

FAO	Food and Agriculture Organization
IDG	International Development Goal
IMF	International Monetary Fund
JMP	Joint Monitoring Programme
NGO	Non-Governmental Organisation
MDG	Millennium Development Goal
MRP	Major Research Paper
OECD	Organization of Economic Co-operation and Development
OECD DAC	Organization of Economic Co-operation and Development - Development Assistance Committee
RUHEPAI	Rural Health Promotion and Poverty Alleviation Initiative
SDG	Sustainable Development Goal
UN	United Nations
UNEP	United Nations Environmental Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Fund
UNW-DPAC	United Nations-Water Decade Programme on Advocacy and Communication
VIP	Ventilated Pit Latrine
WHO	World Health Organization
WSSCC	Water Supply and Sanitation Collaborative Council
WWAP	World Water Assessment Programme

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1 Introduction

Despite significant international efforts, availability and access to safe water[1] and sanitation practices continues to remain a global challenge. A major proportion of the global population lacks access to safe drinking water and basic sanitation. In 2000, 18 percent of the global population lacked access to safe drinking water while 50 percent lacked access to basic sanitation (United Nations, 2001). Twelve years later, in 2012, 11 and 36 percent of the global population still lacks access to safe drinking water and basic sanitation respectively (WHO & UNICEF, 2014).

The purpose of this major research paper (MRP) will be to examine how, why and where the international community has lagged behind in meeting these fundamental challenges. It will examine the achievement or non-achievement of target 7.C of the Millennium Development Goals; "halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation" (United Nations, 2015). More precisely, this MRP will analyse whether the target was achieved in Sub-Saharan African countries.

1.1 Drinking Water and Sanitation Challenges

1.1.1 Sustainable Access to Safe Drinking Water

"Freshwater is vital for practically every aspect of lives of humans, animals, plants, environments and ecosystems. It can be the difference between life and death" (Sivakumar, 2011, p. 532).

In 1990, the percentage of world population with access to improved drinking water sources was 76 percent; in 2015 it is 91 percent (UNICEF & WHO, 2015). In other words, since 1990, 2.6 billion people have gained access to safe drinking water. The global expected target of 88 percent was reached five years before the 2015 MDG deadline. However, Caucasus and Central Asia, Northern Africa, Oceania and Sub-Saharan Africa (SSA) did not reach their respective targets in 2015. Currently, there are 663 million people worldwide living without access to safe

[1] Water in the context of this MRP refers to freshwater defined as water that is not seawater *i.e*. salted water. Freshwater is naturally occurring on Earth in lakes, rivers, ponds, groundwater, glaciers, ice sheet, snow and several kinds of wetlands. Approximately 2.4 percent of the Earth's water is fresh water; the rest is seawater (Cunningham, Cunningham & Saigo, 2005).

drinking water. The lowest levels of coverage of access to safe drinking water are found in the 48 least developed countries. The population most affected are poor people living in rural areas in developing countries in 2015; eight out of ten people in these areas were living without access to safe drinking water (UNICEF & WHO, 2015).

The inability to satisfy basic human water needs can be mainly due to physical and human causes. Some authors argue that water scarcity is caused by a mismanagement of water resources rather than an actual natural physical lack of water (Gleik & Palaniappan, 2010; Sivakumar, 2011; Lu, Ocampo-Raeder & Crow, 2014). To them, the scarcity of safe drinking water often results from the absence of efficient water resource management, functional services and good governance. Some others argue that it is actually a question of natural physical lack of water (Cook, Fisher, Tiemann & Vidal, 2011). No matter how water scarcity is caused, access to safe drinking water and basic sanitation are both required to satisfy basic human needs to live a healthy life (United Nations Development Programme, 2006; Jain & Singh, 2010).

1.1.1.1 Physical Aspects of Water Scarcity

Even though the Earth is covered by a lot of water, only a small percentage is actually available for human consumption. The majority of water found on Earth is in the oceans (precisely 97.4 percent) and therefore saline. It is difficult to convert sea water for human consumption without the use of expensive technology and treatment (Jury & Vaux, 2007). The remaining 2.6 percent is fresh water, but most of it is trapped in glaciers, permanent snow cover or deep groundwater. Just a small fraction is readily available for human consumption in surface water such as rivers or lakes and in accessible groundwater (Jury & Vaux, 2007; Gleik & Palaniappan, 2010). The amount of freshwater available is not evenly distributed around the world. Some regions are rich in freshwater while others are not (Niemczynowicz, 2000; Jared, 2003; Cunningham, Cunningham & Saigo, 2005). For example, a fifth of the world's resources of freshwater are found in Canada (Keen, 2003). Water scarcity occurs in mostly arid and semi-arid regions, where there are natural shortages of water due to climatic, geographical and environmental conditions (Cunningham, Cunningham & Saigo, 2005).

Water is described as a renewable natural resource because it can be recycled and recharged naturally via the hydrological cycle (Gleick and Palaniappan, 2010). For example, rain falling from the sky replenishes surface water such as lakes, rivers and streams. Also when it percolates into the soil, it recharges groundwater. However, water can also be considered non-renewable when resources of water are extracted faster than the natural recharge rate. For example, freshwater found in groundwater aquifers have a very slow recharge rate and when the water is pumped out faster at a rate faster than the recharge rate, the water is no longer renewable (Gleick and Palaniappan, 2010). According to the Lavoisier's Law of Conservation of Mass, no quantity of water can be lost or created but only transformed. Water is transformed from either solid, liquid or gas forms to another through natural sequences but it can also be transformed by human activities and pollution. Water is degraded to a very poor level of quality via pollution such as agricultural and industrial waste, making it toxic for any living being to use and consequently increasing the scarcity of freshwater. Geographical distribution of water, climate change and natural disasters also contribute to water scarcity (Cunningham, Cunningham & Saigo, 2005).

1.1.1.2 Human induced water scarcity

Availability of freshwater is affected by human activity. Since the 1950s, the global demand for freshwater has tripled and will continue to increase as world population grows (Hanigra & Qureshi, 2010). Population growth puts tremendous pressure on freshwater resources (Melloul & Collin, 2001) and is an important driver for water-related problems. In particular, it can jeopardize the ability to meet the current and future global needs for water when combined with mismanagement of water resources (Gawel & Bernsen, 2011). "An increase in population normally leads to an increase in water demands in almost all sectors (domestic, industrial, agricultural, energy and recreation), unless water management practices become more efficient" (Sivakumar, 2011, p. 532). Agricultural needs for freshwater increases as more food is needed; by the year 2050, it is predicted that 70 percent more food will be needed (Cook *et al*, 2011). In reality the agricultural sector "is overwhelmingly the dominant consumer of fresh water" (Jury & Vaux, 2007, p.9). Most of the water is used for irrigation purposes - almost 85 percent of the world's consumption of water is for irrigation (Kanwar, 2010; Duarte, Pinilla &

Serrano, 2014). The expansion of urban population, especially in mega cities in developing countries, also increases the demand for water and the need for more efficient means to distribute water to all including the poorest people (Niemczynowicz, 2000). Overall the growing demands for water from all sectors, especially agricultural, domestic and industrial, reduce the amount of water available to address basic human needs and ecosystems requirements (for plants, animals, rivers, etc.) (Gurría, 2009; Hanigra & Qureshi, 2010; Organization for Economic Co-operation and Development, 2010).

Human actions and inactions that cause freshwater scarcity include those of the government as well as the people. Government inactions or inabilities to provide safe drinking water and basic sanitation can result from the lack of governance, financial resources and/or infrastructure and physical installations. These services cover the provision of safe drinking water, the coverage, treatment, quality control and the maintenance of the infrastructure (OECD, 2010). Continuous poor governance and mismanagement of water resources exacerbate the problems of access to, coverage, use and conservation of safe drinking water in developing countries (Sivakumar, 2011; Koutsoyanis, 2011; Lu *et al.*, 2014). Water services and sanitation are often low in government policy priorities. There is also a lack of government capacities and political will to put in place and implement policies, regulations and institutions to efficiently and effectively manage water resources as well as provide safe drinking water and adequate sanitation services to all citizens (UNICEF, WHO & WSSCC, 2008; Lenton, Lewis & Wright, 2008; Krause, 2009; Jain & Singh, 2010; Sivakumar, 2011; Halleröd, Rothstein & Daoud, 2013; WWAP, 2015). Current water management practices used in many developing countries, especially in Sub-Saharan African countries, are inefficient and suboptimal to provide the level of quality and quantity of safe drinking water needed (Jain & Singh, 2010; Sivakumar, 2011). Major institutional constraints also worsen the situation creating more disparities in access to safe drinking water (Cook *et al.,* 2011). The key institutional constraint is the absence of appropriate institutions at all levels that work in coordination to manage water resources and the demands from each sector. The existing institutions, formal and informal, do not have adequate capacity, accountability and transparency and sound regulatory systems to properly manage drinking water services (Lenton *et al.*, 2008).

Lack of sufficient and sustainable financial resources to provide safe drinking water and adequately manage water resources as well as the ability to purchase the water on the part of the people are major issues in many developing countries (Rheigans, Dreibelbis & Freeman, 2006; Lenton *et al.*, 2008; Koustsoyiannis, 2011; Sivakumar, 2011). Corruption is an important part of the problem (WWAP, 2015). Also the price of drinking water paid by people in developing countries is often very high and represents a large portion of their household income (Rheigans et al., 2006; United Nation Development Programme, 2006). The lack of proper water infrastructures and technologies usually goes hand in hand with the problem of insufficient financial resources. The development and maintenance of water infrastructures and technologies require a lot of money and developing countries lack the funds to do it (Rheigans *et al.,* 2006; Lenton *et al.*, 2008).

There are major disparities in the availability of infrastructure and services between rural and urban communities (WHO & UNICEF, 2006). A much higher percentage of urban households have access to drinking water than rural households. The causes for such disparities include lower incomes of rural households, the high costs of extending services in rural areas, the expansion of cities and consequently increasing needs and, the rural communities' lower level of political influence and power (Rheigans *et al*., 2006). However there are discrepancies between users in urban settings as well, especially due to the rapid expansion of cities where the provision of services cannot keep up with the demand. The rural to urban migration and subsequently the rapid expansion of urban centres in developing countries is forcing millions of people to live in in slums where there is minimal or no access to safe drinking water and basic sanitation. The number of people living in such conditions is increasing (WHO & UNICEF, 2006; United Nations, 2014). "Poor people living in the slums often pay five to ten times more for a liter of water than the wealthy people living in the same city" (Jain & Vijay, 2010, p.221).

In regions and countries affected by wars, conflicts and political instability, access to safe drinking water and basic sanitation to the population is greatly disturbed and consequently diminished (WHO & UN-Water, 2012; WWAP, 2015). For example, several years of political instability and numerous conflicts in Gaza are degrading the environment and the local water

resources. Consequently, the provision of safe drinking water to the population is becoming more and more of a problem (Shomar, 2011) and sustainable solutions are only possible within a stable political environment.

Availability of freshwater also depends on who owns or is assigned the right to it as in the case of transboundary water sources where tensions and/or conflicts can arise and cause more scarcity (Zeitoun & Mirumachi, 2008). Countries sharing water resources (both surface water and groundwater resources) each want to use the amount of water required to meet the needs for their citizens; however one country's use of shared water resources will impact the usage of another country and the ability to meet its needs (Jay & Singh, 2010; Linton & Brooks, 2011). Without good cooperation and collaboration between countries, sharing the same water resources, the effective management of the resources is impossible (Linton & Brooks, 2011; Leb, 2014).

The inefficient use and waste of water is a major contributing factor to water scarcity. Increasing demands on water resources require adequate and efficient water management practices so that there is no waste. As the world population grows, more demand will have to be met with the same amount of water we have today. Sharp increases in water use by all production sectors (such as the manufacturing, energy and food industry) are often inefficient and unsustainable causing unnecessary waste of the precious resources (WWAP, 2015).

Climate change contributes to intensifying water scarcity through changing the availability of water supply. The amount of freshwater available for human use can vary depending on the level of degradation of the water (for example through pollution). Consequences of climate change contributing to water scarcity are an increase in frequency and magnitude of extreme climatic events such as floods and droughts; an alteration of precipitation patterns; a decrease in snow cover and; a faster and widespread melting of ice (World Bank, 2015; United Nations, 2014; Schiermeier, 2014; Alavian et al, 2009). It is expected that by 2025, 1.8 billion people will live in countries or regions where there will be a state of absolute water scarcity (World Bank, 2015; United Nations, 2014). The United Nations describes absolute water scarcity as a

situation where annual water supplies of a country or region become less than 500 cubic metres per person (United Nations, 2015).

1.1.2 Issues in Sustainable Access to Basic Sanitation

In broad terms, sanitation is defined by the World Health Organization (WHO) as the "provision of facilities and services for the safe disposal of human urine and faeces" (WHO, 2015). However the term sanitation also includes the maintenance of hygienic conditions through services and activities such as the management, collection, use and/or recycling of household wastewater (often referred to as sullage or grey water) and industrial waste, drainage of storm water, management, reuse and/or recycling of solid waste, etc. (UNICEF, WHO & WSSCC, 2008; WHO, 2015). The WHO/UNICEF Joint Monitoring Programme for water supply and sanitation (JMP) defines "improved sanitation facility" as a facility "that hygienically separates human excreta from human contact" (WHO/UNICEF JMP.). This definition is widely adopted among the UN system.

The challenges that communities, regions and countries face due to the lack of sanitation cannot be addressed with a "one-size fit all" type of solution; mostly because these challenges are not the same everywhere. Each community, region or country needs to prioritize their challenges and use pragmatic and flexible solutions to address them (UNICEF, WHO & WSSCC, 2008).

In 1990, the percentage of the world's population who had access to improved sanitation facilities was 54 percent; in 2015 it is 68 percent (UNICEF & WHO, 2015). There was an increase in access to sanitation in developing countries except in Oceania where sanitation coverage has remained the same since 1990. However in 46 countries, more than half of the population lack access to improved sanitation facilities. The regions with the lowest sanitation coverage continue to be South Asia and SSA (WHO & UNICEF, 2014; WHO 2014). There are still 2.4 billion people in the world who do not have access to basic sanitation (UNICEF & WHO, 2015) and of those, one billion practice open defecation i.e. "defecate in the open, for example in street gutters, behind bushes or into open bodies of water" (WHO 2014).

The reasons for such a high number of the world's population is living without access to basic sanitation are the lack of infrastructures, services, financing and governance (Bartram, Lewis, Lenton & Wright, 2005; Lenton *et al.*, 2008; Mara, Lane, Scott & Trouba, 2010). As mentioned earlier, addressing the sanitation crisis is often not a government policy priority. Both at the international and national levels, sanitation do not get much attention. International aid devotes a smaller percentage of budgets to address sanitation issues compared to other more popular issues such health and education (Cumming, 2009; Cairncross, Bartram, Cumming & Brocklehurst, 2010). At the national level, governments do not commit enough financial resources to enable significant actions to solve sanitation issues. Being a low priority item on national budgets, sanitation gets funded mostly through international aid (Lenton *et al.*, 2008; Cairncross *et al.*, 2010).

Several institutional constraints further inhibit the enhancement of sanitation coverage. National policies and plans for sanitation are generally nonexistent. Governments do not develop or implement adequate and transparent regulations that oversee sanitation coverage and services. Often, there are no appropriate institutions to administer the services and the existing ones are highly dysfunctional. The lack of accountability and inadequate capacity are also part of the problem (Lenton *et al.*, 2008; Fry, Mihelcic & Watkins, 2008; Cumming, 2009; Cairncross *et. al*, 2010).

Financial insufficiency is at the core of the problem as several developing countries depend on external support to finance sanitation infrastructures and services (UNICEF, WHO & WSSCC, 2008; Fry, Mihelcic & Watkins, 2008; Krause, 2009; Jain & Singh, 2010; Halleröd, Rothstein & Daoud, 2013; WWAP, 2015). Financial resources are needed to build improved sanitation infrastructure, to refurbish existing ones and to provide the services that include the collection, processing and treatment of waste (Rouse, 2014). In urban centers, the sanitation coverage is better due to the higher levels of infrastructures and services however cities and government fail to provide the same in slums and rural areas (Mara *et al.*, 2010; Okuruta, Kulabakob, Chenowetha & Charlesa, 2015).

The adverse social, economic and environmental consequences of the lack of sanitation are very high. The discharge and/or accumulation of excreta, wastewater and other waste is the root cause of several infectious diseases such as diarrheal disease, cholera, hepatitis (A and E) and typhoid fever just to name a few (UNICEF, WHO & WSSCC, 2008; Fry, Mihelcic & Watkins, 2008; Barry & Hugues, 2008; WHO, 2014; Prüss-Ustün et al., 2014; WWAP 2015). It is estimated that, in low and middle income countries, more than 840,000 people die each year due to the lack of water, sanitation and hygiene (WHO, 2104). The lack of sanitation significantly contributes each year to the high levels of child mortality (Cumming, 2009).

History has proven on numerous occasions that sanitation "is the single most cost-effective major public health intervention" (Cumming, 2009 p12) and yet it is highly neglected. The economy is also impacted by the lack of sanitation. The population suffering from the related diseases have reduced and/or no capacities to be part of the active workforce or attend school (in the case of students). With appropriate sanitation, people would be less sick and they would then be able to focus their energy on their normal activities. Plus, it would reduce the burden on health systems reducing expenses and therefore the need for financial resources which could be redirected elsewhere (Cumming, 2009; Mara *et al.*, 2010). The lack of sanitation further increases pollution, especially water pollution since common practices are to directly discharge untreated wastewater in the surrounding environment. Pollution from untreated wastewater contaminates natural water resources like lakes and rivers and adversely impacts fauna and flora. It even contaminates crops if they are irrigated or washed by polluted waters (UNICEF, WHO & WSSCC, 2008; Baum, Luh & Bartram, 2013; WHO, 2104; WWAP, 2015).

1.1.3 International Initiatives to Address Water and Sanitation Concerns

Several initiatives were undertaken over the years to address the global water crisis: there was the United Nation Water Conference in 1977, where access to water by "all peoples whatever their stage of development and social and economic conditions" (UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC), 2014, p.1) was recognised as a human right for the first time. The Conference was followed by the International Drinking Water Supply and Sanitation Decade (1981 to 1990) during which approximately 1.3 billion

people living in developing countries gained access to safe drinking water (UNW-DPAC, 2014). Water scarcity was one of the four main issues addressed in the Earth Summit of Rio de Janeiro in 1992. The year 2003 was declared the "International Year of Freshwater" (UNW-DPAC, 2014). Afterwards UN-Water, an inter-agency body of the United Nations responsible for the coordination of all issues related to freshwater and sanitation was established (UN-Water, 2014). UN-Water is composed of 31 members that are UN entities such as the World Health Organization (WHO), the Food and Agriculture Organization (FAO), United Nations International Children's Fund (UNICEF), United Nations Educational, Scientific and Cultural Organization (UNESCO) and United Nations Environment Programme (UNEP). It also works in partnership with 37 partner organisations that are not part of the UN systems. Some of those partners are the World Wildlife Fund (WWF), WaterAid and Water.Org (UN-Water, 2014). Finally, the period from the year 2005 to the year 2015 was proclaimed as the "International Decade for Water – Water for Life" (UNW-DPAC, 2014).

1.2 Millennium Development Goal 7: Ensure Environmental Sustainability

In 2000, at the United Nations Millennium Summit, leaders of 189 countries agreed to take action and commit to a global partnership in order to reduce extreme poverty (United Nations, 2015). Following the Summit, a group of experts from the UN, World Bank, International Money Fund (IMF) and the Development Assistance Committee from the Organization of Economic Co-operation and Development (OECD) worked together to identify measurable targets for the MDGs (Hulme, 2007; Waage et al., 2010; Vandemoortele, 2011; Fehling, Nelson & Venkatapuran, 2013; Brolan, Lee; Kim & Hill, 2014; United Nations, 2015). These targets were drawn from not only the Millennium Declaration but also previous UN conferences and summit. Also the International Development Goals (IDG) developed and published by the OECD in the year 1996 strongly influenced the selection of the UN targets. A total of eighteen targets were identified and grouped under eight objectives, each aligned to a specific theme, that were to be achieved by 2015. These eight objectives became the Millennium Development Goals (MDG) (Annex 1) (Hulme, 2007; Waage *et al.*, 2010; Vandemoortele, 2011; Brolan, Lee; Kim & Hill, 2014). The group of experts determined that the MDGs would be measured using a span of

twenty-five years – using 1990 as the baseline year and 2015 as the end year (Vandermoortele, 2011; United Nations, 2001). The MDGs[2] were "included in the *Road map towards the implementation of the United Nations Millennium Declaration*, presented to the UN by Secretary-General Kofi Annan on 6 September 2001, and endorsed the next year at the International Conference on Financing for Development at Monterrey" (Brolan *et al.*, 2014).

The seventh MDG aimed at ensuring environmental sustainability by 2015 (United Nations 2015). Environmental sustainability is not an easy concept to define. Goodland (1995) defines it as the "maintenance of natural capital" where waste emissions is not produced faster than the ability of the environment to assimilate in the present or in the future and where renewable resources and non-renewable resources are used either within or below their regenerating capacities and while better renewable substitute are developed. Environmental sustainability is defined by the United Nations as "meeting current human needs without undermining the capacity of the environment to provide for those needs over the long term" (UN Millennium Project, 2005). Therefore "achieving environmental sustainability requires carefully balancing human development activities while maintaining a stable environment that predictably and regularly provides resources such as freshwater, food, clean air, wood, fisheries, and productive soils and that protects people from floods, droughts, pest infestations, and disease" (UN Millennium Project, 2005).

Environmental sustainability was to be ensured through four targets addressing the integration of sustainable development principles into country policies and programmes. The four targets were – (i) the reversion of environmental resources loss, (ii) reduction of biodiversity loss, (iii) increase in sustainable access to safe drinking water and sanitation as well as the (iv) improvement in the lives of the slum dwellers (Hulme, 2007; Waage *et al.*, 2010; United Nations 2015). Each target had a set of indicators that measured their actual achievement through time and at the deadline in 2015 (Hulme, 2007; Waage *et al.*, 2010). Past initiatives by the United Nations on environmental issues such as the Earth Summit in Rio de Janeiro and the Kyoto Protocol agreement help forge the targets and indicators of MDG 7 (Castelló, Gil-González,

[2] Please refer to Annex 1 for a description of each MDG.

Alvarez-Dardet & Hernández-Aguado, 2010; Waage et al., 2010). The IDGs developed by the OECD in the year 1996 contained several targets addressing environmental issues such as water and environmental sustainability (OECD-DAC, 1996). Subsequently, each country identified their own MDG targets based on the global targets.

1.2.1 Millennium Development Goal 7: Target C

This MRP will focus on the assessment of the third target (Target C) of the seventh MDG, which consists of reducing by half the number of people living without sustainable access to drinking water and basic sanitation (United Nations, 2015). Initially when the eight MDGs were presented in the *Road map towards the implementation of the United Nations Millennium Declaration* in 2001, only the target for water was introduced. It is only during the United Nations Summit on Sustainable Development held in 2002 in Johannesburg (South Africa) that the target for sanitation was added to the seventh MDG (Salman, 2005).

As outlined before, it was estimated that in 2000, 18 percent of the world population or 1.1 billion people lacked access to safe drinking water; and approximately 50 percent of the world population lacked basic sanitation (United Nations, 2001). Target C of the seventh MDG was set to reduce by half by the year 2015 the proportion of the world population living without sustainable access to safe drinking water and basic sanitation in 1990 (United Nations, 2015). It meant that by 2015, the proportion of population living without access to safe drinking water and/or sanitation was to be reduced to at least 9 percent and 25 percent respectively.

The achievement of target 7.C will play a crucial role in poverty alleviation. As argued before, water and sanitation are key elements to several aspects of human health, development and well-being (Annan, 2000; Jain & Singh, 2010). Indeed, the achievement of all the other MDGs will depend on the achievement of this target. The collateral damages of living without safe drinking water and/or basic sanitation are far greater than just health damages - the natural environment, the quality of life, the education and the economic development of people and of entire communities are also highly affected (Jain & Singh, 2010; United Nations World Water Assessment Programme (WWAP), 2105). Access to safe drinking water and basic sanitation can help eradicate extreme poverty and hunger (MDG 1) by reducing the burden of diseases

resulting from the consumption of contaminated water and food by wastes, including human wastes, and contaminants (chemicals such as arsenic and lead, industrial pollutants and solvents). Improved sanitation and drinking water reduces the exposure to intestinal helminths (intestinal parasitic worms), occurrence of diarrheal diseases and other water-borne diseases (MDG 6) (Rheingans, *et al.*, 2006; Brocklehurst & Bartram, 2010; Jain & Singh, 2010; Marwah & Marwah, 2013). Consequently, families will be in better health, and less of their income will be put towards medical expenses. The morbidity and mortality caused by diarrheal diseases and other water-borne diseases in children, especially under the age of 5, will be reduced (MDG 4). Adults will be able to spend more time on economic and income generation activities and children, be able to attend school (MDG 2) thus helping to reduce poverty by raising income and skill levels (Rheingans, Dreibelbis & Freeman, 2006; Marwah & Marwah, 2013). Also households will be able to use safe water for bathing and cooking which reduces health complications and the burden of diseases (Marwah & Marwah, 2013).

Furthermore, Target 7.C was intended to help increase gender equality (MDG 3) as its achievement would reduce the burden on women and children, mostly girls, to collect water. In some cases, women and girls spend several hours of their day in fetching water thereby reducing the time spent on other more productive activities like caring for their children, handicrafts, farming and other income generating activities (MDG 1). Girls will be able to attend school and continue their education (MDG 2) if target 7.C is met (Rheingans, Dreibelbis & Freeman, 2006; Brocklehurst & Bartram, 2010; Jain & Singh, 2010; Marwah & Marwah, 2013). Plus adding adequate toilets in schools can provide girls with privacy for menstrual hygiene and therefore encouraging them to continue their education instead of stopping school once they start their menstruations (MDG 2 and 3) (Brocklehurst & Bartram, 2010). The reduction of the burden of fetching water on women and children increase their safety as it reduces the chance of injuries that be caused during this task (Rheingans, Dreibelbis & Freeman, 2006). A better health and the reduction of injuries for women also contribute to improve maternal health (MDG 5) (Rheingans, Dreibelbis & Freeman, 2006; Brocklehurst & Bartram, 2010).

1.3 Research Question

The MRP will concentrate on analysing the implementation of target 7.C in SSA generally and through case studies of two countries – Nigeria and South Africa. It will inquire:

i) Whether the MDG Target 7.C - halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation - has been met in this region;

ii) Are there differences in performance among the case study countries?

   a. Where was it met and why; and,

   b. Where was it not met and why?

The MRP will conclude with recommendations on how to improve performance beyond 2015 in SSA in order to contribute to the current discussion on post-2015 sustainable development goals.

1.4 Research Methodology

The analysis in this MRP is based on secondary data and extensive literature review. The research is structured sequentially as follows:

1. A literature survey will outline challenges and issues related to safe drinking water and sanitation. The literature survey was conducted by undertaking extensive search using the databases available via the University of Ottawa library. The survey also used key word searches (such as “drinking water”, “sewage”, “sanitation” and “open defecation”) in order to better target the search results. After the literature is selected, a thorough scanning of it is done based on specific key themes to help build the assessment of the MRP research questions.

2. The literature survey and the United Nations’ official data on the MDGs will be used to create a baseline on the state of access to safe drinking water and basic sanitation in the selected sub-Saharan African countries prior to the year 2000 in order to assess the achievement of the MDG Target 7.C in these countries.

3. The literature survey will also be used to determine what actions and/or initiatives the international community and countries themselves have undertaken to achieve the target, including the reasons behind the choices of these actions/initiatives and what the outcomes were.

4. The MRP will then provide an analysis on whether the target 7.C was met in the selected countries and in SSA in general, and why or why not. The analysis will illustrate where there are gaps in achieving the target and what the causes are.

5. Finally, this MRP concludes with a series of recommendations for action in the water and sanitation sectors for the new Sustainable Development Goals (SDG) to be set post-2015.

All quantitative data used in the MRP will be from the official data on the MDG indicators prepared by the United Nations Statistics Division to ensure consistency. This data is based on computations by the WHO and UNICEF Joint Monitoring Programme (JMP) for Water Supply and Sanitation. All definitions used in the MRP are also taken from the official definition used by the United Nations.

The selection of the case study countries was based their progress on the accessibility of drinking water and sanitation since 1990. SSA was chosen as the case study region because it is where the achievement of the MDGs Target 7.C was the least successful. The MRP proposal had suggested that the case studies would be of two countries that were successful in the achievement of Target 7.C and two others that were not successful in order to identify the good and bad practices and formulate stronger recommendations. The countries originally selected in the MRP proposal were Nigeria, Somalia, South Africa and the Democratic Republic of the Congo. However, on further examination of the data, it was found that it would not be possible to do a substantive analysis for Somalia and the Democratic Republic of the Congo due to insufficient data and literature. For example, the UN data on Somalia is not complete and does not lend itself to useful analysis. Therefore, the countries of the case study presented in the MRP are Nigeria and South Africa for which a large quantity of quality information is available.

1.5 Organisation of the Major Research Proposal

The MRP consists of 5 chapters,

- Chapter 1 has provided the contextual information for the MRP in describing the drinking water and sanitation challenges and the MDG 7 and Target 7.C respectively. The first chapter also provided the research question, the research methodology and the organisation of the MRP.

- Chapter 2 presents the status of access to safe drinking water and basic sanitation prior to 2000 in SSA and the case study countries based on available quantitative information on access to safe drinking water and basic sanitation as well as explanations for the causes of the good and/or bad status.

- Chapter 3 presents progress on the access to safe drinking and basic sanitation since 2000 in SSA and the case study countries and their current status.

- Chapter 4 of the MRP consists of an analysis of the achievement of MDG Target 7.C in SSA and case study countries and the remaining gaps.

- Finally, Chapter 5 provides recommendations for future actions in the water and sanitation sectors in the post- 2015 period.

2 Status of Access to Safe Drinking Water and Basic Sanitation Prior to 2000 in Sub-Saharan African Countries

2.1 Definitions

The official indicators used to monitor the progress of Target 7.C, for access to safe drinking water and basic sanitation are respectively the "proportion of population using an improved drinking water source" and "the proportion of population using an improved sanitation facility" (United Nations, 2015). The definitions are determined by UNICEF and WHO, the two agencies responsible for the monitoring of Target 7.C.

Term	Definition
Improved Drinking Water Source	Source of water "that, by the nature of its construction and when properly used, adequately protects the source from outside contamination, particularly faecal matter" (UNICEF & WHO, n.d, para. 1). It includes: • "piped water into dwelling, yard or plot; • public tap or standpipe; • tubewell or borehole; • protected dug well; • protected spring; and rainwater" (UNICEF & WHO, n.d, para. 2).
Unimproved Drinking Water Source	It includes: • "unprotected spring; • unprotected dug well; • cart with small tank/drum; tanker-truck; • surface water (rivers, dams, lakes, ponds, streams, canals, and irrigation channels); • bottled water" (UNICEF & WHO, n.d, para. 3).
Improved Sanitation Facility	Sanitation facility that hygienically separates human excreta from human contact" (UNICEF & WHO, n.d, para. 1). It includes: • "flush toilet; • piped sewer system; • septic tank; • flush/pour flush to pit latrine; • ventilated improved pit latrine (VIP); • pit latrine with slab; • composting toilet" (UNICEF & WHO, n.d, para. 3).

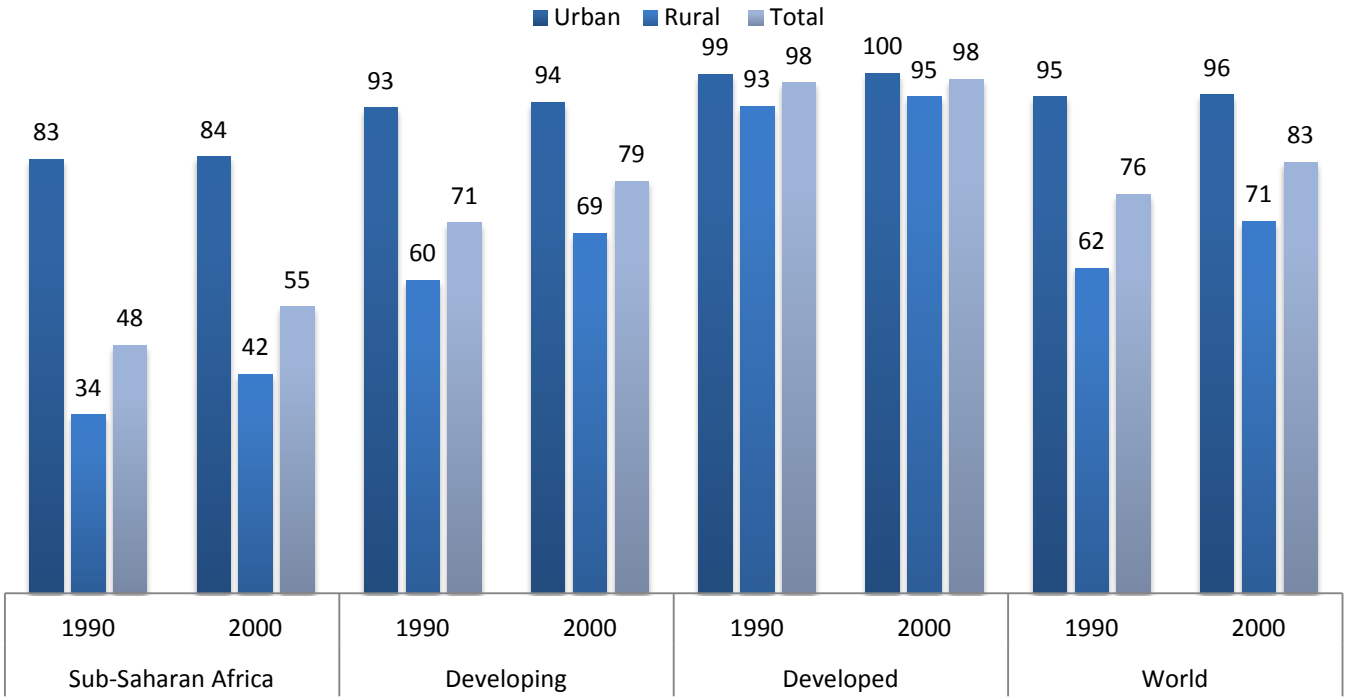
Unimproved Sanitation Facility	It includes: • "flush/pour flush to elsewhere (that is, not to piped sewer system, septic tank or pit latrine); • pit latrine without slab; • bucket; • hanging toilet or hanging latrine and no facilities or bush or field" (which result in open defecation) (UNICEF & WHO, n.d, para. 4).

These definitions only focus on the infrastructural aspects of the water source or the sanitation facility per se. They do not provide a sense of the depth of the complexity the concepts of drinking water and sanitation entail. These definitions contain several gaps that are essential components required to do comprehensive assessment of the access to safe drinking water and adequate sanitation in any given country. First, they do not include the water quality. For example, an improved drinking water source could in fact provide water contaminated with faecal matter or chemicals. The definitions need to be widened to assess microbial water quality (which include faecal matter assessment) and chemical water quality as well (Onda, LoBuglio & Bartram, 2012; Kayes, Moriarty, Fonseca & Bartram, 2013; Bartram *et al*, 2014). Second, it would be essential to measure if the delivery services are reliable and continuous over time or if they fluctuate depending on different contexts like the season. Also the definitions need to measure if the services are affordable and accessible to all without discrimination including accessibility and equity of access, especially between genders (Kayes, Moriarty, Fonseca & Bartram, 2013; Bartram et al, 2014). Finally, these definitions focus only on the household level and do not consider access in places like schools and workplaces. Extra household services are another key component to be included in the definitions and assessment of access to drinking water and sanitation (Bartram et al, 2014). For example, schools in a given area could lack access to safe drinking water and adequate sanitation facilities while all the households in that area do have access. Consequently with the current definitions, the assessment of access would omit that the children going to school in this given area and their teachers are exposed regularly to unsafe water and inadequate sanitation; putting their health at risk. Future definitions need to be more comprehensive and complete.

2.2 Sub-Saharan Africa

2.2.1 Access to Safe Drinking Water Prior to 2000 (Quantitative Data)

Chart 2.2.1: Percentage of Population Using an Improved Drinking Water Source in Sub-Saharan Africa



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

Chart 2.2.1 describes the status of access to safe drinking water in 1990 and 2000 in SSA. It also provides data on other regions for comparison. In 1990, only 47.5 percent of the population in SSA had access to safe drinking water. Between 1990 and 2000, the progress in increasing access was very slow. In rural areas, the percentage of the population with access was very low, reaching only 42.0 per cent in 2000. In contrast, the coverage for improved drinking water sources in urban areas was much higher at 83.6 percent.

In 1990, the percentage of population who had access to piped drinking water source on the premises of their home in SSA was 43 percent in urban areas and only 4 percent in rural areas. The total percentage for the entire of SSA was 17 percent. The population in urban areas not

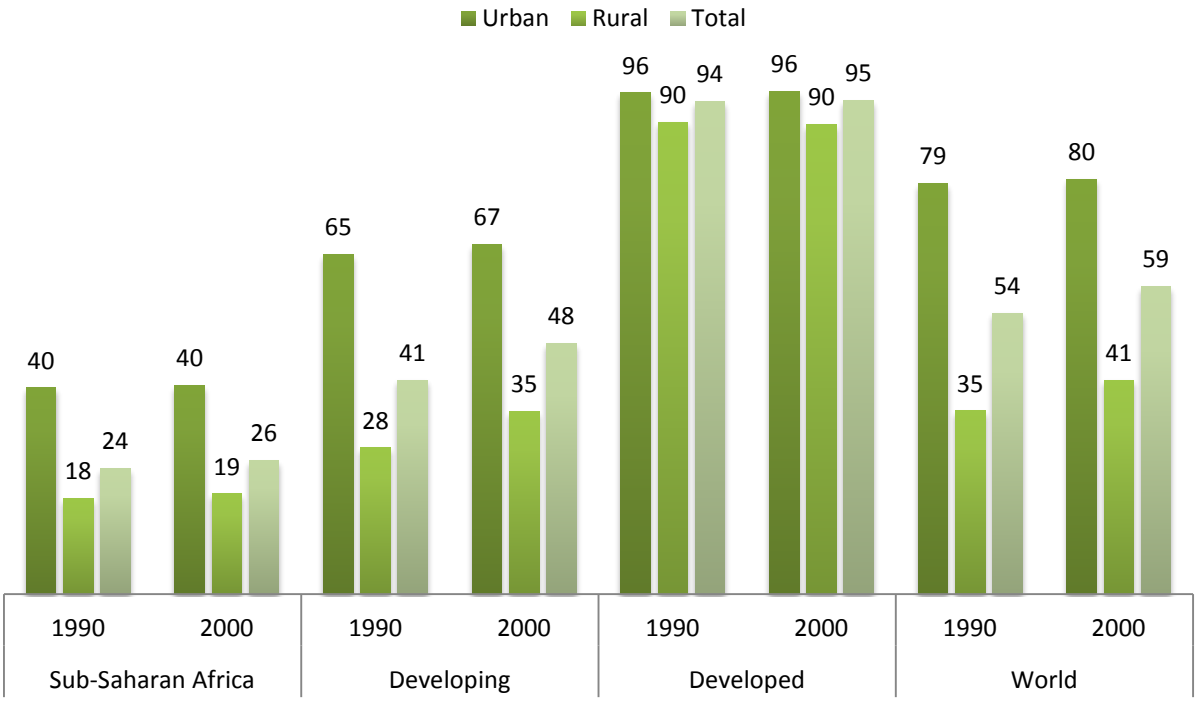
using improved sources of drinking water was 13 percent and in rural areas, it was 32 percent. Also the proportion of population directly using surface water from water bodies like lakes and rivers was only 4 percent in urban areas but 34 percent in rural areas. In SSA, the percentage of population using unimproved drinking water sources and for surface water usage was 26 percent (UNICEF & WHO, 2015[3]).

Overall, the progress done between the year 1990 and the year 2000 was very slow. There was only an increase of approximately 7 percent of population who gained access to improved drinking water sources in SSA. The access increased approximately 8 percent in rural areas while the portion of population with access to safe drinking water in urban areas remained the same.

[3] UNICEF and WHO are the two agencies in charged for monitoring and reporting the data on drinking water and sanitation via the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation (JMP). The data is then reported to the United Nations Statistics Division which compiles all the data for all the MDC indicators.

2.2.2 Access to Basic Sanitation Prior to 2000 (Quantitative Data)

Chart 2.2.2: Percentage of Population Using Improved Sanitation in Sub-Saharan Africa



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

Chart 2.2.2 provides snapshots of the sanitation situation between 1990 and 2000. As shown by the data above, the progress in access to basic sanitation was almost non-existent between 1990 and 2000, in SSA. In 1990, the percentage of population with access to improved sanitation was 24 percent and in 2000, it was 25.6 percent. This represented an annual increase of only 2 percent over the decade. The urban population with access to improved sanitation remained stagnant over the same period and the rural population gained 1 percent; passing from 18 percent to 19 percent. The percentage of the population practicing open defecation decreased from 35 percent to 32 percent (UNICEF & WHO, 2015).

2.2.3 Cause for Lack of Access to Safe Drinking Water and Sanitation in SSA

2.2.3.1 Physical Aspects of Water Scarcity

As a whole, the SSA has "abundant water resources in large rivers, great lakes, vast wetlands and limited but widespread groundwater" (Mwanza, 2003, p.102). A large part of the resources is found in the sub-region of Central Africa. In fact, the Democratic Republic of Congo is one of the top 10 countries in the world with the largest freshwater supplies (Keen, 2001). However some regions in SSA experience physical water scarcity due to lower annual rainfalls and dryer climate. The Sahel region, some Southern African countries like South Africa and Zimbabwe, as well as Somalia and Kenya experienced water stress and/or water scarcity (Clay, 1994; Keen, 2001; Mwanza, 2003).

Despite the unequal distribution of water, SSA has a lot of water potential as a whole. For a region to be considered under physical water stress, it needs to exceed the water resources withdrawal threshold of 25 percent. SSA withdrew less than 3 percent of its total water resources (United Nations, 2008, 2015). Clearly the scarcity of potable water in the region mostly resulted from human activity.

2.2.3.2 Human induced water scarcity

Access to safe drinking water and sanitation were attributed a low priority by government and not much financial resources were allocated to them (Nordberg & Winblad, 1994; Clay, 1994; Mwanza, 2003; Boadi, Kuitunen, Raheem & Hanninen, 2005). The progress to address the issues is very slow and almost stagnant in the case of sanitation (Clay, 1994). Policies and regulations ensuring transparency and accountability were not developed and implemented by governments to improve the services. Corruption is a continuous problem (Mwanza, 2003; Boadi *et al.*, 2005). Adequate infrastructures and qualified human resources to maintain the infrastructures and to manage the services were lacking both in urban and rural areas (Nordberg & Winblad, 1994; Clay, 1994; Mwanza, 2003). There were large disparities between the rich and poor populations. In urban areas, only the rich have access to drinking water and sanitation services with direct household piped connections. The poorest people living in urban centers were mostly living in slums where drinking water and sanitation services were absent.

They had to use either unmaintained shared sanitation facilities and that is when they are available (Nordberg & Winblad, 1994; Mwanza, 2003; UN, 2005; UNICEF & WHO, 2015).

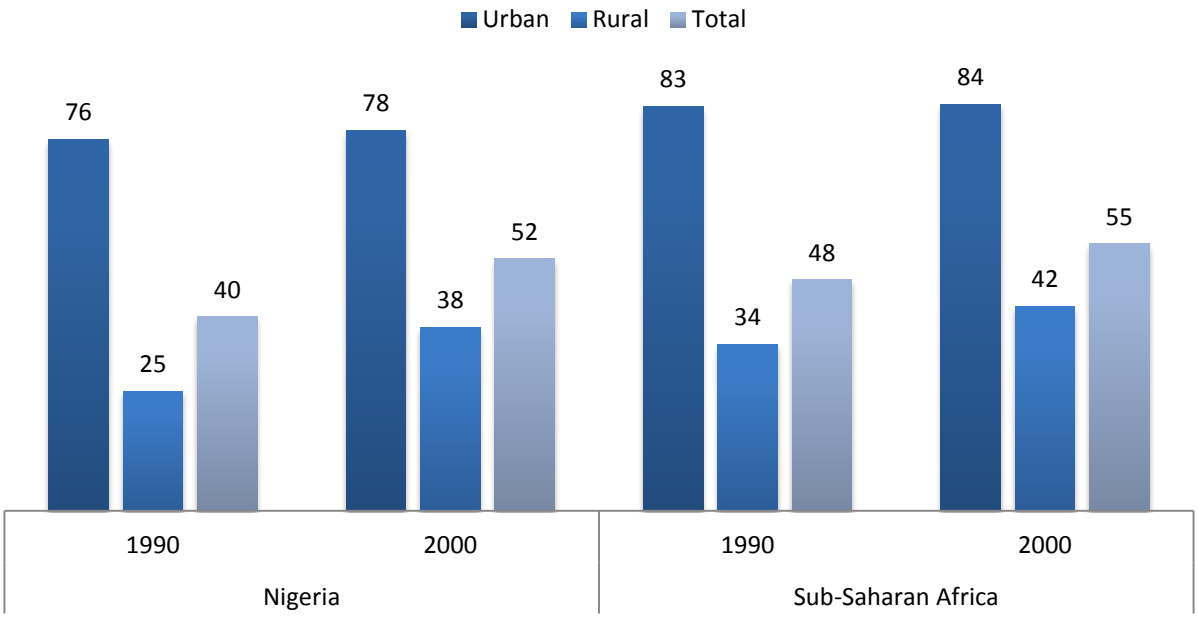
Environmental problems were also present further worsening the problems. Water pollution was a major problem during the 1990-2000 period. Pollutants and untreated wastewater from industry, mining, agriculture contaminated water resources and increased environmental degradation (Clay, 1994; Mwanza, 2003; UN, 2005; Boadi et al., 2005). Water related diseases were major public health problems; diarrhoeal diseases were a major cause of child morbidity and mortality just like today (Nordberg & Winblad, 1994; Clay, 1994; Mwanza, 2003; Boadi et al., 2005). Water scarcity was starting to become an issue in certain parts of SSA; it was noted that the number of droughts event had increased considerably (Clay, 1994; Mwanza, 2003).

Population growth also had an impact on the capacity to provide adequate water and sanitation services. The rapid population growth, especially in urban centers, offset the efforts of many countries to expand services (Nordberg & Winblad, 1994; Clay, 1994; Mwanza, 2003; UN, 2005).

2.3 Nigeria

2.3.1 Access to Safe Drinking Water Prior to 2000

Chart 2.3.1: Percentage of Population Using an Improved Drinking Water Source in Nigeria



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

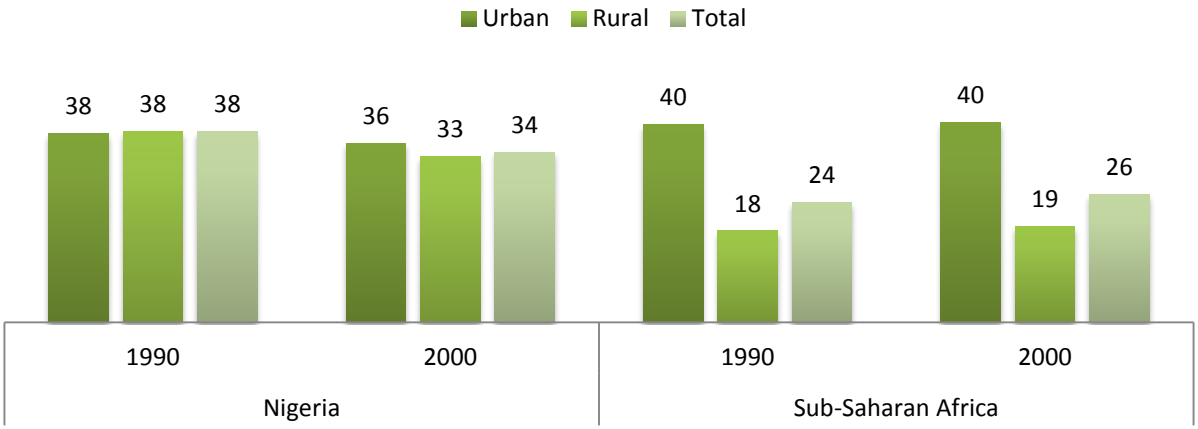
Chart 2.3.1 describes the access to drinking water situation in Nigeria with data provided for SSA for comparison. Access to safe drinking water in Nigeria was relatively low in 1990 at only 40 percent. However between 1990 and 2000, Nigeria made a lot of progress and more than half the population (52 percent) had access to improved drinking water sources by the end of the decade - an increase of almost 12 percent. Compared to the overall progress in SSA, Nigeria showed positive progress. Nevertheless, half of the population was still living without safe drinking water.

In urban areas, 76 percent of the population already had access to safe drinking water in 1990. Although the increase in access by 2000 was not as significant as the overall country increase, 2 percent more of the population gained access to safe drinking water. In rural areas, the progress was more significant and the percentage of population with access to improved

sources of drinking water went from 25 percent to 38 percent over the 10 years period. The percentage of people still collecting drinking water from surface water was high in rural areas in the year 1990 at 50 percent. In urban areas, the percentage was considerably lower at 7 percent. By 2000, the portion of population using surface water decreased to 36 percent and 5 percent respectively. Overall, the portion of population using surface water lowered from 37 percent to 25 percent (WHO & UNICEF).

2.3.2 Access to Basic Sanitation Prior to 2000 (Quantitative Data)

Chart 2.3.2: Percentage of Population Using Improved Sanitation in Nigeria



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

Chart 2.3.2 describes the sanitation situation in Nigeria with data provided for SSA for comparison. The access to basic sanitation in Nigeria decreased by 4 percent during 1990-2000. This is a step back for the country especially when compared to SSA, which had demonstrated slow but steady progress. In 1990, 38.1 percent of population had access to improved sanitation and in the year 2000, the proportion declined to 34 percent. Both in urban and rural areas, population with access to improved sanitation decreased from 37.7 percent and 38.2 percent in 1990 to 35.8 percent and 33.1 percent in 2000 respectively. Consequently, more people were living with inadequate sanitation facilities at the end of the decade.

Fortunately, the number of people practicing open defecation decreased both in urban and rural areas as well as in the entire country between the years 1990 and 2000. However more people used other types of unimproved sanitation instead of improved sanitation facilities (WHO & UNICEF).

2.3.3 Cause for Lack of Access to Safe Drinking Water and Sanitation

2.3.3.1 Physical Aspects of Water Scarcity

Nigeria has abundant supplies of surface and groundwater. However the water resources are unevenly distributed in the country: the northern regions have a semi-arid and arid climate that limit the amount of rainfall and water resources (Akujieze, Coker & Oteze, 2003; Olajuyigbe, 2010). As in the whole of SSA, water scarcity in Nigeria is also mainly due to human actions rather than actual physical water scarcity.

2.3.3.2 Human Induced Water Scarcity

Over the years, Nigerian governments allocated large sums of money in the water and sanitation sectors. However despite the high level of funding, water services remained weak and inefficient (Sangodoyin, 1991; Areola & Akintola, 1997). The main causes were first the lack of qualified water professionals with higher level of education (mainly university and college) (Areola & Akintola, 1997). Insufficient numbers of qualified professional were working in the operational and maintenance sectors of the regional water agencies. Therefore the operation and maintenance of the water technologies were left to unqualified personnel (Areola & Akintola, 1997; Enabor, Sridhar & Olaseha, 1998).

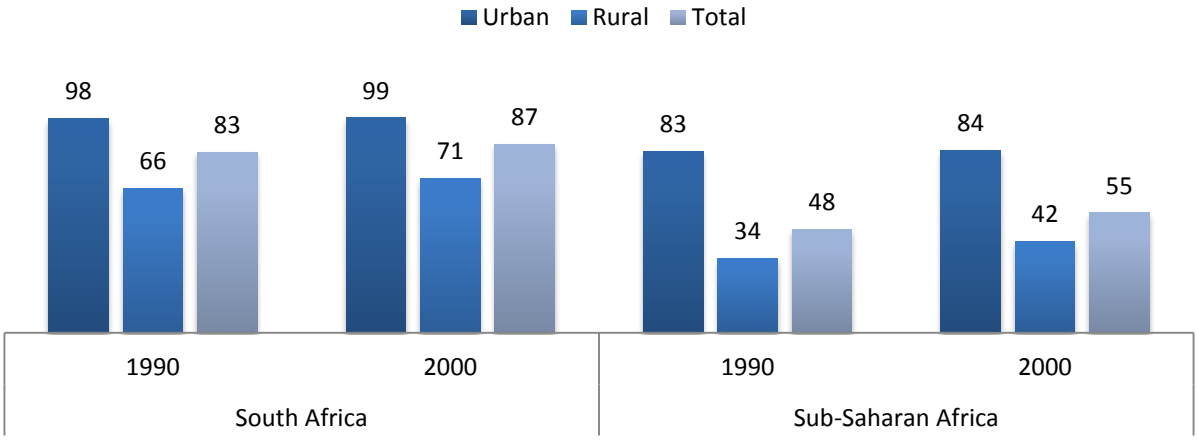
Another cause for the inefficient services was the lack of transparency and the misuse of funds in the water agencies. In addition, the investment in expensive and inappropriate technologies contributed to the waste of government funding in the water and sanitation sector since the technologies did not cater to the country's actual needs and were costly to maintain or repair (Enabor, Sridhar & Olaseha, 1998). Weak policies and the lack of adequate infrastructure both in urban and rural areas contributed to the problem (Sangodoyin, 1991; Chokor, 1993; Areola & Akintola, 1997). Rapid urbanization of the Nigerian cities and the oil industries contributed to

increasing water pollution in the country (Sangodoyin, 1991; Chokor, 1993; Arimah, 1996; Enabor, Sridhar & Olaseha, 1998) and reduced availability of safe drinking water.

2.4 South Africa

2.4.1 Access to Safe Drinking Water Prior to 2000

Chart 2.4.1: Percentage of Population Using an Improved Drinking Water Source in South Africa



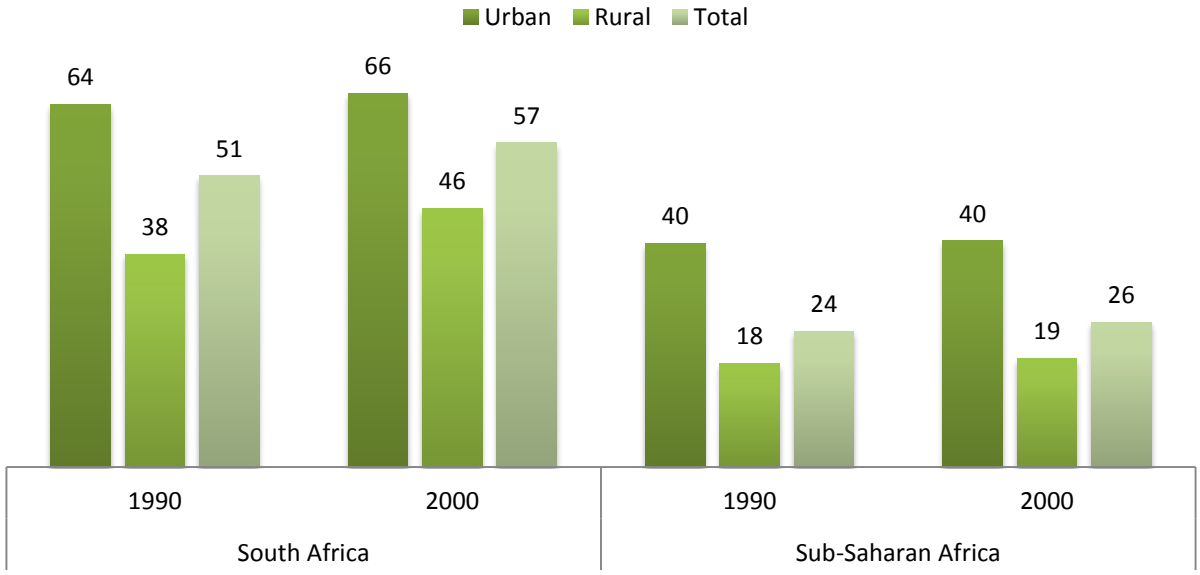
Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

Chart 2.4.1 describes the access to drinking water situation in South Africa with data provided for SSA for comparison South Africa was among the countries in SSA with the highest coverage of safe drinking water in 1990; the total population who had access to improved drinking water sources was 82.8 percent. The portion of population with access was 66.3 percent in rural areas and 98.1 percent in urban areas. In 2000, the total percentage reached 86.5 percent for the entire country; in rural, areas it was 70.6 percent and it urban areas, 86.5 percent. The progress was slow and constant (Golblatt, 1990; Quinn, 2012). However, there was still a significant proportion of the population representing slightly little more than 6 million people (13.5 percent of the year 2000 population) living without safe drinking water in South Africa (UNICEF & WHO).

In the year 1990, 56 percent of the South African population had access to piped-in drinking water directly either in their house or plot or yard. The portion of population with the same type of access increased to 62 percent in the year 2000. Only 13 percent of the population used surface water in the 1990 and it reduced to 3 percent at the end of the decade (UNICEF & WHO).

2.4.2 Access to Basic Sanitation Prior to 2000 (Quantitative Data)

Chart 2.4.2: Percentage of Population Using Improved Sanitation in South Africa



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

Chart 2.4.2 describes the sanitation situation in Nigeria with data provided for SSA for comparison. South Africa was successful in improving access to basic sanitation, but not to the same extent as the increase in access to safe drinking water. Between 1990 and 2000, the access to improved sanitation facilities increased from 51 percent to 57 percent much higher than the increase in SSA. Nevertheless the access to sanitation was low by global standards.

In urban areas, the proportion of people who had access to basic sanitation was 64 percent in 1990 and 66 percent in 2000. In rural areas, the proportion of the population was much lower at 38 percent in 1990. However the disparities between rural and urban population got smaller

as the population who had access to basic sanitation in rural areas increased to 46 percent. In 1990, the proportion of the population practising open defecation was 2 percent in urban areas, 27 percent in rural areas and 14 percent overall in the country. The proportion of urban population defecating in the open remained at 2 percent. Both the proportion of rural overall country's population decreased to 21 percent and 10 percent respectively (UNICEF & WHO).

2.4.3 Cause for Lack of Access to Safe Drinking Water and Sanitation

2.4.3.1 Physical Aspects of Water Scarcity

South Africa is a water scarce country; most of its regions have a semi-arid climate where droughts are common and rainfall uneven. The average annual levels of rainfall for the country are below the global average. Some regions of the country have higher levels of rainfall while others are really below than the country's average. Also the high evaporation rates of water due to the semi-arid climate increase the problems of water scarcity (De Villiers, Schmitz & Booysen, 1996).

In addition, the country is poor in groundwater with only a low numbers of small aquifers that have limited quantity of water. South Africa has only a few large aquifers but their distribution in the country makes it complicated to exploit. The country has big rivers with larger water volumes located on the east and south coast but unfortunately they are far from most population concentration points where water demands are high (De Villiers, Schmitz & Booysen, 1996; Basson & Rooyen, 1998).

2.4.3.2 Human induced water scarcity

During the mid-1990s, South Africa faced many challenges after the end of the apartheid in 1994. Before the election of Nelson Mandela, most water and sanitation services in rural and urban areas were directed solely to the white population. Black people had barely any access to these services. However under the new democratic government, the focus of the services changed and they were made available to all the population regardless of the race (Eberhard & Quick, 1995; Golbalt, 1996; Naidoo & Constantinides, 2000).

There was a need to expend the water and sanitation infrastructure to ensure adequate services to all. New water legislation, policies and regulations were also required to address the new reality of the country which recognized the right to drinking water and basic sanitation for all citizens (Golbalt, 1996; Naidoo & Constantinides, 2000).

Rural and urban areas inhabited by black people were extremely undeveloped and highly populated. In the mid-1990s approximately 17.5 million black people lived with no access to piped water compared to only 5,000 white people (Golbalt, 1996). Evening out this unequal balance required the rapid expansion of the services to provide drinking water and sanitation services to the neglected population in the post-apartheid period. However, the expansion of these services faced some significant challenges (Golbalt, 1996; Naidoo & Constantinides, 2000).

First, the management of water resources had to be completely reformed since the water resources are scarce and more people had to use them. Second the agencies responsible for the provision of water and sanitation services had to be reformed since they were mostly unregulated during the apartheid. They had to become more accountable and responsible towards their consumers, including the new ones. They also had to efficiently use their limited economic resources as well as address water scarcity and the service backlogs from the apartheid period. Finally, the reformed agencies had to maintain the infrastructures and ensure sustainable and affordable services to all (Naidoo & Constantinides, 2000). The new water policies and legislation had to be developed in order to address the inequalities between races (Golbalt, 1996; Naidoo & Constantinides, 2000).

The expansion of the sanitation and water services required a huge amount of investment over a span of the 10 years in order to be successful. The Government of National Unity had to develop a fair tariff and income policy that took into consideration the poorest people, to ensure the financial sustainability of the new expended services. This new tariff and income policy was also needed due to the country's limited economic resources (Golbalt, 1996; Naidoo & Constantinides, 2000).

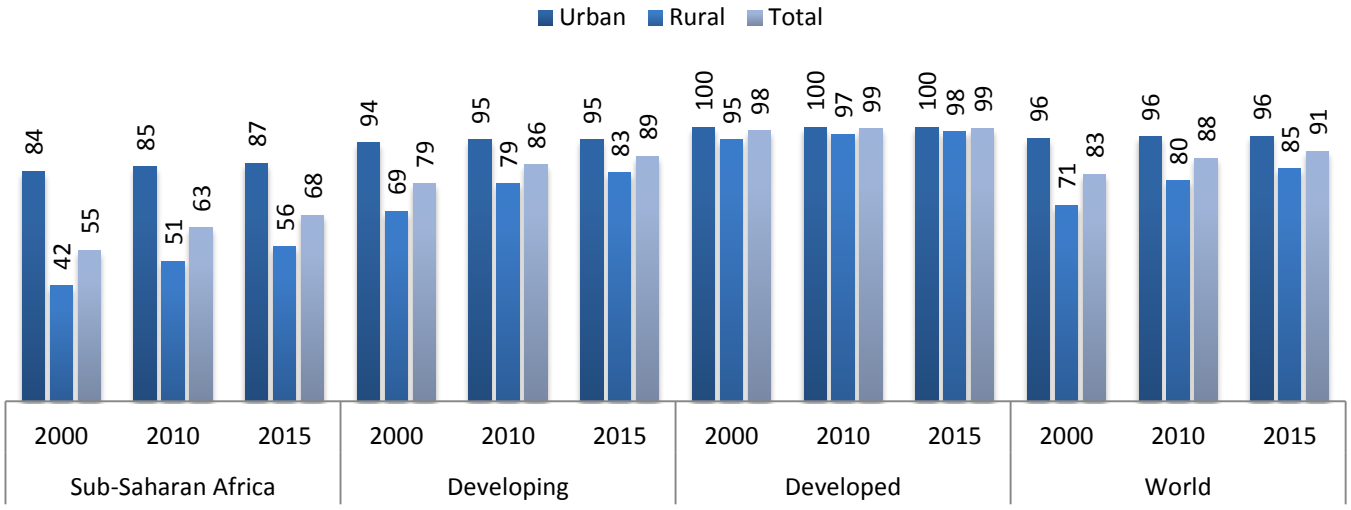
Finally, the population growth especially in urban areas also created challenges for the expansion of the services. The government and water agencies had to address at the same time the backlogs for access to services coming from the apartheid period and the increasing demands caused by population growth (De Villiers & Booysen, 1996; Golbalt, 1996; Naidoo & Constantinides, 2000).

3 The situation in Sub-Saharan Africa and the case study countries since 2000

3.1 Sub-Saharan Africa

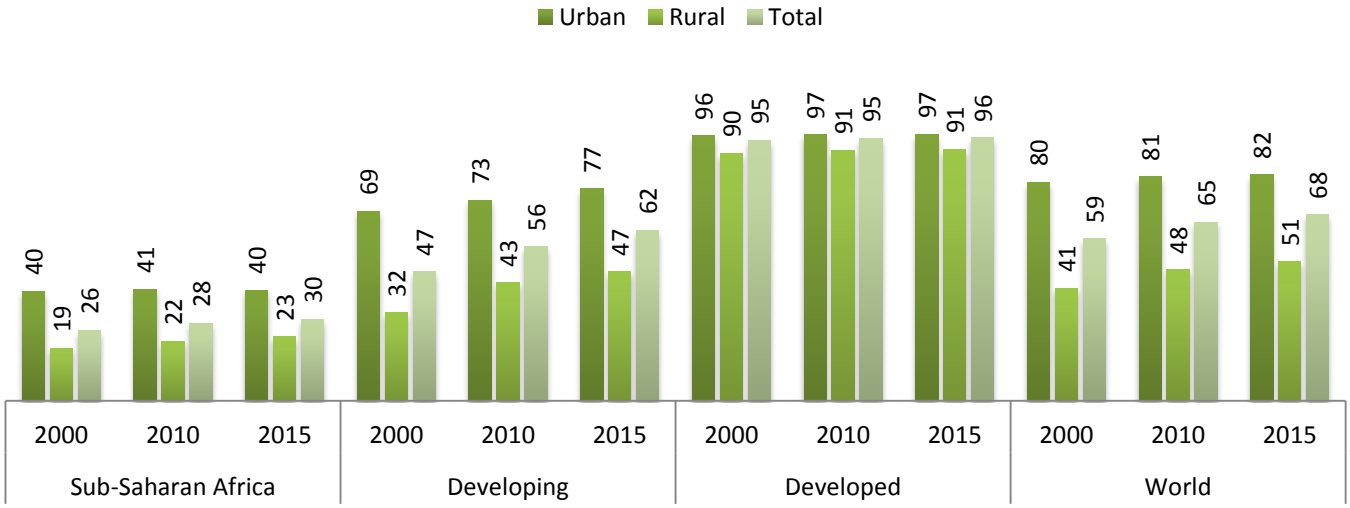
Charts 3.1.1 and 3.1.2 describe the scenario in SSA in the post-2000 period for access to clean water and improved sanitation respectively. The MDG targets for SSA based on 1990 baseline figures are 74 percent for access to safe drinking water and 62 percent for access to basic sanitation (UNICEF & WHO, 2015).

Chart 3.1.1: Percentage of Population Using an Improved Drinking Water Source in Sub-Saharan Africa



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

Chart 3.1.2: Percentage of Population Using Improved Sanitation in Sub-Saharan Africa



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

3.1.1 Progress on Access to Safe Drinking Water and Basic Sanitation Since 2000

Many of the challenges faced by the drinking water and sanitation sectors between 1990 and 2000 continue to be the same ones today. Progress on increasing access to safe drinking water and sanitation has been slow in the Sub-Saharan African Region. Access to safe drinking water grew at an average of 1 percent per year between the years 2000 and 2015. The average annual progress on access to basic sanitation was less than 1 percent (Salami, Stampini, Kamara, Sullivan & Namara, 2014; UNICEF & WHO, 2015). The MDG targets were not met in either case although the region was close to the desired target in the case of access to safe drinking water.

The developing countries, as whole, have made positive continuous progress in meeting the MDG target 7.C and have reached the target to halve the proportion of the population without access to safe drinking water (United Nations, 2015; UNICEF & WHO, 2015) in advance of the 2015 target date. However, SSA has lagged behind. Globally and in the developing countries, the gaps between urban and rural population with regard to access to safe drinking water have

narrowed over the last fifteen years. Unfortunately in SSA, these gaps have barely decreased during the same period of time.

The scenario on access to basic sanitation is less optimistic. Neither on the global scale nor in developing countries nor in SSA has the progress been significant to enough to meet the target. Since the year 2000, SSA was unable to improve the coverage to be even close to the MDG Target of 62 percent (UNICEF & WHO, 2015). In fact, the access to basic sanitation in the SSA has been stagnant when the population growth over these years is taken into account – although the percentage of the population practising open defecation has decreased, the actual number of people has in fact increased (UNICEF & WHO, 2015). Compared to the overall figure for the developing countries, the progress done in the Sub-Saharan African region is very low.

Even though environmental causes are partly responsible for the slow progress in meeting the MDG targets, it is mostly human induced activities that are the root causes for the slow progress in SSA (Salami, Stampini, Kamara, Sullivan & Namara, 2014; UNICEF & WHO, 2015). As mentioned in the previous chapter, as a whole SSA has sufficient water resources to meet its human and environmental needs (Mwanza, 2003). Only some parts of the region experience water scarcity due to arid and semi-arid climates, lower annual rainfall and low water availability due to natural causes. However, SSA is globally the most vulnerable region to the effects of climate change. More Sub-Saharan African countries are at risk of becoming water stressed because of irregular rainfall, the decrease in water surfaces and the deepening of the water tables. Over the years, more droughts and floods have been recorded. These new environmental conditions that the region is facing are causing the slow progress in access to safe drinking water and sanitation (Frankhauser & Schmidt-Traub, 2011; Pullan, Freeman, Gething & Brooker, 2014).

While the physical aspects are causes for concern, the major root causes of the slow progress are human activities or inactivities and most of these causes are the same as those observed in 2000. Poor governance is still a key factor in the slow progress towards the achievement of MDG Target 7.C (Pullan *et al.*, 2014; Salami *et al.*, 2014; Burki, 2015). Although safe drinking water and basic sanitation are now included in many national, regional and international

policies, development strategies, regulations etc., they are still a low priority for most governments. On average, water and sanitation occupy a small percentage of national budgets (Galan, Kim & Graham, 2013; Salami *et al.*, 2014) and the implementation of the policies and strategies to achieve the targets has been a constant challenge for SSA partly as a result of the low budgets (Galan *et al.*, 2013). At the local level, the institutions responsible for both drinking and sanitation are often not equipped to manage and/or do not have the capacity to manage sanitation issues. As a result, they often focus only on access to drinking water. Consequently, it is estimated that most of the financial resources intended for both sectors end up only being used for drinking water services (Galan *et al.*, 2013; Salami *et al.*, 2014; Burki, 2015).

Insufficient financial resources also played a major role in the slow progress over the years. It is difficult to actually determine how governments allocated and used the financial resources coming from development aid and national budgets that were originally intended for drinking water and sanitation. Over the years, SSA received the highest amount of development aid in the developing world, but a very small portion was aimed at access to safe drinking water and basic sanitation (Galan *et al.*, 2013; Salami *et al.*, 2014). The lack of adequate financial resources reduced the ability of Sub-Saharan African countries to expand the water and sanitation infrastructure. It also prevented the proper operation and maintenance of the current and new infrastructure. In the region, most investments in infrastructure came from development aid (Salami *et al.*, 2014). The lack of qualified professionals to manage, operate and maintain the services and facilities remain an issue (Salami *et al.*, 2014). The involvement of local communities in the design, implementation and maintenance of drinking water and sanitation projects remained very low in the region (Salami *et al.*, 2014). All of these factors contributed to reducing the implementation capacities of the SSA countries for providing safe drinking water and basic sanitation services and consequently the sustainability of these services. The result was a slow progress in increasing access to safe drinking water and basic sanitation in SSA.

There is another factor that contributed to the slow progress. In SSA, water is connected to various local and indigenous religious, cultural and spiritual beliefs that prevent the

implementation of improved drinking water and sanitation practices (Akpabio & Takara, 2014). Cultural taboos and beliefs around human excreta actually increased the practice of open defecation in the region. For example, in rural Uganda, there is this belief that it is not good to use pit latrines because due to their fixed location as it is easier for sorcerers to access people excreta for evil purposes. People believing this are more inclined to practice open defecation. Another example coming from rural Madagascar is that the storage of faecal waste in a structure is a taboo and the storage of faecal matter below ground level contaminates the dead (Akpabio & Takara, 2014). Working to change cultural taboos and beliefs is very challenging and not all governments, international organisations and non-governmental organisation (NGO) programmes are equipped or designed to overcome the challenge (Akpabio & Takara, 2014). However some programmes do address this challenge. For example in Uganda, the NGO Rural Health Promotion and Poverty Alleviation Initiative (RUHEPAI) works in rural communities to promote sustainable access to safe drinking water and educate on sanitation (Rural Health Promotion and Poverty Alleviation Initiative, 2013). Due to all kinds of cultural, religious and spiritual beliefs and/or taboos, the implementation of safe drinking water and basic sanitation practices are not straightforward in some part of SSA and slows down the progress in the achievement of Target 7.C. (Akpabio & Takara, 2014). In addition to good governance, adequate infrastructures, financial and human resources, behavioural changes, education and awareness are also necessary (Akpabio & Takara, 2014).

3.1.2 2015 Status on Access to Safe Drinking Water and Basic Sanitation

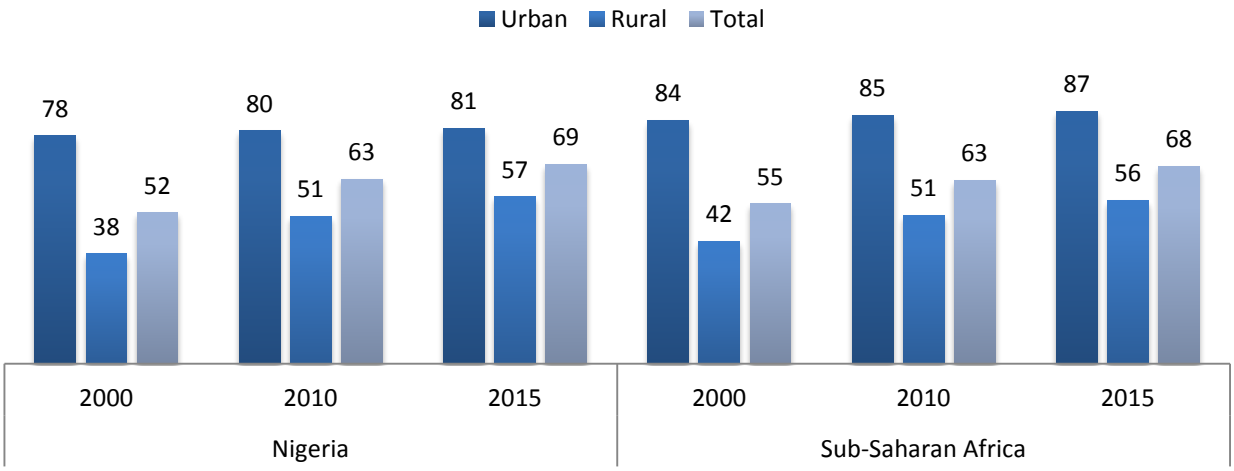
Now that the MDG period is coming to an end, it is clear that the drinking water and sanitation targets will not be met in SSA by the end of the year (Salami *et al.*, 2014; UNICEF & WHO, 2015). As the data shows, access to safe drinking water in SSA reached 68 percent for the entire region; only a few percentage points shy from the MDG target of 74 percent (UNICEF & WHO, 2015). In rural areas, the access to safe drinking water reached 56 percent - 11 percent below the expected target of 67 percent. The proportion of urban population with access to safe drinking water also narrowly missed the target and reached 87 percent (UNICEF & WHO, 2015).

On the other hand, the improvement on access to basic sanitation is almost non-existent in SSA. From 2000 to 2015, the proportion of population using improved sanitation facilities went from 26 to 30 percent compared to 24 percent in 1990. In rural areas, the access to basic sanitation increased by only one percent to reach 23 percent. And in urban areas, the access stayed the same at 40 percent (UNICEF & WHO, 2015). The non-existent progress can be attributable to the fact that the focus of investments and projects from national governments and development aid has been more on water than sanitation in part due to the lack of capacities and the taboos surrounding human excreta (Galan *et al.*, 2013; Salami *et al.*, 2014; Akpabio & Takara, 2014; Burki, 2015).

3.2 Nigeria

Charts 3.2.1 and 3.2.2 describe the situation in Nigeria in the post-2000 period. The MDG targets for Nigeria based on 1990 baseline figures are 70 percent[4] for access to safe drinking water and 69 percent for access to basic sanitation (UNICEF & WHO, 2015).

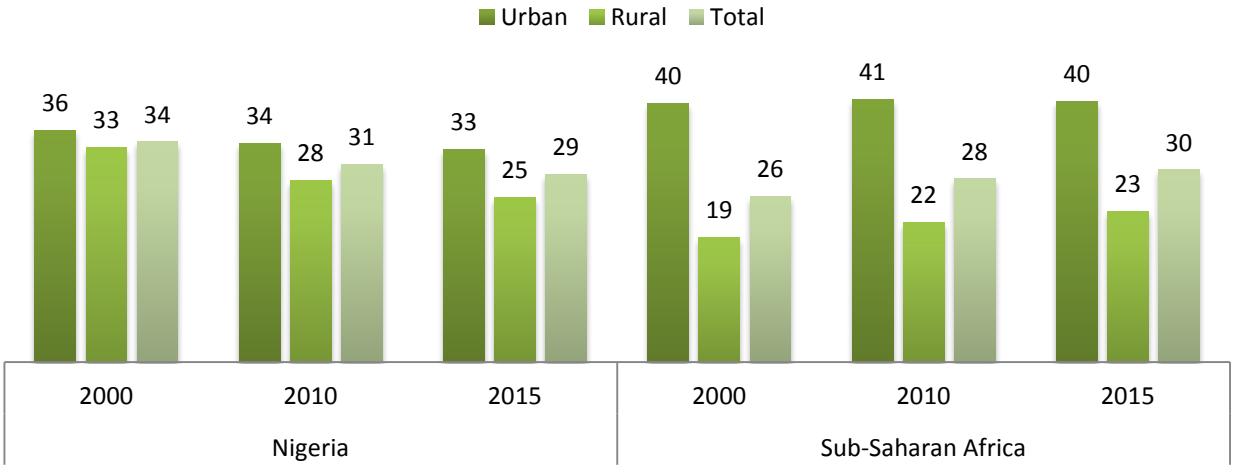
Chart 3.2.1: Percentage of Population Using an Improved Drinking Water Source in Nigeria



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

[4] Based on the method used by the WHO/UNICEF JMP for Water Supply and Sanitation, if the 2015 result is more or less 1 percent of the country's target, then the target is met.

Chart 3.2.2: Percentage of Population Using Improved Sanitation in Nigeria



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

3.2.1 Progress on Access to Safe Drinking Water and Basic Sanitation Since 2000

The progress on access to safe drinking water in Nigeria since the year 2000 is slow but positive enough that the country will meet the MDG Target 7.C by the end of this year. On the down side, the progress on access to basic sanitation continued to regress since the beginning of the new millennium. In fact, more people are now using unimproved sanitation facilities (UNICEF & WHO, 2015). Nigeria is part of the countries around the world with the highest levels of people practising open defecation (Burki, 2015; UNICEF & WHO, 2015).

The country faces many challenges in both sectors. The main challenge is the poor governance and the institutional constraints that the Nigerian government must deal with (Omugba, 2009; Olaseni & Alade, 2012; Oyefara, 2013). The government undertook a reform of the water and sanitation sector that was implemented over 10 years. The reforms aimed at increasing the capacity of the responsible institutions to improve the delivery of services in rural and urban areas, their performance and cost-effectiveness. The reforms were also undertaken so the government could deliver on its commitment to equitable and sustainable services to all Nigerians. The outcomes of the reform process were a national water Policy, a water resources

bill, a management strategy for water resources and a complete review of the framework governing water and sanitation institutions in several states (Omugba, 2009).

Despite this progress to improve governance, the efforts were not enough to provide universal coverage of both services in the country. The government lacks credible data on drinking water and sanitation to properly inform decision-making on resource allocation and national investments. It has poorly managed human and natural resources and neglected urban and rural planning for drinking water and sanitation services (Omugba, 2009; Olaseni & Alade, 2012). The government was not able to demonstrate accountability and transparency with respect to the use of funds (Olaseni & Alade, 2012; Oyefara, 2013). In fact corruption is major problem in Nigeria. The embezzlement of funds, especially those intended for the development of infrastructure, is a recurring practice in public offices (Olaseni & Alade, 2012). These governance problems are more severe than the lack of funds for both sectors (Omugba, 2009). Nevertheless, the government devotes inadequate amount of funds to develop, operate and maintain drinking water and sanitation infrastructures and services. Finally, like in other SSA countries, the drinking water sector was prioritized over the provision of proper sanitation facilities (Olaseni & Alade, 2012; Burki 2015).

The rapid population growth in Nigeria also impeded the progress on access to safe drinking water and sanitation. The increase in population accentuated the pressure on the existing infrastructure and the limited financial resources of the government. In fact, to make ends meet, the Nigerian government took out foreign loans which put the country in deep debts (Ogilviea *et al.*, 2010; Olaseni & Alade, 2012). Also with more than 50 percent of the population living in urban areas, the government concentrated its effort in the cities leaving the rural areas behind. As a result the disparities between the rural and urban populations in terms of access to clean water and appropriate sanitation facilities are still significant (Christenson, Bain, Wright, Aondoakaa, Hossain & Bartram, 2014).

Finally, environmental degradation of the water resources also contributed to slow down the progress and reduce freshwater availability. Water pollution caused by domestic, agricultural and industrial waste discharged into the environment is high. The oil industry is also a major

source of pollution and can have an impact on people's access to safe drinking water. Unfortunately, the Nigerian government do not have efficient administrative structures to protect water resources and to impose sanctions to polluter (Adedeji & Ako, 2009; Oyefara, 2013). More sources of freshwater then becomes more polluted and of poor quality, therefore limiting the access of the population to reliable sources of water.

3.2.2 2015 Status on Access to Safe Drinking Water and Basic Sanitation

Despite several challenges, Nigeria has managed to meet its MDG water target. In 2015, the proportion of Nigerians who had access to improved drinking water sources in the overall country is 69 percent. It is only one percent higher than the proportion for the SSA. The urban population with access to safe drinking water reached 81 percent and the rural one reached 57 percent. There are still households, mostly women, who need to walk on average 65 minutes per day to fetch water. It is the reality for many poor rural families (UNICEF & WHO, 2015).

In 2015, the proportion of the population using improved sanitation facilities declined from its 1990 level to 29 percent for the entire country, to 25 percent in rural areas and 33 percent in urban areas. The percentage of the population defecating in the open increased and reached 25 percent (UNICEF & WHO, 2015). This means that one in four people practices open defecation. In rural areas, it is 34 percent of the population and in urban areas, 16 percent. This is an increase of 6 percent in urban areas since 2010 (UNICEF & WHO, 2015).

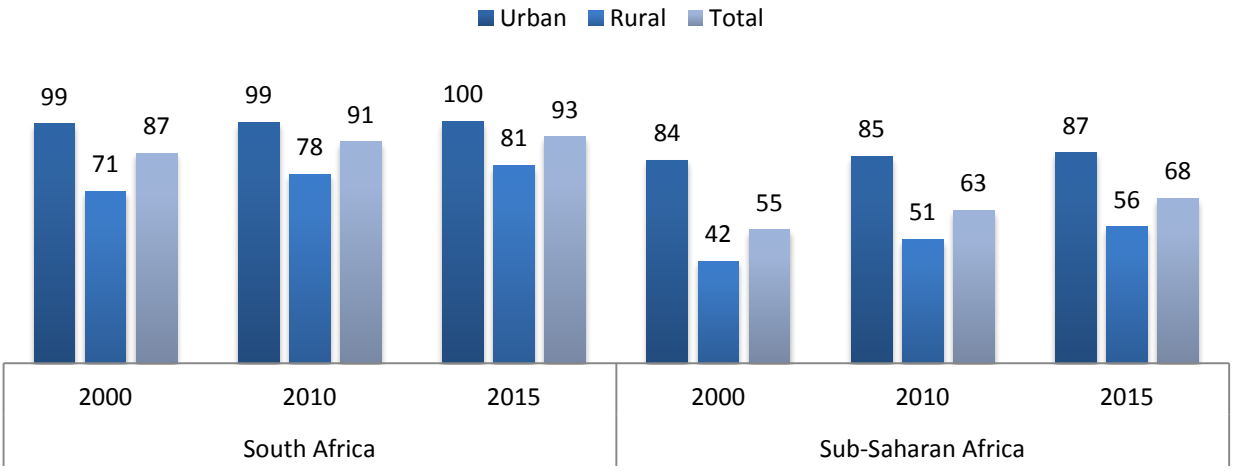
Sanitation has remained a low priority for the Nigerian government which in part explains the reason for the decline. Also the participation of the civil society is low. Nigerian civil societies are either not well organized or lack the capacity to implement projects. Civil society could definitely be a key player in reversing the situation because it can help develop projects that really address the needs of the community (Oyefara, 2013). The rapid population growth, the weak institutions, the failure to implement policies and initiatives, the unsustainable public spending and the inadequate infrastructure all contributed to the decline in access to basic sanitation (UNICEF & WHO, 2015).

In conclusion, Nigeria did reach the Target 7.C with respect to access to safe drinking water but failed to decrease the number of people living without access to basic sanitation.

3.3 South Africa

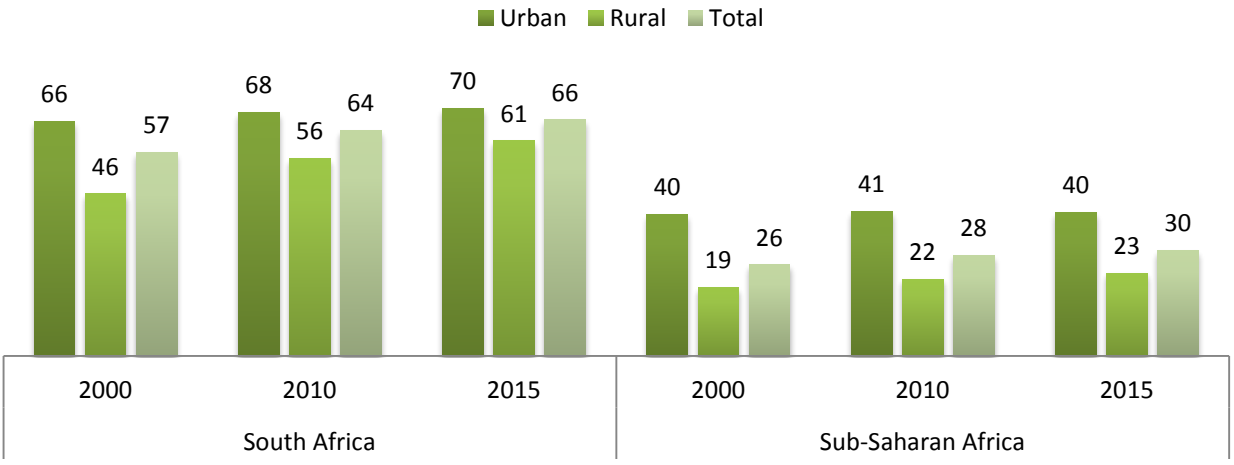
Charts 3.3.1 and 3.3.2 describe the situation in South Africa. The MDG targets for South Africa based on 1990 baseline figures are 92 percent for access to safe drinking water and 76 percent for access to basic sanitation (UNICEF & WHO, 2015).

Chart 3.3.1: Percentage of Population Using an Improved Drinking Water Source in South Africa



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

Chart 3.3.2: Percentage of Population Using Improved Sanitation in South Africa



Source: WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation

3.3.1 Progress on Access to Safe Drinking Water and Basic Sanitation Since 2000

Since 2000, South Africa was able to continuously increase the access to both drinking water and sanitation. The progress for drinking water was enabled by the full coverage of the services in urban areas. 92 percent of urban households have direct access to drinking water on dwelling. The rest of urban household have access to drinking water via other improved drinking water sources like public taps and standpipes (UNICEF & WHO, 2015). Access to sanitation continued to increase gradually since 2000 but a little more slowly. In rural areas, the access to basic sanitation increased a lot more rapidly than in urban areas. This progress helped to reduce the inequalities many South African experienced during apartheid (Quinn, 2012). However, the poorest and vulnerable people still struggle to access adequate services. Public water infrastructures in poorer areas (slums and rural areas) are often over ground and therefore the supply is insufficient. Consequently many are forced to use unsafe water for survival even though there is public improved drinking water sources available (Norman, Bradshaw, Lewin, Cairncross & Nannan, 2010; Razzaque & Kleingeld, 2013).

By the turn of the millennium, South Africa had developed new legislations on water and sanitation. First, the National Water Services Act became the main legislative instrument for water resource management in the country. It is guided by four central principles: equity, efficiency, sustainability and representativity. The Act provided a mechanism to ensure public participation at the local level (Kahinda & Taigbenu, 2011; Quinn, 2012). Second, the Water Service Act became the regulatory framework for the drinking water and sanitation service delivery. This Act guaranteed the right to safe drinking water and basic sanitation to all South African citizens. The local governments were given the responsibility for the provision of the services. The Act also specified how they must fulfil this responsibility towards the community (Kahinda & Taigbenu, 2011; Quinn, 2012).

On paper, these legislations were comprehensive and ambitious but their actual implementation turned out to be challenging. The costs for the implementation of the public participatory processes at the local level exceeded initial estimates. The process planned for the implementation was difficult, slow and very long. The original plan had to be scaled back and

turned into a pilot project (Herrfahrdt-Pähle, 2010; Quinn, 2012; Razzaque & Kleingeld, 2013). The National Water Act also called for the establishment of an ecological reserve of water since the country is water stressed due to its semi-arid climate. The implementation for this reserve was not successful because again the costs ended being much higher than anticipated. Also several administrative issues contributed to the failure, including the lack of skilled human resources (Herrfahrdt-Pähle, 2010; Quinn, 2012).

The implementation of the Water Service Act is still not complete due to the increasing demands for services by the growing population. Also the infrastructures are deficient and there is a lack of funding because the implementation costs were poorly estimated initially and they ended up being higher. There is insufficient number of professionals to manage and operate the services (Norman *et al.*, 2010; Quinn 2012). The population group who suffer the most from the lack of services are poor and vulnerable people mostly living in slums and rural areas (Razzaque & Kleingeld, 2013).

As explained in the previous chapter, South Africa is a country with limited water resources due to its semi-arid climate causing high rates of evaporation and uneven annual rainfall level. However, new factors are also contributing to increase the scarcity of the water resources. First water pollution has become a problem (De Villiers, Schmitz & Booysen, 1996; Herrfahrdt-Pähle, 2010; Norman *et al.*, 2010; Razzaque & Kleingeld, 2013). There have reports of illegal discharges in water bodies by the agricultural and mining sectors. Plus illegal extraction of water for the same sectors has been also reported. The activities contribute to degrade water resources and increase water scarcity (Herrfahrdt-Pähle, 2010). Climate change is expected to impact South Africa water resources by decreasing river flows, annual rates of rainfall and changing water availability throughout the country (Herrfahrdt-Pähle, 2010). In order to address the impact of climate change, South Africa has started to do water transfer between regions and store water in bulk in dams. But, increasing demands for water by the growing population and all economic sectors as well as the lack of financial resources and some watersheds almost reaching their limits make this initiative difficult to implement (Herrfahrdt-Pähle, 2010; Quinn 2012).

3.3.2 2015 Status on Access to Safe Drinking Water and Basic Sanitation

South Africa was able the meet the access to safe drinking water target in 2015, 93 percent of all South African had access to improved drinking water sources. The rural population with access to safe drinking water is now 81 percent and 100 percent of the urban population have access. These results are way higher than those for SSA (UNICEF & WHO, 2015).

The progress on access for basic sanitation was not as successful. The proportion of the population with access to improved sanitation facilities is 66 percent for the entire country, 70 percent in urban areas and 61 percent in rural areas. The results are still higher than those for SSA but not enough for South Africa to meet Target 7.C. The number of people practising open defecation significantly declined in South Africa: 4 percent in the entire country 14 percent in 1990), 8 percent in rural areas (27 percent in 1990) and 1 percent in urban areas (2 percent in 1990) (UNICEF & WHO, 2015).

4 The Achievement of MDG Target 7.C in Sub-Saharan Africa and the Case Study Countries: Analysis

4.1 Achievement of MDG Target 7.C in Sub-Saharan Africa

The above data from UNICEF/WHO JMP, the authoritative source for data for water supply and sanitation, demonstrates that the MDG Target 7.C was not met in SSA.

The region did get close to the safe drinking water target. The access reached 68 percent against a target of 74 percent by 2015. This represents a considerable improvement especially when considering that the baseline (in 1990) started at 48 percent (UNICEF & WHO, 2015). The 20 percent increase actually represents a more significant improvement in access as the service is now available to a much higher number of people given the population growth.

The almost successful outcome of SSA in terms of access to safe drinking water can be attributed to two major causes. Many of the SSA countries did reach their own individual targets for access to safe drinking water. Nigeria and South Africa are two successful examples but there are many others that demonstrated positive outcomes like Botswana, Cameroon,

Senegal, Ghana, Djibouti and Ethiopia (Quinn, 2012; UNICEF & WHO, 2015). A second cause is the fact that much more focus and priority has been put on safe drinking water than on sanitation (Nelson & Murray, 2008; Cumming, Elliott, Overbo & Bartram, 2014; Burki, 2015). The data provided above strongly supports this assertion and the scientific literature review confirms it. It appears that many national institutions in the SSA responsible for the provision of drinking water and sanitation services diverted effort towards addressing drinking water access needs than sanitation access needs (Chiplunkar, 2009; Salami et al., 2014; Burki, 2015). It was therefore much easier to divert all the effort on drinking water services only especially given an inherent cultural reluctance to explicitly consider sanitation as a national problem or issue. The lack of transparency, accountability, financial and human resources further aggravated the problem. It prevents governments from upholding their responsibilities to inform the population of their actions and uses of funds. It weakens its performance to accomplish projects/programmes and deliver adequate services and to avoid the flourishing of corruption (Chiplunkar, 2009; Salami *et al.,* 2014; Burki, 2015).

The access to basic sanitation in SSA is now a more pressing concern than it was in 1990 when the access was already at a low of 24 percent. In 2015, the population with access to basic sanitation is 30 percent and the target to be achieved was 62 percent. This means that, because of population growth, the actual number of people living today without basic sanitation is much higher than in 1990 the baseline year. In that year, approximately 388 million people did not have access to basic sanitation and today it is almost 700 million people (UNICEF & WHO, 2015). More than two thirds of the SSA population use unimproved sanitation facilities in 2015. It can be argued that the SSA was actually a failure in terms of achieving the sanitation target of MDG target 7.C.

No countries in SSA except for three countries with very small populations (Capo Verde, Seychelles and Reunion) were able to meet their individual sanitation targets. Some countries did progress but some others, like Nigeria and Djibouti, regressed (UNICEF & WHO, 2015). These experiences of these two countries suggest that it was not necessary that the

achievement of the safe drinking water target led to or was directly correlated to the success in meeting sanitation targets (Salami *et al.*, 2014).

The causes for this failure are complex and involve political, economic, environmental, social and cultural factors. Lack of governance, financial resources, infrastructures and qualified professionals combined with strong cultural and religious beliefs required a more holistic approach towards a solution (Akpabio & Takara, 2014). It is obvious now that the approach of just writing new policies and building infrastructure is not the key to solve the issue. Education, behavioural changes and awareness are equally, if not more important (Aboud & Singla, 2012).

The SSA region has received most of the global development assistance since the establishment of the MDGs (Galan *et al.*, 2013; Salami *et al.*, 2014). A vast majority of the drinking water and sanitation project were funded through development aid, especially infrastructure capital investments (Galan *et al.*, 2013; Salami *et al.*, 2014). However, in SSA, the public and the civil society organizations were barely involved in developing, implementing and sustaining drinking water and sanitation projects. The ones who would benefit from these initiatives did not have a voice to express their actual needs. Also, it was then not possible to prevent the failure of a project due to cultural beliefs since these were not taken into consideration. Civil society organizations and the public are key stakeholders in such projects and ignoring them almost guarantees failure. It is only they who can ensure the sustainability of a project by taking ownership (Nordtveit, 2010; Aboud & Singla 2012; Sachs, 2012; Langford & Winkler, 2014). A question must then be raised - if most drinking water and sanitation projects were funded through development aid and key stakeholders were not involved from the start, does it mean that the projects were based on the beliefs and assumptions of the donors and not the actual beneficiaries? Does this failure reinforce the belief that ownership of a development effort should belong to the people and not to the financiers?

SSA's experience in terms of meeting target 7.C is indicative of its general development status. The challenges that SSA faces today are the same as the ones it faced 25 years ago despite all the international development aid, conventions and summits. Many governments lacked transparency, accountability, financial, governance and human capacities in 1990 and they still

do today (Mwanza, 2003; Galan *et al.*, 2013; Salami *et al.*, 2014). Even with all the development aid received over the years, most SSA countries except a few (Salami *et al.*, 2014) were unable to overcome these challenges. Future actions beyond 2015 will need to integrate all factors (political, economic, environmental, social and cultural) impacting drinking water and sanitation in finding a sustainable solution. And the integration of all those factors will have to be done through the involvement of all stakeholders, including civil society organizations, the public and the private sector (Chenoweth, 2004; Al-Houmd & Edwards, 2005, de Gouvello & Scott, 2012, Nordtveit, 2010; Aboud & Singla 2012; Sachs, 2012; Langford & Winkler, 2014).

4.2 Performance in the Case Study Countries

Both South Africa and Nigeria met or will meet the safe drinking water target by the end of 2015. South Africa increased access to safe drinking water to 93 percent (83 percent in 1990) of the population in the country. It was also able to decrease the disparities between rural and urban areas where the access was increased respectively to 81 and 100 percent (66 and 98 percent in 1990). In Nigeria, the access to improved water sources increased to 69 percent overall, 25 percent in rural areas and 76 percent in the urban areas. In 1990, the access was at 40, 25 and 76 percent respectively (UNICEF & WHO, 2015).

On the other hand, the sanitation target was not met in either country. While South Africa did demonstrate slow progress, Nigeria regressed. Today, there are more people in Nigeria living without basic sanitation than with it. In 1990, the access to basic sanitation in the Nigeria as well as rural and urban areas was about 38 percent. The current access to basic sanitation has declined to 33 percent in urban areas, 25 percent in rural areas and 29 percent nationwide. South Africa's progress was deemed moderate for the entire country (increasing 51 percent in 1990 to 66 per cent in 2015) and in urban areas (increasing from 64 percent to 70 percent). However the progress accomplished in rural areas was very significant. The proportion of the population with access to basic sanitation went from 38 percent in 1990 to 61 percent in 2015; an increase of 23 percentage points (UNICEF & WHO, 2015).

Since 1990, the baseline year for the MDGs, the two national governments undertook major reforms of their water and sanitation sector (Golbalt, 1996; Naidoo & Constantinides, 2000;

Omugba, 2009; Kahinda & Taigbenu, 2011; Quinn, 2012). Following the apartheid, the new South African government completely reformed not only the water and sanitation sector but also the overall policy stance for the entire country. The outcomes for the water and sanitation sectors were two main pieces of legislation that govern water resources management as well the delivery of water and sanitation solutions. It provided access to safe drinking water and basic sanitation to all citizens regardless of their racial profiles which was not the case before 1994. It also prescribed a strong civil society and public participation in both provision of the services and the management of water resources (Golbalt, 1996; Naidoo & Constantinides, 2000; Kahinda & Taigbenu, 2011; Quinn, 2012). Even though the implementation has proven to be challenging; the new government was able to make progress in the provision of both services. It has not yet been able to increase public and civil society participation to the intended scale but the advances made paid a huge dividend (Quinn, 2012; Razzaque & Kleingeld, 2013). The efforts of the South African government to provide equitable services to all citizens directed the country towards a more universal coverage of safe drinking water and basic sanitation. The increased access to basic sanitation in rural areas is significant because during the apartheid that is where a majority of black communities lived and they did not have access to these services (Golbalt, 1996, UNICEF & WHO, 2015).

The Nigerian reforms were not as successful as the South African ones. The main outcome of the reform was one piece of legislation, the National Water Policy, and a proposed law for water resources. Institutions responsible for water and sanitation services despite being reformed remained weak and continue to face several constraints with corruption being the main obstacle. Public and civil society participation in searching for solutions or in the delivery of these services was minimum. Sanitation occupied a very low priority for the government. Corruption combined with the lack of accountability and transparency on the use of funds prevented people from knowing if the allocated financial resources for drinking water and sanitation were used as intended (Omugba, 2009; Olaseni & Alade, 2012).

Overall even though Nigeria underwent a major reform like South Africa, the country barely met the drinking water target[5] and completely failed on the sanitation target. The main difference between the two reform scenarios is that the South African reforms ensured public and civil society participation and implemented strong legislative acts prescribing roles and responsibilities of each stakeholder as well as the management of water resources (Quinn, 2012). The Nigerian reforms were unable to provide sufficient legislative cover, address corruption and include the civil society and the public as legitimate partners (Olaseni & Alade, 2012).

5 Conclusion

The conclusions of the research and analysis in this MRP can make useful contributions to the formulation of the post-2015 Sustainable Development Goals (Annex 1), in the areas of access to clean water and appropriate provision of sanitary facilities particularly in SSA.

First, from a physical, availability of water perspective, it is feasible that the SSA region can provide access to fresh, clean water for its population. However, this will require major cooperation between SSA countries. Regional water resources management will be a key component of successful provision of water and sanitation services in SSA. To overcome future water scarcity, SSA countries will need to work together to manage the water resources and where necessary transfer water between water rich countries and water poor ones (Frankhauser & Schmidt-Traub, 2011, Pullan, Freeman, Gething & Brooker, 2014).

Second, the more successful countries in meeting the MDG 7.C targets can support other countries in the region to design, implement and maintain appropriate water and sanitation services as most SSA countries face somewhat similar realities. This South-South cooperation will ensure that water and sanitation projects respond better to their needs. South Africa is a good candidate to lead this cooperation effort. The role of the international community should be to support the national and regional plans with financial and technical assistance. Their role

[5]Nigeria needed an increase of 30 percentage points to meet the target and by 2015; the country had increase by 29 points. Under the WHO/UNCEF JMP for water supply and sanitation a difference of only 1 percent was reasonable to declare that the country had met the target (UNICEF & WHO, 2015).

would be in the background than directly on the field (Abdenur & da Fonseca, 2013; De Renzio & Seifert, 2014).

Finally, all drinking water and sanitation projects will require complete participation of all stakeholders especially the national and regional civil society organizations and public from beginning to end. They are both key players who will be able to ensure to sustainability of the initiatives. Their participation will also ensure a full ownership the project during and after its implementation (Nordtveit, 2010; Aboud & Singla 2012; Sachs, 2012; Langford & Winkler, 2014).

Annex 1: Millennium Development Goals and Post-2015 Sustainable Development Goals

Millennium Development Goals

Goals	Status
Eradicate extreme and hunger	**The world has reduced extreme poverty by half**. In 1990, almost half of the population in developing regions lived on less than $1.25 a day. This rate dropped to 14% by 2015, reducing the number of people living in extreme poverty from 1.9 billion (1990) to 836 million (2015).
Achieve universal primary education	**91 % of children in developing regions are attending primary school.** The school enrolment rate in primary education in developing regions increased from 83% to 91% between 2000 and 2015. In 2015, 57 million children were out of school. SSA has the best level of improvement. In 1990, the primary school enrolment was 52% and in 2015, it is 80%.
Promote gender equality and empower women	**Disparities in primary school enrolment between boys and girls are being eliminated in all developing regions** By 2015, developing regions as a whole have achieved gender parity in primary education. **The political participation of women has continued to increase** In January 2014, 46 countries had more than 30% female members of parliament in at least one chamber. More women are now holding some of the so-called "hard" ministerial portfolios—such as Defense, Foreign Affairs and the Environment.
Reduce child mortality	**Child mortality has declined by more than half, but more progress is needed** The mortality rate for children under age five dropped by more than 50%, from 90 deaths per 1,000 live births in 1990 to 43 in 2015. Preventable diseases are the main causes of under-five deaths and have to eliminate if further reductions are to be achieved.
Improve maternal health	**Much more needs to be done to reduce maternal mortality** The maternal mortality ratio dropped by 45% between 1990 and 2015, from 380 to 210 deaths per 100,000 live births. In SSA, the

	maternal mortality ratio decline by 49%. However, almost 300,000 women died in 2013 from causes related to pregnancy and childbirth. Maternal death is mostly preventable. But, lack of provision of care to pregnant women as a major impediment.
Combat HIV/AIDs, malaria and other preventable diseases	**Antiretroviral therapy is saving lives and must be expanded further** 13.6 million people in developing regions had access to and received treatment using antiretroviral therapy (ART) for HIV-infected people by 2014. ART has saved 7.6 million lives since 1995. Expanding the ART coverage and better dissemination of knowledge about HIV among youth can save many more. **Efforts in the fight against malaria and tuberculosis have shown results** Between 2000 and 2015, an estimated 6.2 million deaths from malaria were averted due to the substantial expansion of malaria interventions. About 90% of the averted deaths were children under the age of five living in sub-Saharan Africa. The intensive efforts to fight tuberculosis have saved an estimated 37 million lives worldwide since 1995. If the trends continue, the world will reach the MDG targets on malaria and tuberculosis.
Ensure environmental sustainability	**Major trends that threaten environmental sustainability continue, but examples of successful global action exist** Global emissions of carbon dioxide (CO2) continued their upward trend. The levels of global emissions have increased above 50% above their 1990 level. Millions of hectares of forest are lost every year, many species are being driven closer to extinction and renewable water resources are becoming scarcer. At the same time, international actions have eliminated 98% of ozone-depleting substances and the proportion of terrestrial and coastal marine areas under protection has been increasing. **Access to an improved drinking water source became a reality for 2.6 billion people** The target of halving the proportion of people without access to an improved drinking water source was achieved in 2010, five years ahead of schedule. In 2015, 91% of the world's population had access to an improved source, up from 76% in 1990. Over 2.6 billion people gained access to an improved source of drinking water

	between 1990 and 2015. **2.1 billion people has gained access to improved sanitation since 1990, yet a billion people still resorted to open defecation** Between 1990 and 2015, almost 2.1 billion people gained access to an improved sanitation facility. However, in 2015, 2.4 billion people did not use an improved sanitation facility and 946 million people still resorted to open defecation, which poses a huge risk to communities that are often poor and vulnerable already. Much greater effort and investment will be needed to redress inadequate sanitation. **Proportion of people living in slums in urban areas dropped from 39.4% in 1990 to 29.7% in 2014.**
Develop a global partnership for development	**Development assistance rebounded, the trading system stayed favorable for developing countries and their debt burden remained low** Official development assistance stood at $135.2 billion in 2014, the highest level ever recorded, after two years of declining volumes. However, aid is shifting away from the poorest countries. 80 % of imports from developing countries entered developed countries duty-free and tariffs remained at an all-time low. The debt burden of developing countries remained stable at about 3 % of export revenue.

Source: United Nations, 2015, 2014

Sustainable Development Goals

These are the proposed goals for actions after 2015 to be achieved by 2030.

Goal 1: End Poverty in all its form everywhere
Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture
Goal 3: Ensure healthy lives and promote well-being for all at all ages
Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all
Goal 5 Achieve gender equality and empower all women and girls
Goal 6: Ensure availability and sustainable management of water and sanitation for all
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation
Goal 10: Reduce inequality within and among countries
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable
Goal 12: Ensure sustainable consumption and production patterns
Goal 13: Take urgent action to combat climate change
Goal 14 : Conserve and sustainably use the oceans, seas and marine resources for sustainable development
Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss
Goal 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels
Goal 17: Strengthen the means of implementation and revitalize the global partnership for sustainable development

Source: United Nations, 2015

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