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Global Water Finance: Assessment of the Funding Needed to Attain the Millennium Development Goals for Water and Sanitation

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Global Water Finance: Assessment of the Funding Needed to Attain the Millennium Development Goals for Water and Sanitation

Abstract

This report presents data and information to make an assessment of the funding needed to attain the Millennium Development Goals (MDGs) for access to improved water and sanitation by the year 2015. Specifically, it describes current achievements of MDGs and the current funding condition. In 2002, 1.1 billion people lacked access to improved water, and 2.6 billion people lacked access to improved sanitation. To achieve the Millennium Development Goals, it is necessary to provide improved water access for additional 1.5 billion people and improved sanitation access for 2 billion people by 2015. The breakdown of funding is estimated to be 65-70 percent from domestic public sector, 5 percent from the domestic private sector, 10-15 percent from international donors, and 10-15 percent from international private companies. There is an approximately \$10 billion per year shortfall between current spending for water and sanitation infrastructure and the estimated cost to achieve the MDG target. To achieve the target, in-country funding and international aid should be increased by \$10 billion per year. Particularly, international aid should be doubled or increased by \$3 billion per year for countries that have difficulties increasing their own in-country funding.

In 2002, 42 percent of people or 300 million people in Sub-Sahara Africa lack access to improved water. According to reports of the World Bank, UNICEF and WHO, the total annual expenditure requirement for improved water and sanitation is \$3.3 billion and \$3.4 billion per year respectively. Despite the necessity to spend funding effectively, a case study on Ethiopia reveals that only 30 percent of the budget was used for actual infrastructure, and a large portion was impacted by corruption and mismanagement. Many efforts have been made to date to improve this condition, including prioritization, promoting equity, enhancing sector coordination, and raising capacity. Yet, those efforts have not worked effectively enough to help many countries in Sub-Saharan Africa to meet the MDG target. A case study on Kenya, however, reveals its successful increase of in-country funding through charging taxes and giving the responsibility for water and sanitation provision from a local government to a private company.

Comments

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Global Water Finance

**Assessment of the Funding Needed to Attain
the Millennium Development Goals
for Water and Sanitation**

Hideyuki Hiruma

University of Pennsylvania

April 2007

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ABBREVIATIONS

AfDB	African Development Bank
AsDB	Asian Development Bank
CBO	Community Based Organizations
DAC	Development Assistance Committee
DNV	Det Norske Veritas
EC	European Commission
ERS	Economic Recovery Strategy
EU	European Union
GWP	Global Water Partnership
GWSSAR	Global Water Supply and Sanitation Assessment 2000 Report
IADB	Inter-American Development Bank
ICWP	Improved Community Water Point Density
IDA	International Development Association (Part of the World Bank funds)
IDB	Inter-American Development Bank
IFI	International Financial Institution
IMF	International Monetary Fund
GIS	Geographic Information System
GPS	Global Positioning System
JMP	World Health Organization – United Nation Children’s Fund Joint Monitoring Programme
MDGs	Millennium Development Goals
NGO	Non-governmental Organization
NWSB	Nairobi Water Service Board
NWSC	Nairobi Water and Sewage Company
O&M	Operation and Maintenance
ODA	Official Development Assistance
OECD	Organization for Economic Cooperation and Development
OECD-DAC	OECD – Development Assistance Committee
O&M	Operation and Maintenance

PRSP	Poverty Reduction Strategy Paper
SSA	Sub-Saharan Africa
UN	United Nations
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UN-Habitat	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
WB	World Bank
WHO	World Health Organization
WSB	Water Services Boards
WSP	Water and Sanitation Program
WSRB	Water Services Regulatory Board
WSS	Water and Sanitation sector
WSSCC	Water Supply and Sanitation Collaborative Council
WWC	World Water Council

ABSTRACT

This report presents data and information to make an assessment of the funding needed to attain the Millennium Development Goals (MDGs) for access to improved water and sanitation by the year 2015. Specifically, it describes current achievements of MDGs and the current funding condition. In 2002, 1.1 billion people lacked access to improved water, and 2.6 billion people lacked access to improved sanitation. To achieve the Millennium Development Goals, it is necessary to provide improved water access for additional 1.5 billion people and improved sanitation access for 2 billion people by 2015. The breakdown of funding is estimated to be 65-70 percent from domestic public sector, 5 percent from the domestic private sector, 10-15 percent from international donors, and 10-15 percent from international private companies. There is an approximately \$10 billion per year shortfall between current spending for water and sanitation infrastructure and the estimated cost to achieve the MDG target. To achieve the target, in-country funding and international aid should be increased by \$10 billion per year. Particularly, international aid should be doubled or increased by \$3 billion per year for countries that have difficulties increasing their own in-country funding.

In 2002, 42 percent of people or 300 million people in Sub-Sahara Africa lack access to improved water. According to reports of the World Bank, UNICEF and WHO, the total annual expenditure requirement for improved water and sanitation is \$3.3 billion and \$3.4 billion per year respectively. Despite the necessity to spend funding effectively, a case study on Ethiopia reveals that only 30 percent of the budget was used for actual infrastructure, and a large portion was impacted by corruption and mismanagement. Many efforts have been made to date to improve this condition, including prioritization, promoting equity, enhancing sector coordination, and raising capacity. Yet, those efforts have not worked effectively enough to help many countries in Sub-Saharan Africa to meet the MDG target. A case study on Kenya, however, reveals its successful increase of in-country funding through charging taxes and giving the responsibility for water and sanitation provision from a local government to a private company.

1. INTRODUCTION

“The human right to water is indispensable for leading a life in human dignity. It is a prerequisite for the realization of other human rights,” the United Nations Committee on Economic, Social and Cultural Rights stated in 2002 (Camdessus, 2003). Despite this necessity, more than 1 billion people lack access to an improved water sources, and more than 2 billion people lack access to improved sanitation (World Bank, 2004a). The United Nations established a goal of halving the proportion of people without access to safe drinking water and sanitation by 2015 in the UN Millennium Development Goals (MDGs). It is projected to achieve the target in some countries, yet, it is difficult in other countries. Effective funding is one of the keys to achieving the target.

Chapter 1 makes a global assessment of the funding needed to attain the MDGs for access to safe water and basic sanitation. Chapter 2 focuses on Sub-Saharan Africa where 44 percent of people (or 300 million people) lack access to safe drinking water in 2004 (World Bank, 2004b). Chapter 3 discusses conditions in Kenya as a case study. Chapter 4 makes recommendations for improvements.

The goals of this paper are to estimate current funding levels, to evaluate the effectiveness of funding, to identify barriers and factors influencing success, to suggest how the international community could assure the most sustainable water and sanitation systems to suit unique local conditions, and to make recommendations for improvements. (Later, “water systems” refers to “water and sanitation systems.”)

Chapter 1 Global Assessment

Chapter 1 provides a global assessment for the funding needed to attain the UN MDGs for access to safe water and sanitation. It identifies sources of funds and the current estimates of shortfalls in funding levels. The effectiveness of the various types of funding is also discussed in this chapter.

2. CURRENT CONDITION

2.1 Significance of Water

Water has become one of the most important issues in the world. There are several reasons that the international community has to focus on water. First, as stated above, water is a basic need and a right for people to sustain life. Second, availability of clean water and sanitation prevents diseases. Each year, 4 billion cases of diarrhea are reported, and 2.2 million people die from it (Camdessus, 2003). Clean water prevents infection from many diseases, particularly, intestinal worms, with which 10 percent of people in developing countries are affected. Blindness from trachoma, which affects 6 million people each year, could be prevented by clean water use. Cholera and schistosomiasis are also major water-borne diseases (Camdessus, 2003). Third, improved water and sanitation access brings positive influences on other MDG goals, such as poverty and school enrollment rate. Availability of water enhances living standards, promotes irrigation, and increases food production. Clean segregated boys/girls toilets are a desired pre-condition for girls to attend schools.

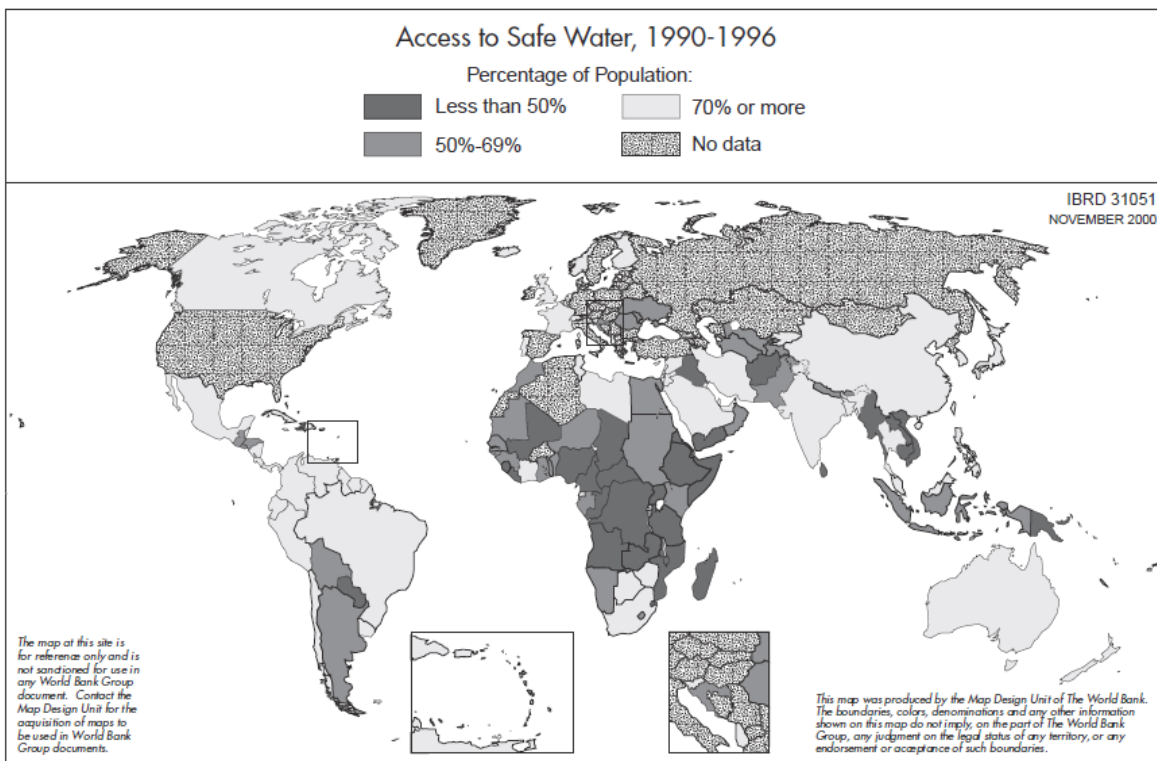
2.2 Definition of Safe and Improved Water

Improved water is defined as “any form of water collection or piping used to make water regularly available” (World Bank, 2004b). However, it is not the same as safe water. The definition of safe water is broader and depends on institutional implementation. For example, the World Bank regards safe water as “treated surface water, as well as untreated but uncontaminated water from sources such as natural springs and sanitary wells”; yet their practical measures are different from other institutions (World Bank, 2001). This has resulted in several different estimates of cost to achieve the MDGs.

2.3 Millennium Development Goals

In the declaration of the United Nations Millennium Summit in 2000, the international community committed to the Millennium Development Goals with signatures of 189 countries. The goals aim to reduce global poverty, improve living standards, and promote social and economic progress (World Bank, 2004a). There are eight goals, and each goal has several specific targets (See Appendix I for each goal and target). In the Goal 7, “Ensure environmental sustainability,” Target 10 states “Halve by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation” (World Bank, 2004a). The United Nations set year 1990 as the base year from which to measure success toward this goal. Figure 1 is a map showing the population that has access to safe water between 1990 and 1996 (World Bank, 2000).

Figure 1. Access to Safe Water between 1990 and 1996.

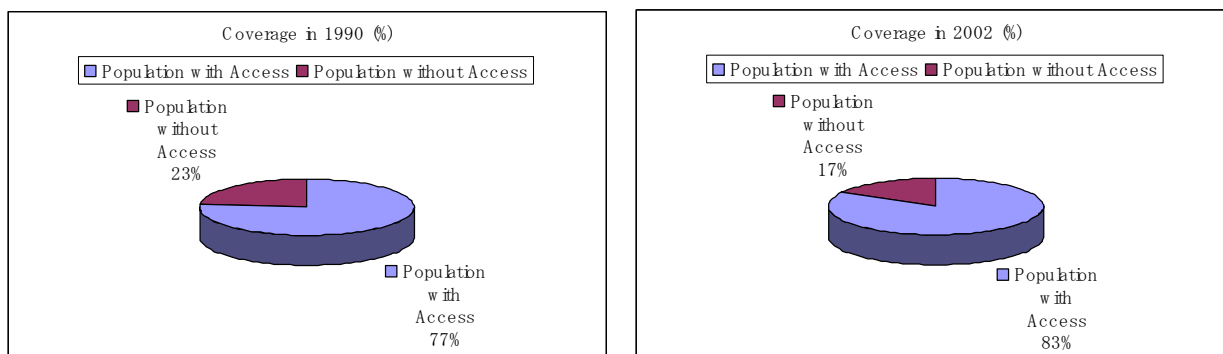


Source: World Bank (2000).

To achieve the target, countries have made significant efforts. Figure 2 shows the ratio of people in the world who have access to an improved water source. In 1990, 77 percent of the

world's population was lacking access to an improved water source. It improved to 83 percent in 2002 (World Health Organization, 2005). Between 1990 and 2002, approximately 400 million people obtained access to improved water (World Bank, 2004b). Although many people have gained access, the rapid population growth increases the number of people who need access. In 2002, 1.1 billion people were still lacking access to improved water. To achieve the MDG target, it is estimated that providing 1.5 billion more people with access to improved water is needed (World Bank, 2004b).

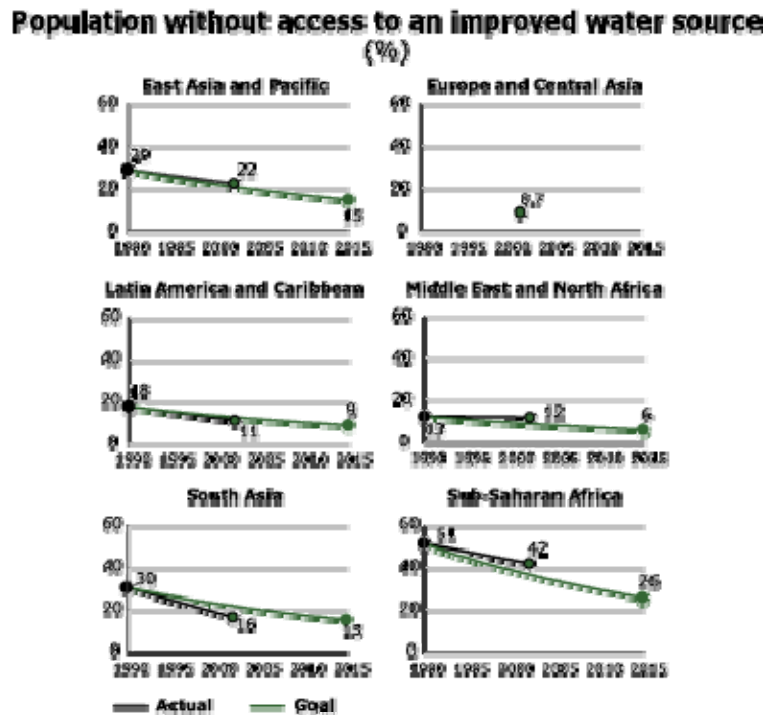
Figure 2. Coverage of Water Access in 1990 and 2002.



Source: World Health Organization (2005).

There are regional differences in the access to an improved water source. Figure 3 shows the 1990 and 2002 levels of population without access to improved water and goals by 2015 (World Bank, 2004b). Regions of Europe, Central Asia, Middle East, and North Africa already had relatively smaller populations without access to an improved water source in 1990. In Egypt, Tunisia, and Morocco, the progress has been made at a fast pace. Regions of East Asia and Pacific, Latin America and Caribbean, and South Asia have made significant progress by 2002. Yet, water contamination is still a big concern in South Asia. In East Asia, rapid population growth makes it difficult for countries to keep up the pace of providing improved water access. In Sub-Saharan Africa, 42 percent of people, or 300 million people, were still lacking access to improved water in 2002 (World Bank, 2004b). Although the region has made progress since 1990, meeting the MDG target is still difficult and needs support from developed countries. (See Appendix II for worldwide and regional statistics.)

Figure 3.



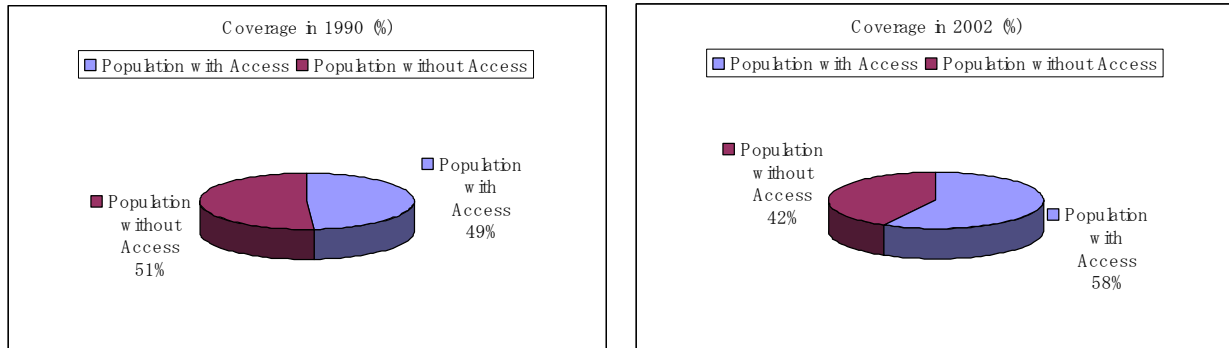
Source: World Bank (2004b).

Compared to access to improved water, providing basic sanitation is far behind the MDG target. Figure 4 shows the world population who had access in 1990 to improved sanitation and who did not (World Health Organization, 2005). As the figure shows, more than half the world population did not have access to improved sanitation. The condition improved by 2002, yet 42 percent of the people, or more than 2.6 billion people, still did not have access to improved sanitation. (See Appendix II for the exact number of people who have access to improved sanitation.)

For sanitation, there is a large gap between developed countries and developing countries. While developed countries have achieved almost 100 percent in 2002, only 49 percent of people in developing countries have access to improved sanitation (World Health Organization, 2005). In developing countries, moreover, the gap between rural and urban areas is extremely wide. (See Appendix III for the gap between urban and rural areas.) The MDG target to halve the population without improved sanitation by 2015 is to provide it for 75 percent of world population. It will require providing improved sanitation for 2 billion more people by 2015

(World Bank, 2004b). Because the current condition is behind the target, greater financing and more effective sanitation programs are necessary.

Figure 4. Coverage of Access to Improved Sanitation in 1990 and 2002.



Source: World Health Organization (2005).

3. FINANCE

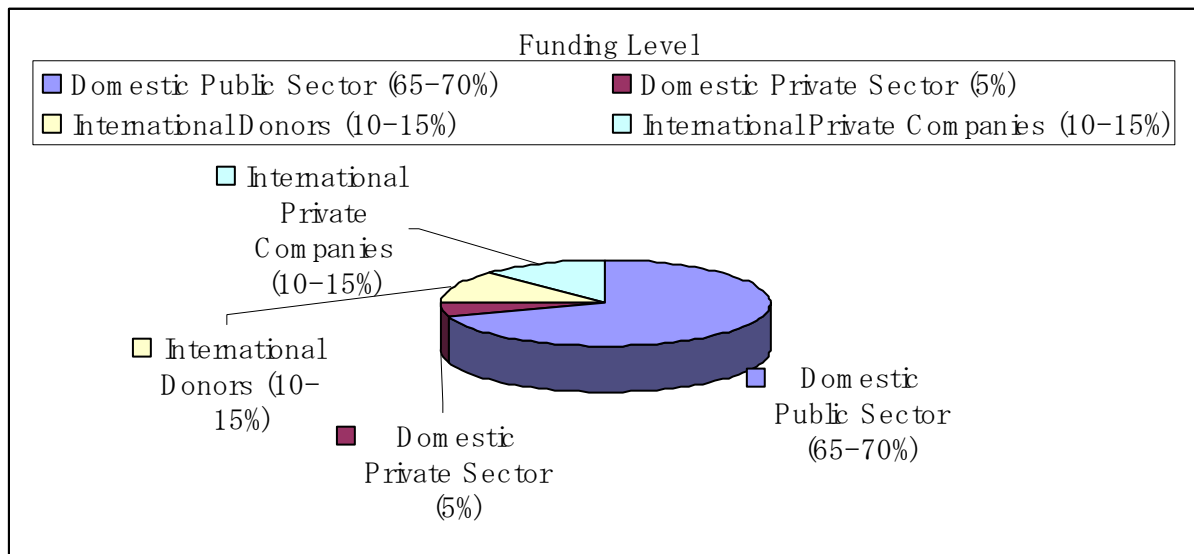
This section describes (1) sources of funding, (2) financial requirements, and (3) international aid. For sources of funding, this paper used the report “Financing Water for All” edited by Michel Camdessus. Camdessus is a former Managing Director of the International Monetary Fund. He chaired the “World Panel on Financing Water Infrastructure” and presented the report at the 3rd World Water Forum in Kyoto, 2003. The “World Panel on Financing Water Infrastructure” is also called “Camdessus Panel,” (World Water Council, 2005). For financial requirements, this paper used the report “The Cost of Meeting the Johannesburg Targets for Drinking Water” written by Henri Smets. Smets is a researcher of Water Academy, France, and reported the current spending and an estimate cost for the MDG target in his report (Smets, 2004).

3.1 Sources of Funding

Sources of funding for water infrastructure vary from country to country. Yet, generally, the breakdown of funding has been estimated to be 65-70 percent for the domestic (i.e. in-country) public sector, for 5 percent for the domestic private sector, 10-15 percent for the international donors, and 10-15 percent for the international private companies (Camdessus,

2003). Figure 5 shows the breakdown of funding from each sector in the mid-1990s. As the figure shows, in-country funding is between 70-75 percent. The largest funding sources are local finance, including local governments, local banks, and water users. Official bodies, such as the Ministry of Public Works, the Ministry of Interior, and the Ministry of the Environment, also have an important role in the in-country funding. In-country funding is difficult to quantify in global terms. International lending and aid, on the other hand, accounts for a smaller ratio, between 20-30 percent. This type of funding includes international aid, foreign banks, and private companies (Camdessus, 2003).

Figure 5. Sources of Funding.



Source: Camdessus (2003).

In both the domestic and international sectors, there are many parties who finance water infrastructure. Water users include households, farmers, and business. Householders, particularly ones who live in rural areas, tend to invest their cash in water infrastructure, such as wells, pipes, and basic sanitation. Farmers also invest in tubewells, pumps, and surface irrigation systems. Water authorities and utilities fund regular water infrastructure improvements and additional improvements when they get revenues from loans and public subsidies. Non-governmental organizations (NGOs) and local communities fund through voluntary private contributions or international organizations. Local banks and other financing institutions usually offer short to

medium-term loans. Besides these, there are more parties involved in water financing, such as international banks, export credit agencies, international aid from multilateral and bilateral sources, multilateral financial institutions, environmental and water funds, and central and local governments (Camdessus, 2003).

The many parties could be categorized to three groups: water users, tax payers, and aid donors (Camdessus, 2003). Water users pay for official water service through their expenditure or water bills. Tax payers fund water infrastructure through various local or national fiscal flows, including state, ministry, special development funds, provinces, and municipalities (Smets, 2004). Aid donors include international aid and private voluntary contributions.

3.2 Financing Requirements – Enough or Shortfall?

Although many individual countries have made a significant effort to provide for their improved water and sanitation needs, it will still require additional funding to achieve the MDG target. In other words, there is approximately a \$10 billion per year shortfall between current spending for water infrastructure and the estimated cost to achieve the MDG target (Camdessus, 2003). Because the definition of safe water and sanitation is broad and the calculation method is rarely shown, there are a number of estimates for the cost to meet the MDG target. Smets reported the current spending and an estimated cost for the MDG target (Smets, 2004). Table 1 shows the investment for water supply and sanitation between 1990 and 2000 (World Health Organization and United Nations Children’s Fund, 2000). Although the financing of water supply and sanitation has been decreasing since 1990, the average annual total investment between 1990 and 2000 was around \$15 billion. Countries have invested in water supply while they have invested less in sanitation. The shortage of investment in sanitation has hindered the improvement in the ratio of the world population without access to improved sanitation.

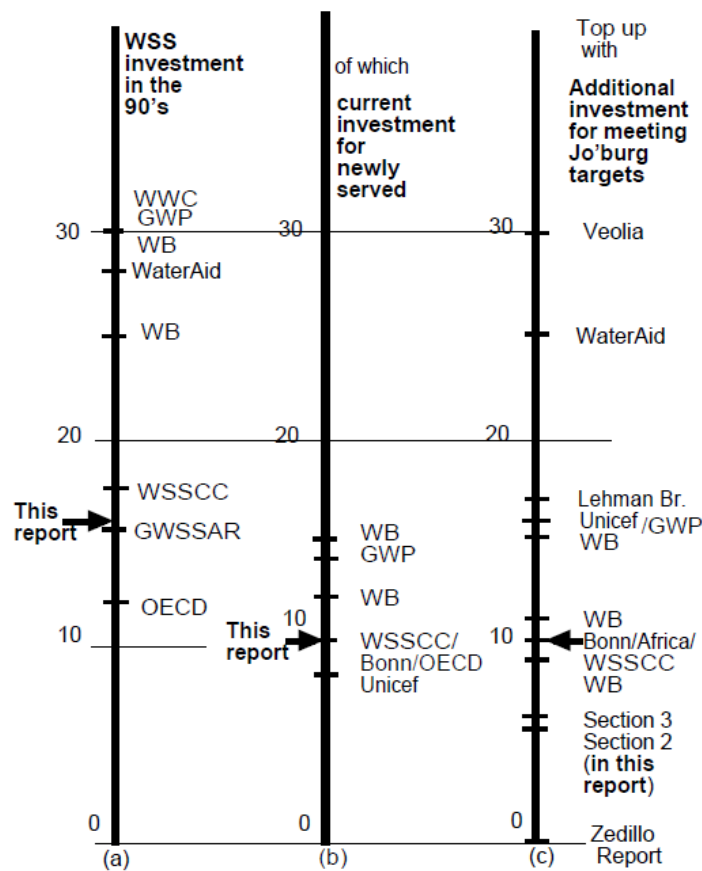
Table 1. Past Investment for Water Supply and Sanitation (1990-2000 per Year).

	Africa	Asia	Lat. America	Total
Investment for Water Supply (M\$)	4,091	6,063	2,410	12,564
Investment for Sanitation (M\$)	542	1,104	1,503	3,148
Total Inv. for Water Supply and Sanitation (M\$)	4,633	7,167	3,913	15,712

Source: World Health Organization and United Nations Children’s Fund (2000).

In addition to the information from the World Health Organization (WHO) and the United Nations Children’s Fund (UNICEF), there are several other estimates. Figure 6 shows various estimates of investment for water supply and sanitation. Column (a) is an estimate of 1990’s. Today, it is calculated at approximately \$16 billion a year, but it ranges from \$10 billion to \$30 billion (Smets, 2004). It ranges widely because some of the estimates include the cost for waste water treatment and for agriculture, which is not directly related to the attainment of MDGs for water and sanitation.

Figure 6. Various Estimates of Investment for Water Supply and Sanitation.



a) Investment in WSS in the 90's of which :
 b) current investment to serve the unserved ;
 c) additional investment to be made for reaching the Johannesburg targets for water (In addition to current investment).

(in \$ billion per year invested in developing countries)

Source: Smets (2004).

Column (b) of Figure 6 shows the current level of investment. It decreased from the 1990's and has become around \$10 billion. Column (c) shows an estimate of the additional investment needed to meet the MDG target by 2015. In addition to spending the current investment, the Water Supply and Sanitation Collaborative Council (WSSCC) suggests spending an extra \$10 billion per year. The estimate of the World Bank is almost the same as WSSCC, which suggests spending an extra \$11 billion per year (Smets, 2004). In total, a \$27 billion investment per year for water supply and sanitation is estimated to be necessary to meet the MDG target (Smets, 2004). However, the cost covers only the most basic standards of service. It will cost more for the rehabilitation of existing systems and the improvement of waste water treatment (Camdessus, 2003). Table 2 shows annual investment cost estimates for meeting MDGs calculated by the World Bank. The total estimate is \$30 billion, which is almost same as WSSCC and the previous World Bank estimates. (See Table 6 for more detailed investment requirements to meet MDGs in Sub-Saharan Africa.)

Table 2. Annual Investment Cost Estimates for Meeting MDGs (\$ billion per year).

<i>Region</i>	<i>Supply</i>	<i>Sanit.</i>	<i>Total</i>	<i>%</i>
<i>Sub-Saharan Africa</i>	<i>1.9</i>	<i>3.3</i>	<i>5.2</i>	<i>17</i>
<i>Middle East+ N. Africa</i>	<i>0.6</i>	<i>1.2</i>	<i>1.8</i>	<i>6</i>
<i>East Asia + Pacific</i>	<i>2.6</i>	<i>6.9</i>	<i>9.5</i>	<i>32</i>
<i>South Asia</i>	<i>2.1</i>	<i>6.7</i>	<i>8.8</i>	<i>29</i>
<i>Latin America + Carib.</i>	<i>0.8</i>	<i>1.5</i>	<i>2.3</i>	<i>8</i>
<i>Europe + Central Asia</i>	<i>0.2</i>	<i>0.4</i>	<i>0.6</i>	<i>2</i>
<i>Additional production</i>	<i>1.8</i>	<i>-</i>	<i>1.8</i>	<i>6</i>
<i>Total developing world</i>	<i>10.0</i>	<i>20.0</i>	<i>30.0</i>	<i>100</i>

Source: Smets (2004).

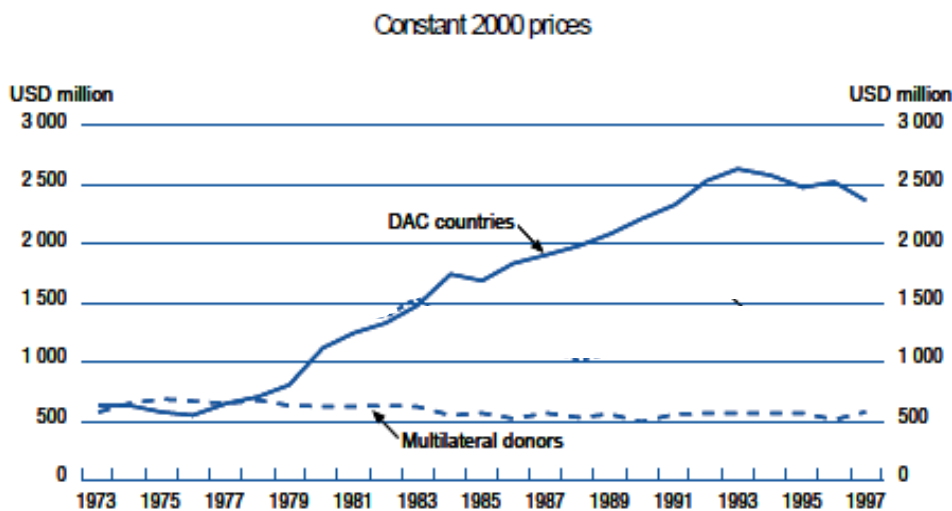
3.3 International Aid

Smets suggests that aid for water supply and sanitation should be at least doubled to meet the MDG target, (Smets, 2004). An additional \$10 billion spending for water finance per year is achievable, yet still hard for the international community. It is particularly difficult for many low-income developing countries to increase spending for water infrastructure. Thus, an

increase of foreign aid is necessary to achieve the MDG target. Currently, international aid is around \$3 billion a year. To achieve the target, at least an additional \$3 billion is necessary (Smets, 2004).

Figure 7 shows bilateral and multilateral aid for water supply and sanitation (OECD, 2003). The Development Assistance Committee (DAC) consists of 23 developed countries and represents more than 80 percent of the whole international aid for water supply and sanitation. (See Appendix IV for the member of DAC countries.) Most of the aid has taken the form of bilateral aid, which is financial aid given by one country directly to another. From 1973 to 1980's, the DAC members' bilateral aid increased at an average annual rate of 9 percent. However, it has been decreasing since the 1990's reflecting the downward trend of the Official Development Assistance (ODA) expenditures in general. However, the share of aid for water has been stable with 6 percent of bilateral aid. Compared to DAC's bilateral aid, the share of multilateral aid (which is financial aid to developing countries from institutions with an international membership such as the World Bank) is smaller.

Figure 7. Aid to Water Supply and Sanitation (1973-2001).



Source: OECD (2003).

The amount of aid and the share by individual donor countries are illustrated in Table 2 (OECD, 2003). Among the donors, Japan's contribution is the largest, accounting for approximately one third of total aid. The second largest donor between 1999 and 2001 was the

International Development Association (IDA), a part of the World Bank funds. Germany, the United States, France, the United Kingdom, and the European Commission (EC) account for another one third. Although the share is not big, the African Development Fund (AfDF), the Asian Development Fund (AsDF), and the Inter-American Development Bank (IDB) also have made contributions to particular regions (OECD, 2003).

Table 2. Annual Average Share for Water Supply and Sanitation (1996-2001).

	USD million		% of donor total		% all donors	
	1996-1998	1999-2001	1996-1998	1999-2001	1996-1998	1999-2001
Australia	23	40	3	6	1	1
Austria	34	46	17	18	1	2
Belgium	12	13	4	4	0	0
Canada	23	22	4	4	1	1
Denmark	103	73	15	13	3	2
Finland	18	12	11	8	1	0
France	259	148	13	13	7	5
Germany	435	318	19	11	13	11
Ireland	6	7	7	7	0	0
Italy	35	29	14	9	1	1
Japan	1 442	999	14	14	41	33
Luxembourg	2	8	4	13	0	0
Netherlands	103	75	8	7	3	2
New Zealand	1	1	2	2	0	0
Norway	16	32	4	5	0	1
Portugal	0	5	1	3	0	0
Spain	23	60	4	8	1	2
Sweden	43	35	6	6	1	1
Switzerland	25	25	7	6	1	1
United Kingdom*	116	165	8	7	3	5
United States	186	252	6	4	5	8
Total DAC countries	2 906	2 368	11	9	83	78
AfDF	56	64	10	9	2	2
AsDF	150	88	11	8	4	3
EC	..	216	..	5	..	5
IDA	323	331	6	6	9	11
IDB Sp F	46	32	9	9	1	1
Total multilateral	575	730	7	6	17	22
Total	3 482	3 098	10	8	100	100

Source: OECD (2003).

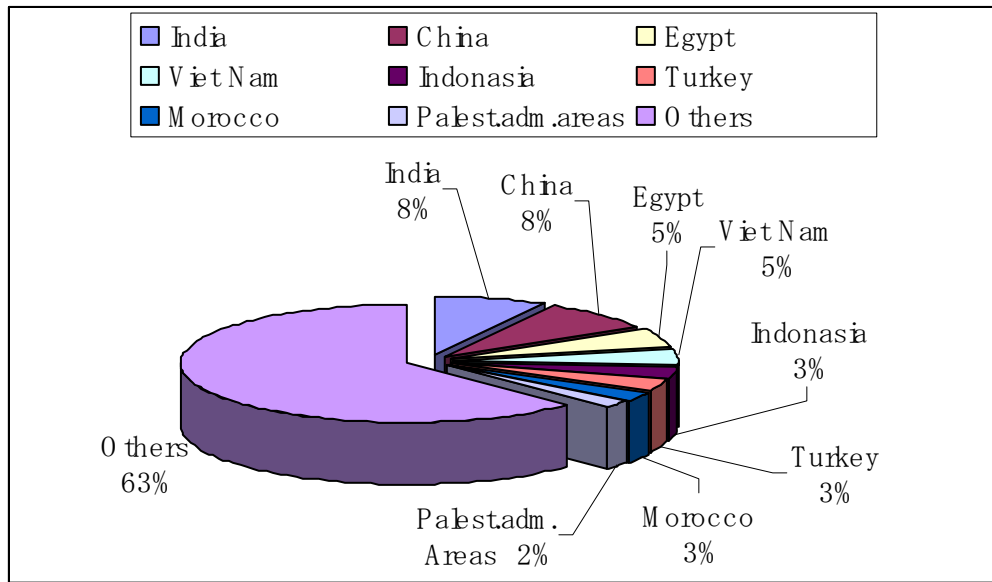
3.4 Effectiveness of Funding

Effective funding is crucial to meet the MDG target; however, governments and international aid do not always make effective investments currently. For in-country funding, central and local governments make a large part of the investment in water in many developing

countries; yet there have been obstacles that hinder effective funding. First, there is a gap in priorities in the water sector between local and central governments. Because water systems tend to be local responsibility, the central government puts less priority in water and gives it a small share in the budget. Local governments, then, have difficulty repairing water infrastructure and investing in new water systems for people without access to water services. Although international aid helps fund the water sector, the amount of aid differs year by year, which makes it difficult for local governments to invest in long-term projects. Most local government regulators of water sectors are not sufficiently trained. Regulation is important for water agencies to make their actions accountable to the public. Yet, because regulation is weak, companies and the general public cannot have confidence when investing in the water sector. Corruption is another reason of ineffective use of funding (Camdessus, 2003).

The breakdown of international aid shows unfair and ineffective funding in the water sector. International aid does not go to countries that need aid the most but to a selected group of countries. Figure 8 shows recipient countries of international aid between 1990 and 2004 (World Water Council, 2006). Only 10 countries received 37 percent of the total aid. These countries were India, China, Egypt, Vietnam, Indonesia, Turkey, Morocco, Palestine, Philippines, and Jordan. The years 1995 and 1996 were extreme: 60 percent of aid went to only 10 countries (India, China, Egypt, Vietnam, Indonesia, Turkey, Morocco, Peru, Tunisia, and Sri Lanka) (OECD, 2003). While small groups of countries received a large portion of international aid, many countries where people lacked access to safe water and sanitation received very little aid. Only 12 percent of the total aid was given to countries where more than 40 percent of people lack access to safe water and sanitation (OECD, 2003). A possible reason of the disparity is that Japan is the largest donor of the water funds and offers aid to many Asian countries. The form of the aid is mostly loan because Japan expects these countries they offer aid can pay it back.

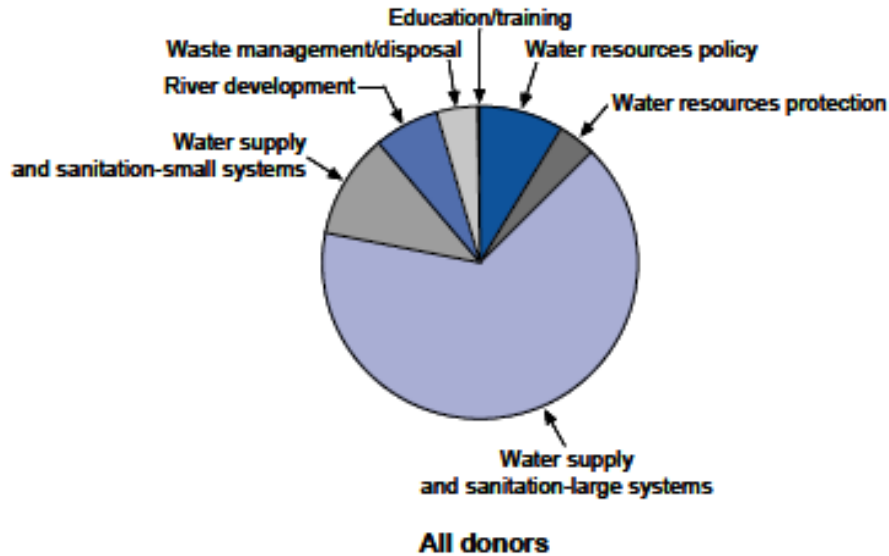
Figure 8. Aid for Water Supply and Sanitation by Recipient (1990-2004).



Source: World Water Council (2006).

Reviewing the purpose of investment use reveals other possible inefficiencies. Figure 9 shows the ODA's investment in water supply and sanitation by subsector between 1997 and 2001 (OECD, 2003). More than three quarters of ODA was targeted for supply and sanitation-large systems, and about 15 percent was financed for small systems (Tearfund, 2004). Yet, small systems, such as hand pumps, gravity-fed systems, rainwater collection, and latrines, are also needed to provide sustainable services. A more balanced investment between small and large system could promote efficient water and sanitation provision. The United Kingdom and Japan are decreasing this gap in aid between the large-scale and small-scale systems (Tearfund, 2004).

Figure 9. Water Supply and Sanitation Aid by Subsector (1997-2001).



Source: OECD (2003).

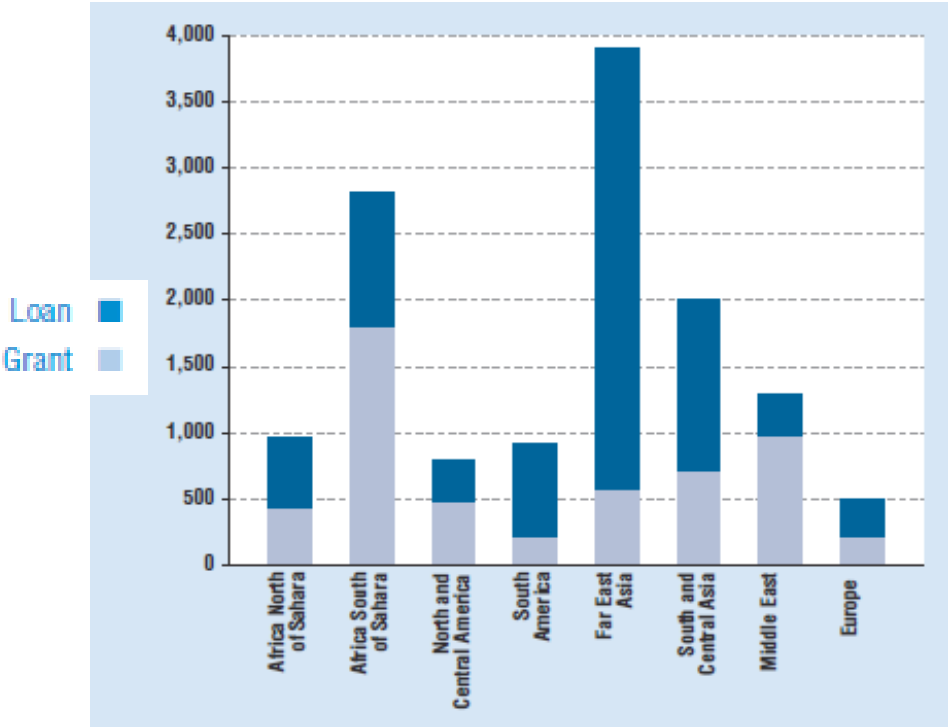
The small portion of aid dedicated to water policy and education is another concern. Water resources policy includes reform of planning and programs to improve water resource management through institutional partnership, technical development, and capacity building (OECD, 2003). Less aid to these functions could prevent improvement of water governance in these countries. The tiny portions of the funds used for education and training may result in people using water in impractical and/or inefficient ways.

3.5 Imposed Conditions on Borrowers

Loans and grants sometimes impose conditions on borrowers. Figure 10 shows regional breakdown of ODA to water supply and sanitation from 1998 to 2002. Far East Asia received the highest amount of aid from ODA. This is because Japan is the largest donor of water sector funds and offers aid ten times as much to Far East Asia than to other regions (Tearfund, 2004). However, the aid is mostly in the form of loans. Donors expect that Far East Asia has the potential to pay back loans due to healthy economic growth. Sub-Saharan Africa received the second-highest amount of aid and the highest amount in the form of grants, reflecting their difficulty in repaying loans. Imposed conditions from donors, however, makes it difficult for African countries to allocate money effectively. Although the total amount of aid to Asia and

Africa is greater than that of Oceania and Europe, the per head amount of aid of Asia and Africa is smaller than that of Oceania and Europe (Tearfund, 2004).

Figure 10. Regional Breakdown of ODA to Water Supply and Sanitation between 1998 and 2002 (In US\$ millions).



Source: Tearfund (2004).

Chapter 2. Assessment on Sub-Saharan Africa

Chapter 2 focuses on Sub-Saharan Africa because the region has the most sentences lack of access to safe drinking water and sanitation. With a case study of Ethiopia, this chapter describes the efforts that have been done to address the problems, such as prioritization, transparency, equity, and sector coordination. This chapter evaluates efforts of Sub-Saharan African countries identifying the barriers to success and factors influencing on progress.

4. CURRENT CONDITION AND FINANCIAL REQUIREMENTS

4.1 General Condition of Sub-Sahara Africa

Although economic development is seen in Sub-Saharan African countries, it remains at a slow growth rate. An increase in the poverty rate and the number of poor people contribute to the slow pace. Sub-Saharan Africa has the largest proportion of people whose income is below \$1 a day. Economic growth in this region is estimated to be 1.6 percent between 2006 and 2015; this is less than the growth rate needed to reduce poverty rate to half the 1990 level. In fact, the number of the poor is estimated to increase from 313 million in 2001 to 340 million people by 2015. The health condition in Sub-Saharan Africa is anticipated to further deteriorate, particularly among the poor. This is due to shortages in health workers, an over-dependence on donations, the unprecedented burden of HIV/AIDS, and infectious disease, such as malaria and tuberculosis. Sub-Saharan Africa is also dependent on commodity exports and has political instability. (World Bank, 2004c).

There is some tangible progress, however, seen in Sub-Saharan Africa. Primary education is successfully provided in many countries, which has resulted in significant enrollment increases. The next step is increasing the enrollment at the secondary level. Uganda and Ghana are known for remarkable economic growth and poverty reduction. Cameroon is also anticipated to achieve its target of poverty reduction (World Bank, 2004c). (See Appendix V for various conditions of Sub-Saharan Africa.)

4.2 Millennium Development Goals

In Sub-Saharan Africa, more than 300 million people lacked access to safe drinking water in 2004. Table 3 shows the drinking water supply in Sub-Saharan Africa in 1990 and in 2004. In 1990, people who did not have access to safe drinking water were 51 percent of the

population. Thus, the target by 2015 is to reduce it by 25 percent. Sub-Saharan African has provided water access to more than 150 million people. Yet, 44 percent of people remain unserved in 2004, and the pace is not fast enough to meet the target. Population growth is one of the factors that makes it difficult to achieve the target in this region (JMP, 2006a).

Table 3. Drinking Water Supply in Sub-Saharan Africa.

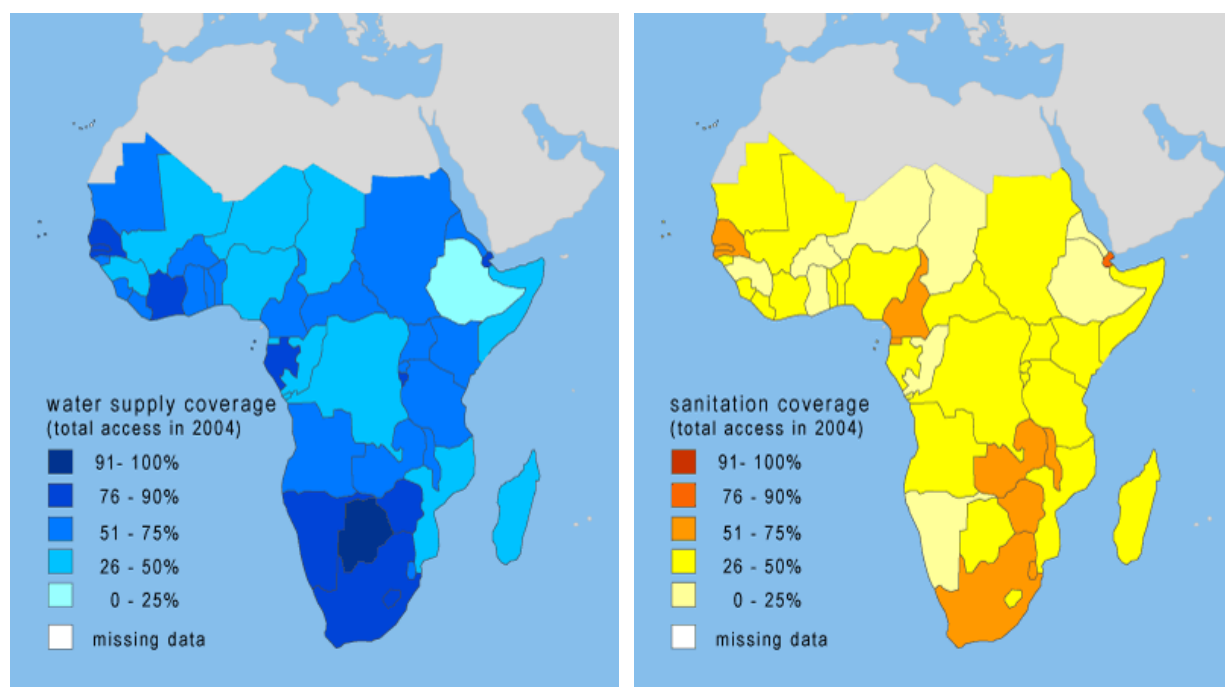
	1990 - Population (thousands)					2004 - Population (thousands)			
	Total	served	unserved	% unserved		Total	served	unserved	% unserved
Urban	144'992	119'508	25'484	18	>	267'516	215'121	52'395	20
Rural	372'259	135'527	236'732	64	>	467'135	197'169	269'956	58
Total	517'251	255'035	262'216	51	>	734'641	412'290	322'351	44

Source: JMP (2006a)

Rural areas show some progress. More than 60 million people gained access to safe drinking water between 1990 and 2004. On the other hand, the proportion of people who lack access to safe drinking water in urban areas increased over the best 14 years. Although more than 95 million people gained access to water supply, the combination of demographic growth in urban areas and rural to urban migrations increased the unserved population in urban areas (JMP, 2006a). Figure 11 is a map showing the drinking water coverage of Sub-Saharan African countries in 2004 (JMP, 2006a). As the map shows, many Sub-Saharan African countries still serve safe water to less than 50 percent of their population.

Provision of improved sanitation is worse than that of drinking water. Table 4 shows sanitation coverage in Sub-Saharan Africa in 1990 and 2004. Approximately 460 million people or 63 percent of people in Sub-Saharan Africa lack access to improved sanitation. Between 1990 and 2004, about 107 million people gained access to sanitation. However, the unserved population increased to more than 100 million people due to population growth. About 60 percent of people who gained access to improved sanitation were living in urban areas; yet the proportion decreased just 1 percent. Still more than 300 million people in rural area lack access to improved sanitation (JMP, 2006b). Figure 11 shows the sanitation coverage of Sub-Saharan African countries in 2004. As this map show, many countries still provide improved sanitation to less than 50 percent of the population. (See Appendix II for water supply and sanitation coverage of each country in Sub-Saharan Africa.)

Figure 11. Drinking Water Coverage and Sanitation Coverage in 2004.



Source: JMP (2006a).

Table 4. Sanitation Coverage in Sub-Saharan Africa.

	1990 - Population (thousands)					2004 - Population (thousands)			
	Total	served	unserved	% unserved		Total	served	unserved	% unserved
Urban	144'992	75'757	69'235	48	>	267'516	142'241	125'275	47
Rural	372'259	88'609	283'650	76	>	467'125	129'192	337'933	72
Total	517'251	164'366	352'885	68	>	734'641	271'433	463'208	63

Source: JMP (2006b)

4.3 Financial Requirements

To meet the MDG target, about 400 million people in Sub-Saharan Africa need to gain access to improved water. Table 5 shows the annual expenditure requirements to meet the MDGs in Sub-Saharan Africa. The estimate is based on reports of the World Bank and JMP. The total annual expenditure requirement for improved water is \$3.3 billion per year. The total expenditure requirement for sanitation is \$3.4 billion per year. The calculation of expenditure comprises three components. The first component is the requirement of new infrastructure and the rehabilitation of existing infrastructure. The second one is operations and maintenance

(O&M) cost for new and existing infrastructure. The third one is finance for sector development, such as building capacity, policy formation, and sector monitoring (WSP, 2005).

Table 5. Annual Expenditure Requirements to Meet MDGs in Sub-Saharan Africa (2002).

	Capital Investment	O&M	Sector Management	Total	Requirements as a % of GDP
Water (Billion \$/yr)	1.1	1.8	0.4	3.3	1.30%
Sanitation (Billion \$/yr)	1.5	1.5	0.4	3.4	1.40%
Total	2.6	3.3	0.8	6.7	2.70%

Source: WSP (2005)

5. CASE STUDY – ETHIOPIA

In order to depict the current condition of water finance in Sub-Saharan Africa, this paper studies two cases – Ethiopia and Kenya. Ethiopia is chosen as a case study because it has a low percentage of the population provided with safe water and sanitation, and it is anticipated that it will be difficult to meet the MDGs with current efforts. Thus, studying this country would reveal what is needed the most. The effectiveness of finance in all of Sub-Sahara Africa is then evaluated in the next section. A case Study of Kenya is discussed on Chapter 3. Figure 12 shows the location of Ethiopia. Information is derived from the WaterAid, which is an international organization that works for empowering people through providing safe water and sanitation (WaterAid, 2005a).

Figure 12. Map of Ethiopia.

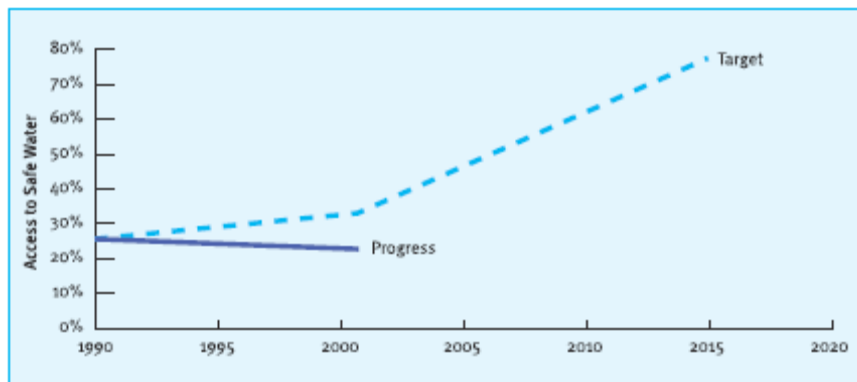


Source: Nations Online Project (2006a).

5.1 General Information of Ethiopia

Ethiopia has one of the lowest proportion of providing improved water and sanitation in the world. Only 22 percent of the population has access to safe drinking water, and only 6 percent of the population has access to improved sanitation. Figure 13 shows the progress toward the MDG for safe drinking water. The proportion of safe drinking water access in 2000 actually declined from 1990 level due to population growth and ineffective water management. It is anticipated that it will be difficult to meet the MDG target by 2015. Although provision of safe drinking water is prioritized in policy documents, no targets or a specific budget lines are ensured for sanitation. Approximately 90 percent of people use open fields and approximately 6 percent use pit latrines in the country (Water Aid, 2005a).

Figure 13. Progress towards the Water Millennium Development Goal in Ethiopia.



Source: WaterAid (2005a).

5.2 Finance in Ethiopia

According to the calculation by WaterAid, \$96 million per year is required to be spent to reach water and sanitation MDG targets. Although the annual budget for water and sanitation is \$219 million, only \$65 million is actually spent a year. This is around 30 percent of the budget; in other words, almost 70 percent of the water budget is impacted by corruption and mismanagement. The numbers of households that must gain access to safe water or sanitation are 4 times and 20 times greater than what has been achieved so far. Thus, an increase of expenditure by \$31 million is necessary to reach the MDG target. A lack of coordination among donors is also one of the factors that have resulted in extremely low performance in the water sector (WaterAid, 2005a).

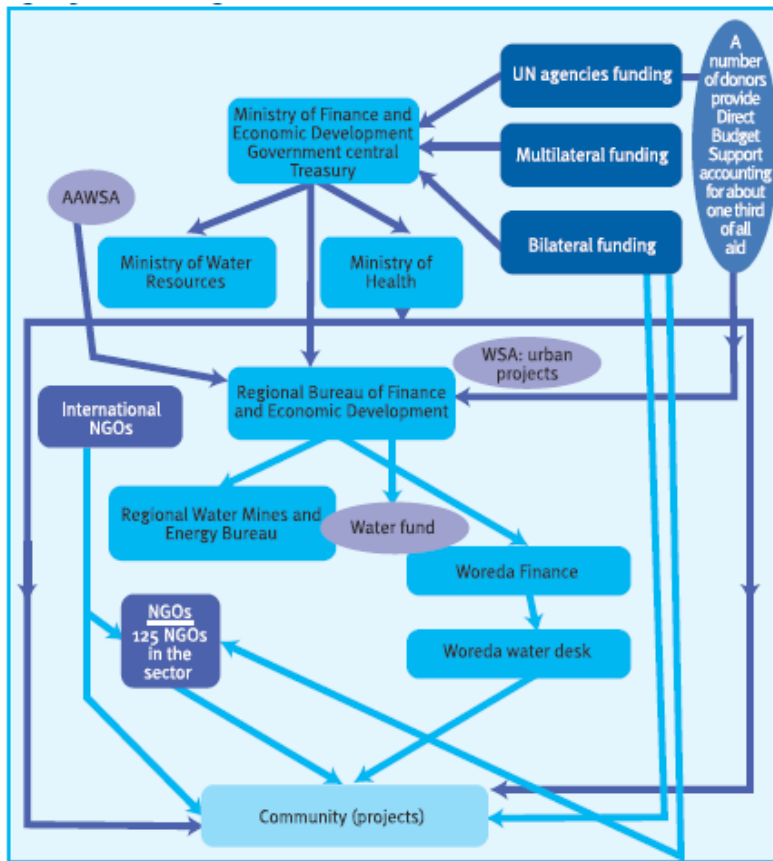
The main funding source is from domestic public sector. National revenue increased from \$11 billion to almost \$20 billion between 1998 and 2004. Yet, the increase is due to the new borrowing from the domestic market. In the national budget, the water sector receives about 2 percent. Between 1991 and 1994, the budget for water declined sharply because of the fall of the socialist government, which illustrates the influence of political instability on the water sector. The central government does not have strong control over water management, but states mainly have that responsibility (WaterAid, 2005a).

Funding from external donors is very low in Ethiopia. Ethiopia received only \$16 per capita in 2001 while Burkina Faso, Rwanda, and Ghana received around \$33 per capita. Major donors are the World Bank and UN organizations, such as UNDP and UNICEF. The total aid supports 24 percent of urban investments and merely 8 percent of rural investments. Urban areas received \$19.2 million in 2001 and 2002. This is funded by the Federal budget for \$2.7 million, foreign loans for \$11.7 million, and foreign grants for 4.8 million. The aid from donors, however, is not effectively used, including the delays in disbursing funds. Procedures to utilize the aid are slowed by having repeated time lost in paperwork (WaterAid, 2005a).

5.3 Effectiveness in Funding in Ethiopia

Coordination among water sectors in Ethiopia is ineffective. Figure 14 shows water funding routes in Ethiopia. The Ministry of Finance and Economic Development is the designated agency to receive funds from donors and allocate them to the community. Yet, funds that go through that route are only one third. The rest of the funds from donors go directly to regional levels. Budget allocation is usually conducted at regional levels. There should be more effective coordination among federal ministries, regional bureaux, community, and NGOs. Usually funds are moved with six months delays. Comprehensive water sector planning and collaboration procedures should be created by the government and donors (WaterAid, 2005a).

Figure 14. Water Funding Routes in Ethiopia.



Source: WaterAid (2005a).

Decentralization has not been effectively conducted. Although the government revenue doubled from 1998 to 2004, regional spending increased only 50 percent. This indicates that national budget allocation to regional levels decreased from 40 percent to 30 percent in the 6 years. One major barrier to decentralization is the lack of water sector professionals. For instance, there is only one part-time staff person in the region office where there should be 11 people. This has contributed to huge gap of water and sanitation coverage between regions. The Addis Ababa region has 98.4 percent water coverage while Somali and Gambella regions have only 12.8 percent and 15.9 percent (WaterAid, 2005a).

The sustainability of the water infrastructure, such as wells and protected springs, is not high in Ethiopia. In Benshangul Gumiz and Oromia regions have around 80 percent and 65 percent of functional rates of water infrastructure. Even simple technologies, such as shallow wells, are hard to sustain in Ethiopia. A lack of emphasis on community management and

training for maintenance is a barrier to sustain the technologies and infrastructure. The female proportion of water sector institution is very low in Ethiopia. In developing countries, females tend to have more responsibility dealing with water than males. Although Ethiopia encourages female involvement, most decision making is done by males. Only 7 percent of the parliament is woman, and only two out of the 26 water ministry department chairs are women. At the community level, only 25 percent of management posts are held by women (WaterAid, 2005a).

Transparency in administrative agencies and the involvement of civil society is important, yet, there are many barriers to an effective process. A lack of up-to-date financial data is one of the main concerns in order to improve transparency. The currently available official budget data is further 1996/97 fiscal year. Other reports are also two or three years late, and it has been difficult to accurately track the amount of expenditures. Statistics are problematic because comparability between data set is difficult. Also, the data is not consistent. A Water Ministry official said, “The Central Statistical Authority reported urban coverage of 98 percent, but they asked only about the presence of pipes and not whether any water actually came out of them” (WaterAid, 2005a). The government is reluctant to have dialogues or negotiation with community based organizations, which hinders any accountability of the government (WaterAid, 2005a).

6. EVALUATION OF EFFECTIVENESS

Using the case study on Ethiopia, this section evaluates the effectiveness of funding in Sub-Saharan Africa. In order to enhance effectiveness, many efforts, such as prioritization, promoting transparency, enhancing equity, promoting sector coordination, and raising capacity, have been conducted in countries. This section shows the efforts that have been done to date and evaluates them identifying the barriers to success and factors influencing progress.

6.1 Prioritization

Prioritization to facilitate funding of safe water and sanitation has been made effectively in some countries but not effectively in many other countries in Sub-Saharan Africa. One of the barriers is that officials in the Water Ministry have usually poor relations to other government sectors. The officials fail to get the attention of governments regarding what they are achieving

and to keep seeking financial sources. Yet, in Uganda, prioritization efforts have been most effective. A factor influencing progress is community involvement. Communities have been actively involved in national poverty reduction process and have put water issues as a top priority for poverty reduction. As a result, 2.2 million people gained access to safe water over the last three years (WaterAid, 2005b).

Lack of emphasis on water has resulted in ineffective spending of the national budget. The International Monetary Fund (IMF) reported that preventive health care associated with water would result in high returns with low costs. Yet, the IMF found that low-income countries spend less (38 percent) of their budget on health than middle-income countries (45 percent). Particularly, greater emphasis on sanitation should be made with stable budget planning. Some sanitation options are cheap; for example, 78 percent of households have installed simple latrines with only \$5 in Bangladesh (WaterAid, 2005b).

6.2 Transparency – Data Gaps Needed to be Filled

The case study of Ethiopia depicts the current condition of water sectors in terms of transparency. The lack of information available has been a barrier to estimate the exact amount of expenditure actually spent for water and sanitation projects. There is a large gap between the current condition and the reported one. The data gaps and a lack of transparency also have been barriers to effective prioritization and the equity in access. In several countries, some districts gain investments year by year while other districts remain without any investments. Public information on water is inconsistent and does not provide enough specific information (WaterAid, 2005b).

A factor influencing progress is again civic groups involvement. In most countries, a network of civil societies has resulted in sharing information on their investigation and improvement of infrastructure. The Uganda Water Sector Network plays an important role by publishing a report on NGO funding for water and sanitation. Yet, civil societies need more accurate information from their government to analyze the condition and operate more effectively (WaterAid, 2005b).

6.3 Equity

The NGOs for the UN Commission on Sustainable Development reported that only 40 percent of aid for water was given to those countries which have 90 percent of 1.1 billion people who need it. The ineffective allocation of money is not only on a country-to-country level but also within a country. In Tanzania, 93 percent of the national water budget was allocated to just one region between 2003 and 2004. The per capita investment in this region was \$140 while other regions were \$20 per capita. The inequity in distributing investments is partly due to the lack of information, particularly the locations of water points. In a district of Mozambique, only 69 water points were recorded in government database while 114 points were found by local surveys (WaterAid, 2005b).

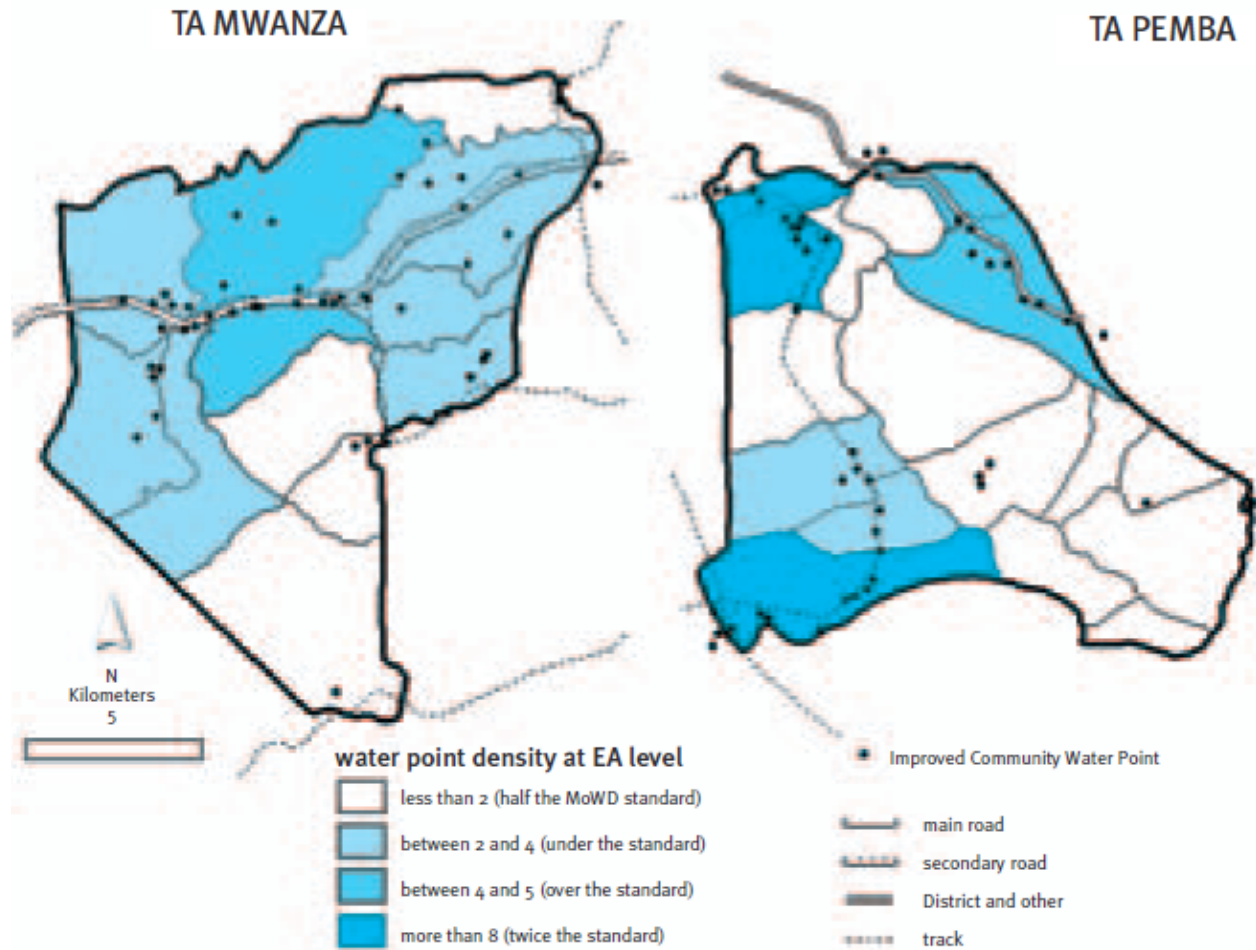
A successful example that may contribute to progress is mapping water points. In Malawi, areas which have already received water points and other areas which have not are clearly distinguished by maps. Figure 15 shows the water point density of two districts in Malawi. The water point density is the number of water points per 1000 population. This map was created by surveying water points and their condition, together with their Global Positioning System (GPS) positions. The data was then translated into maps to produce a Geographic Information System (GIS) database. Census statistics and the map information allow calculating the number of water points, called the Improved Community Water Point Density (ICWP). The ICWP reveals the equity of distribution of water points. New investments are made based on the information (WaterAid, 2005b).

6.4 Sector Coordination

Ineffective sector coordination has brought inequities and confusion to local areas. There are often overlaps of water and sanitation projects along with multiple funding and reporting burdens. A District Assembly Chief Executive in Ghana said, “Most districts are dealing with a variety of donors. They all have separate requirements so the district has up to 20 different bank accounts and I have to write over 200 reports a year” (WaterAid, 2005b). Having multiple funding does not mean the available amount of money is increased. In Ethiopia, when a district has funds from donors, the government cuts back its fund. Because the amount of aid fluctuates year by year, local districts prefer government funding. A lack of sector coordination often results in many different types of technology and equipment. It may lead to ineffective

operation of the equipment and poor sustainability of the water supply systems. In Burkina Faso, more than 30 different handpumps are used. Fixing these pumps costs a lot, and many of broken pumps remain unrepaired but are still listed as functioning water points (WaterAid, 2005b).

Figure 15. Water Point Density in Malawi.



Source: WaterAid (2005b)

6.5 Capacity

Local administrative bodies usually do not have appropriate funding or staffing levels to carry out the work. Although decentralization is often a good strategy in this circumstance, decentralization could even exacerbate local authorities which do not have funding and depend on central agencies. Although some local people receive professional training on the water supply system, many of them leave the position because it does not pay much due to a lack of

funding from the government. A Government Agency Director in Madagascar said, “This year, five of my 25 staff have left for jobs where they will be paid more than I am” (WaterAid, 2005b). The central government should give local governments not only responsibility but also sufficient money.

Chapter 3. Case Study – Kenya

Chapter 1 made a global assessment, and Chapter 2 made regional assessments focusing on Sub-Saharan Africa. This chapter picks one country to depict the local conditions and propose more concrete recommendations. Though the detailed study, some lessons could be learned and successes could be duplicated in other countries. Kenya is studied in this chapter because Kenya is located adjacent to Ethiopia and shares similar local conditions in terms of natural environment. Water and sanitation provision, however, is different; Kenya has a higher level of provision. Kenya also has more stable political conditions. Figure 16 shows a map of Kenya. Compared to Ethiopia, Kenya has been successful with providing water and sanitation. This paper proposes what kind of technology and water systems would be most sustainable in each community and makes recommendations for types of international aid to support the systems. (Later, a “community” refers to a “village” or a “town.”) It also discusses what kinds of infrastructure, law, policy, and other conditions are needed.

Figure 16. Map of Kenya.



Source: Nations Online Project (2006b).

7. CURRENT CONDITION AND FINANCIAL REQUIREMENTS

7.1 General Information of Kenya

Poverty is prevalent in Kenya. In 2003, 56 percent of the population was below the poverty line, and it is expected to become 65.9 percent by 2015 (Government of Kenya, 2005). Particularly, poverty in rural areas has caused over-exploitation of natural resources.

Deforestation and unsustainable agricultural practice has deteriorated vegetation coverage and soil's quality. Limited government capacity for environmental management and weak legal frameworks have been barriers to progress (UNDP, 2005).

The World Bank estimated that access to improved water source increased from 45 percent in 1990 to 62 percent in 2002. Access to improved sanitation increased slightly from 42 percent in 1990 to 48 percent in 2002 (World Bank, 2007a). Table 6 shows the provision of improved water and sanitation. On the other hand, another data published from the Government of Kenya, UNDP, and the Government of Finland indicates that 57 percent of the population had access to safe water and 81 percent of the population had access to safe sanitary means in 2000 (Government of Kenya, 2005). There are large gaps in these estimates between agencies depending on the definition of safe water and sanitation. According to a government report, access to safe water was 89.7 percent in urban areas and 43.5 percent in rural areas. Access to sanitation was 94.8 percent in urban areas and 76.6 percent in rural areas in 2000 (Government of Kenya, 2005). A high incidence of waterborne disease is reported, including diarrhea, intestinal worms, trachoma, and cholera (UNDP, 2005)

Table 6. Provision of Improved Water and Sanitation in Kenya.

	1990	2002
Access to an Improved Water Source (% of Population)	45	62
Access to Improved Sanitation (% of Population)	42	48

Source: World Bank (2007a).

7.2 Finance in Kenya

The average annual investment in water and sanitation systems for five years between 1997 and 2002 was approximately \$35 million per year (Government of Kenya, 2005). Table 7 shows the total amount of 5 year investment in water and sanitation systems. Investments from the government budget was only 38.5 percent, and the rest of 61.5 percent come from donor countries. This implies that Kenya is depending on international aid for investment in water and sanitation. In some urban areas, such as Nairobi, investment in water and sanitation from domestic sector is very high (more than 90 percent in Nairobi). However, in many rural areas, investment from the domestic sector is lower than the national average.

Table 7. Investments in Water and Sewage Systems between 1997/2002.

	Total in US\$ Million	%
Professional Services and Other Expenses	65.35	37.2
Rural Water Supply	38.59	21.9
Urban Water Supply	28.4	16.1
Urban Sewage Schemes	29.82	17
WRM & Other Projects	13.72	7.8
Total	175.88	100
Financing		
Appropriation in Aid	108.22	61.5
Government Budget	67.67	38.5
Total Financing	175.88	100

Source: Government of Kenya, 2005.

Based on the calculation by the Government of Kenya, UNDP, and the Government of Finland, Kenya would need almost \$50 million per year to meet the MDG target (Government of Kenya, 2005). Table 8 shows the estimated costs of water supply for total and average between 2005 and 2015. Although access to safe water in urban areas is higher than rural areas, urban areas would need more investments due to population growth and migration from rural to urban areas. Operating cost requires almost same amount of funds as capital cost, which implies that both rehabilitation of old infrastructure and installation of new infrastructure is needed.

Table 8. Estimated Costs of Water to Meet MDG Targets in \$US.

	Total 2005 - 2015	Average 2005 - 2015	% of Total
Capital Cost - Rural	84,418,455	7,674,405	16%
Operating Cost - Rural	81,582,543	7,416,595	15%
Rural Areas - Total	166,000,998	15,091,000	31%
Capital Cost - Urban	148,074,974	13,461,361	27%
Operating Cost - Urban	228,902,567	20,809,324	42%
Urban Total	376,977,541	34,270,686	69%
Total	542,978,539	49,361,685	100%

Source: Government of Kenya (2005).

Sanitation would require over \$20 million meeting the MDG target. Urban areas would need 80 percent, and rural areas would need 20 percent of the investments (Government of Kenya). Table 9 shows estimated costs of sanitation to meet the MDG target. The estimated cost of sanitation is lower than that of water supply because the calculation is based on the Government of Kenya, which reports sanitation coverage is 81 percent while water coverage is 57 percent. Combined with water supply, it would require approximately \$70 million or twice amount of current investment. Investment from the domestic sector is increasing, particularly in urban areas; however, more investment in rural areas is needed.

Table 9. Estimated Costs of Sanitation to Meet MDG Targets in \$US.

	Total 2005 - 2015	Average 2005 - 2015	% of Total
Capital Cost - Rural	27,323,541	2,483,958	11%
Operating Cost - Rural	21,263,286	1,933,026	9%
Rural Areas - Total	48,586,827	4,416,984	20%
Capital Cost - Urban	91,585,659	8,325,969	38%
Operating Cost - Urban	98,043,360	8,913,033	41%
Urban Total	189,629,019	17,239,002	80%
Total	238,215,846	21,655,986	100%

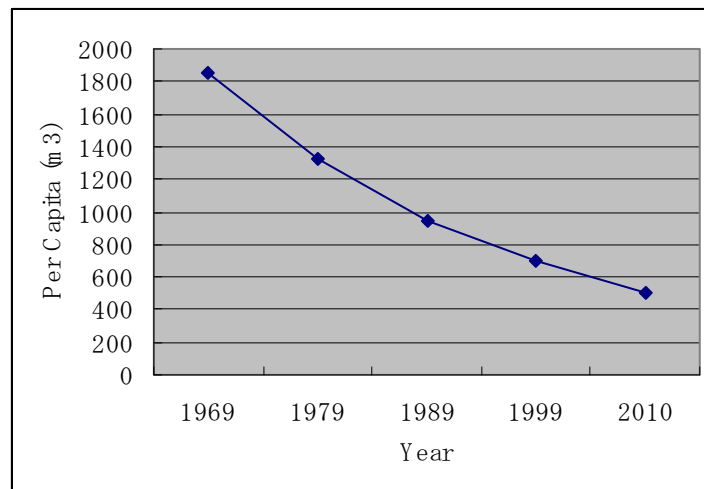
Source: Government of Kenya (2005).

8. EVALUATION OF EFFECTIVENESS

8.1 Effectiveness of Water Resource Use and Water Infrastructure

Water resources in Kenya are not efficiently used; only 15 percent of water resources are currently used. With that condition, Kenya is classified as a water scarce country with fresh water supply of merely 647 m³ per capita per year (Government of Kenya, 2005). Figure 17 shows per capita water availability in Kenya. It is decreasing due to rapid population growth and economic needs. A country which has water supply of less than 1,000 m³ per capita per year is classified as a water scarce country, and a country between 1,000 and 1,700 m³ per capita per year is classified as a water stressed country. The remaining 85 percent of water resources should be developed, which could add almost 3,000 m³ of water resources per capita.

Figure 17. Per Capita Water Availability.



Source: UN-Water (2006).

Kenya has not efficiently invested in catchment area protection and water storage infrastructure improvement to respond to extreme hydrological events, such as floods and droughts. These extreme hydrological events are becoming prevalent in Kenya. The low level investment has resulted in a decrease of water storage per capita from 11.4 m³ in 1969 to 4.7 m³ in 1999 (Government of Kenya, 2005). Currently, 3000 dams and water pans provide water storage capacity of 124 million m³. According to an estimate of the National Water Resources Management Strategy, approximately 3.4 billion m³ of water storage capacity will be required by 2010 to ensure stable water supply to the country (Government of Kenya, 2005).

Not only water storage infrastructure but also other infrastructures in Kenya were constructed 20 to 40 years ago. Most of these infrastructures are showing inadequate performance and have outlived their useful lives. Inefficient financial and management capacity is one of the barriers in updating the infrastructures. Other barriers are poor choice of technology, economic recession, and a lack of water demand management. Replacement or rehabilitation of instruments with higher level of investments is urgently needed (Government of Kenya, 2005).

8.2 Effectiveness of Water Policy and Management

With poverty reduction, the central government placed high priority on the development of water supply and sanitation. Poverty has been a major barrier to meeting the MDG targets with 56 percent of population under the poverty line. Rapid population growth is overstretching

the capacity of water supply and sanitation facilities. National policies, such as the Economic Recovery Strategy (ERS), the Poverty Reduction Strategy Paper (PRSP), and the current National Development Plan (2002-2008) emphasize water supply and sanitation as a precondition for economic recovery and poverty reduction. Improvement in water security is expected to raise performance of key sectors of the economy, including agriculture, energy, livestock, manufacturing, environment, and tourism (Government of Kenya).

Financial and commercial management of water supply and sanitation has not been efficient. As in Ethiopia's case, water supply and sanitation utilities cannot attract skilled employers and lack proper management. Under the Ministry of Water and Irrigation, the water supply branch does not have sufficient administrative, financial, and accounting capacity. Municipalities also lack such capacity. Management of sanitation is even more complicated and less efficient. Provision of improved sanitation is currently under two different ministries: sewage for the Ministry of Water and Irrigation and others for the Ministry of Health. Thus, it requires unified vision and projects of two ministries to gain full benefits. Although there are agreed upon national policies on water development, an initiative that drives sanitation development has not been formed. The current management system could hinder planning process of the water and sanitation sectors (Government of Kenya, 2005).

9. DISCUSSION OF THE MOST SUSTAINABLE WATER SYSTEM

Providing the most sustainable technology and water systems with each community would be one of the most efficient ways of using financial resources both from domestic and international sectors. Because local conditions are different from community to community, technology and water systems should be varied among communities. When international organization or donor countries provide technology or water systems, they should conduct thorough local research and know local people's perspective. In other words, the aid could be inefficient and unsustainable if donor countries decide what kind of technology or water system they provide without discussing it with local people. In most cases, each community knows which technology and water systems they can maintain and would fit the local condition the most. Thus, donor countries need continuous discussions both before and after providing aid and technology with the community. The following sections show examples of the efforts to provide

the most suited water systems in urban areas, rural areas, and urban slums in Kenya. Some of the successes and lessons could be duplicated in other parts of developing countries.

9.1 Urban Areas

A successful example of urban areas is the city of Nairobi where water supply is owned by local water companies. Figure 18 shows a map of Nairobi. The water supply used to be controlled by the Nairobi City Council. However, the council had little motivation to improve the water supply of the city. A considerable amount of the budget was impacted by corruption and mismanagement (Water Integrity Network, 2007). Under these conditions, chemicals and pathogens used to exist in the water. Sediment in the catchment area was also a serious problem.

The Nairobi Water and Sewage Company (NWSC) took over the responsibility of providing water supply from the Nairobi City Council in 2003 (Athi Water Services Board, 2007). NWSC introduced commercial principles that require people to pay a tax for their water supply. Tax revenue has been increasing and is expected to double from \$2 million per month before NWSC came in to \$4.3 million per month in a few years (Heinrich Boll Foundation, 2004). Also NWSC has reduced corruption and enhanced the efficiency of budget use. NWSC uses the revenue not only for the city of Nairobi but also slum areas which are located outskirts of the city. NWSC still has a problem of unaccounted amount of water due to water leakage and broken infrastructure. The success of a tax revenue increase has been duplicated in other parts of the country.

In order to promote the privatization, the World Bank provided \$15 million for Nairobi Water and Sewage Institutional Restructuring Project. The project aims efficient and sustainable water supply through enhancing governance, institutional, and service delivery framework. There are three main thrusts: strengthening Nairobi Water Service Board (NWSB), strengthening the financial operations of NWSC, and supporting monitoring (World Bank, 2007b). This would support NWSC in providing appropriate quantity and quality of water.

Figure 18. Map of Nairobi and Kajiado.



Source: ICROSS (2005).

9.2 Rural Areas

Kajiado is a successful example of a rural area that faces as severe a water shortage as other cities but is improving the condition with the support of international organizations. Figure 18 shows a map of Kajiado. Low and unstable rainfall and pollution of water sources affects both humans and livestock. Rainwater harvesting is the prevalent way of obtaining safe water. Rainwater is stored in tanks and shared with community. However, the number of tanks is far less than is needed. Women walk 10 to 15 km spending more than three hours to get water from rivers. The water from river is not necessarily safe; nevertheless women go to rivers 3 or 4 times a week. For sanitation, pit latrines are prevalently used. Yet, the latrine coverage is still low; 42 percent while a national average is 86 percent in 2002. Although people show interest in disease prevention, little has been done in practice (DNV, 2005).

Among several international organizations that conduct projects in Kajiado, the project of UNEP has been effective. Through continuous discussion with local people, UNEP found that local people see rainwater harvesting with adequate equipment as one of the cheapest and most sustainable ways of gaining relatively safe water supply. UNEP is promoting the use of rainwater harvesting as a catalyst for development in Kajiado. UNEP provided 84 rooftop tanks that provide drinking water to more than 400 families (UNEP, 2006). The enhanced rainwater

harvesting system is expected to reduce the time of women to walk long distance. Although Kajiado is receiving multiple funding from different organizations, there have been a few reporting burdens.

Another project that UNEP is conducting is an establishment of a microfinance system. Through the project, the community has collected more than \$7,000. Borrowing the money, women earn extra money from bead making, small-scale trading, and other income-generating activities (UNEP, 2006). It has empowered women and also enabled their children, especially girls, to go to schools. Reduction of fetching firewood and water is also expected to alleviate land degradation and protect catchment areas.

9.3 Urban Slums

Kibera is the largest slum in Africa, and several lessons could be learned from examining this slum. It is located 7 km southwest of Nairobi, within the city boundaries. An estimated population ranges from 500,000 to over 1,000,000. The density is more than 2,000 people per ha, where a quarter of the city of Nairobi lives in the area. The central government and the Nairobi City Council have neglected to improve these conditions. Kibera lacks basic urban services, such as water supply, sanitation, solid waste management, power, and roads. Most people buy water from public water tap paying 4 cents for 20 liters. The amount of water used is measured by meters. However, many water pipes are broken with leakages. Water leaks before it reaches a meter, which makes a gap between the amount the city of Nairobi provides and the amount people in Kibera receive. From the leakage, pathogens and other pollutants can also get in, which deteriorates water quality and causes waterborne diseases. People use a “public toilet,” a facility which contains shower and toilet paying 4 cents each time. They use pit latrines. The absence of organized community framework also makes it difficult to attract financing (UN-Habitat, 2005).

In areas where water conditions are severe, water policies or laws are often not practiced even though they have good laws and policies. Thus, efficient investments from international organizations or donor countries are necessary. UN-Habitat built an office in Kibera to improve the situation. The Kibera Integrated Water, Sanitation and Waste Management project aims to support small-scale community based initiatives with the Government of Kenya. This project is expected to bring more the government’s attention to development of Kibera. The

project also promotes door to door waste collection and recycling initiatives to prevent water contamination (UN-Habitat, 2005).

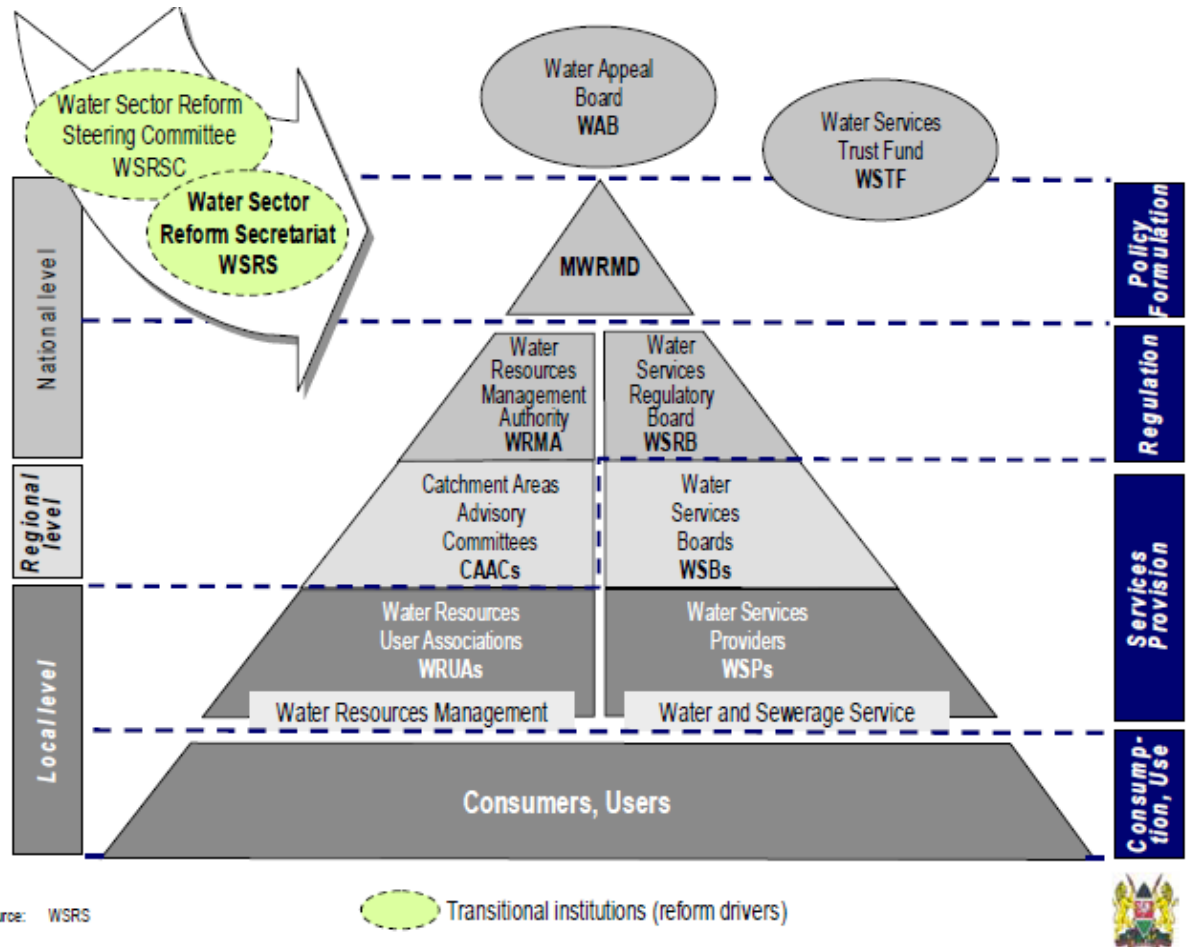
9.4 Water Policy and Sector Reforms

To support the sustainable water system and ensure efficient funding, appropriate water policies are needed. Kenya has been successful with water policies, which were renewed continuously in this decade. Through the Sessional Paper No.1 of 1999 on National Policy on Water Resources Management and Development and the Water Act 2002, Kenya drastically reformed its water policies and sectors, which have resulted in significant improvements and effectiveness (Government of Kenya, 2005). It is aiming to ensure harmony within all water sector players and to reduce poverty levels, particularly in rural areas (UN-Water, 2006).

The main point of the sector reforms is to define clear roles of water policy formulation, regulation, and services provision. Figure 19 shows the institutional set-up under the Water Act 2002, which illustrates the distinction of the three roles on the right column. There used to be no clear distinction of such roles with many different actors. Their activities conflicted with each other, which made effective enforcement difficult. Separation of the roles has provided clear policy accountability, assured clear regulatory framework, and improved service delivery (Ministry of Water and Irrigation, 2005). The reform has specific guiding principles, such as introduction of commercial principles, establishing new institutions with clear responsibilities, and mobilizing financial resources from local sources.

As shown in Figure 19, the Water Services Regulatory Board (WSRB) regulates provision of water services. Under WSRB, the Water Services Boards (WSBs) are the only authorities to receive licenses for water services provision in their jurisdictions. The Ministry of Water and Irrigation, which is the top of the pyramid, gave its functions for the water services provision to WSBs, including the property, rights, and liabilities. WSBs also maintain the ownership and utilities of water facilities. Under WSBs, water companies established by local authorities undertake the water services provision and overall management of water facilities. NGOs and other community based organizations (CBOs) are required to participate in management agreements with WSBs (Ministry of Water and Irrigation, 2007).

Figure 19. Institutional Set-Up under Water Act 2002.

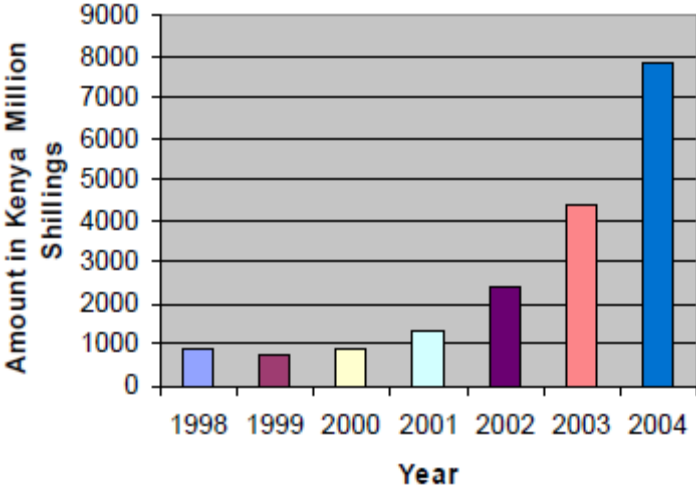


Source: UN-Water (2006).

9.5 Water Tax and Funding Trend

Water sector reforms based on Water Act 2002 have resulted in an increasing funding trend. Figure 20 shows the funding level of water sector between 1998 and 2004. The investment in water sectors was KSh 2.5 billion or \$35 million in 2002. It became three times greater in 2004 with KSh 7.9 billion or \$115 million. The increasing trend is continuing (UN-Water, 2006). This success was attained by increased tax revenue from introducing commercial principles. People used to take water for granted and did not pay tax for it. The improvement of water supply and sanitation coverage, however, contributes to convincing people to pay a tax to receive more benefits. Today, people in an every part of the country pay a tax for water. Although there are still inefficient practices of water budget use, the government allocates and utilizes the budget in a more effective way.

Figure 20. Funding Trend of Water Sector.



Source: UN-Water (2006).

Chapter 4. Recommendations

10. RECOMMENDATIONS FOR IMPROVEMENTS

In order to achieve the MDG target, the funding of water supply and sanitation should be increased by an additional \$10 billion. However, the funding level has been decreasing, static, or just slightly increasing in developing countries as discussed above. This paper suggests recommendations for local institutions, international aid, and other agencies. This involves suggestions by the Camdessus Panel of the Third World Water Forum and reports of the Fourth World Water Forum. Application of recommendations below should be varied by country to suit their own conditions. For example, decentralization should be encouraged in Ethiopia but efforts of centralization might be more effective in other countries.

10.1 Recommendations for Governments Receiving Aid

In-country funding should be increased greatly to meet the MDG target. Charging a tax on water and sanitation may effectively increase the budget, which has been successful in Kenya. On the other hand, some countries have a large enough budget but have not used funds efficiently mostly due to corruption as in Ethiopia. Efficient use of the current budget is another condition to attain the target. Governments in developing countries should create a specific plan for investments and delivery of money. One method to measure the success of planning would be to check whether or not the plan has clear targets and a comprehensive management plan for water resources. The budget for water and sanitation should be separated. Coordination within the water and sanitation sectors should be emphasized. Another indicator of progress would be the involvement of partnership with communities and other stakeholders. The plan should be reviewed by these groups.

Decentralization of water responsibility from central to local governments is important. Central governments should give more responsibility to local governments in planning, structuring, implementing, and managing water-related projects and services. Decentralization should also aim to remove obstacles in flows of funding from the central to local governments. The money flow from central to local governments should take the form of grants as much as possible to enhance the stability. The grants, development of strategies, project preparation, and structuring capacity would be able to remove obstacles in the flow of funding. The Camdessus

Panel suggested the creation of “project preparation fund” or “debt for project preparations” to facilitate the process (Camdessus, 2003).

To promote effective decentralization, the central governments should carry out several things, which are shown in Table 10. Cooperation between central and local governments is necessary because their priority setting on water issues is different from one another. Central governments should offer subsidies, techniques of water supply, and training for local government staff. Central governments should set guidelines and standards for local governments in provision of water services. Necessary technical and financial assistance to meet the standard should be given by the central government to local governments. To enhance transparency, central governments could provide incentives or awards for good reporting by local governments. Collecting, publishing, and comparing the reports of local governments would enhance transparency. Most of all, dialogues between central and local governments are crucial to promote this decentralization.

The current tendency is for the central government just to give responsibility to local authorities without sufficient budget allocation as mentioned above. Thus, the central government should allocate a budget in the form of grants. Setting special grants for water and sanitation could help governments prepare for a stable budget. A measure of success would be that the budget allocation of local authorities is equitable and based on need. The budget should be allocated to reduce the gap in geographic coverage.

Table 10. Check List of Conditions Needed for Decentralization.

1	Establish guidelines and standards for local governments in water and sanitation provision.
2	Establish clear structures and responsibilities of the central and local governments.
3	Create specific plans for investments and delivery of the money.
4	Create clear targets and a comprehensive management plan for water resources.
5	Separate the budgets of water and sanitation.
6	Make sure there is effective cooperation between the central and local governments.
7	Offer techniques for water supply and training to local government staff.
8	Offer a sufficient and stable water budget to local governments.

Revolving funds is practiced in 60 developing countries and expected to enhance availability of funds for local governments. State Revolving Funds have created innovative

financing mechanisms in the United States. In developing countries, revolving funds are prepared by the central government to make loans to borrowers and use the repayments from those borrowers to make additional loans. In many cases, borrowers are local governments, and they conduct projects to expand safe water and sanitation services. The International Association of Local and Regional Development Funds (IADF) was formed to help developing countries strengthen revolving funds. It also aims to create the conditions for establishing new revolving funds mechanisms (Sustainable Development Partnerships, 2004).

10.2 Recommendations for International Aid

As the first step, international aid should be increased by additional \$3 billion per year to meet the minimum requirement of the MDG target. The higher amount of aid is needed to enhance water governance, prepare for projects, and provide training for local government staff. Once these systems are established, aid for water supply and sanitation could be used more effectively. More than 70 percent of the ODA should be reallocated to the least developed countries and Sub-Saharan countries where the water service deficit is greatest (Tearfund, 2004). These ODA should take the form of grants rather than concessional loans. The aid for water should be tied to efforts in promoting health and education and reducing poverty.

Donor countries should not only fund but also support developing countries. Donors could reward countries that accomplished an early achievement of water projects. Donors should work under the guidelines of OECD's Development Assistance Committee and UN organizations to promote the coordination of their efforts. Because water-related projects are usually capital-intensive, donor countries should provide ODA to create a special facility to pre-finance disbursements budgeted for a later period. Donors should annually report the impact of their aid, including the number of people who acquired access to safe water and sanitation by the aid and the efficiency of water projects supported by the aid. At the same time, donor countries should eradicate wasteful duplication in planning, funding, and reporting systems between donors and recipient governments. Donor countries should encourage recipient governments to align their donation with the federal investment and delivery plans. Enhancing sector coordination should be associated with this process.

10.3 Recommendations for Other Sectors

NGOs could give advice to local governments on locally appropriate and affordable technologies. NGOs also could help local community to address operation and maintenance issues and promote preparing replacement of equipment parts and infrastructure. Users and local communities should actively contribute to their own water supply and sanitation. If possible, they should cover O&M costs, pay for water costs, and manage water schemes. Service providers should be encouraged to establish sustainable sources of income from users. Users who can pay should pay and others who cannot pay should be able to get transparent subsidies. Involvement of private sectors could increase tax revenue and enhance the efficiency of budget use as Kenya's case. Private sectors also could reduce corruption.

Partnerships among all stakeholders would help to ensure sustainable and affordable water services. Cooperation among local and national governments, users, international organizations, and NGOs is important to estimate demand and provide water supply effectively. Involvement of many agencies may enhance the transparency and reliability of projects. It may also reduce the risk of financing in local areas and enhance users' willingness to pay water bills. The increased revenues would enhance the capability of local governments to prepare and implement projects with high quality. Bilateral and multilateral investors could encourage establishment of such partnerships.

Enhancing advocacy efforts at global, regional, and local levels is needed. It could be promoted by small NGOs, researchers, government officials, and many other stakeholders. Enhanced advocacy would report the current condition of Sub-Saharan Africa and may attract a greater amount of funding. Today, less than 40 percent of funding goes to the least developed countries and Sub-Saharan Africa where aid is needed most as mentioned above. Tailored advocacy strategies are important in the budget allocation process as is priority setting at national and local levels. Particularly, the significance of water should be emphasized as a contribution to poverty reduction and other MDG targets.

11. CONCLUSION

While this research resulted in many findings, there were difficulties in obtaining enough information and data to make an analysis. The efforts to achieve the MDG targets by 2015 are an ongoing process, and thus, only limited data are currently available. In addition, these data are presented in different ways among institutions and countries. This has resulted in different estimates of necessary financial requirements to meet the MDGs among institutions. These definitions and the way of presenting information should be determined by international conferences, such as the World Water Forum. Uniformity of data and the mandatory annual reporting among institutions and countries would enhance the transparency and accountability of water financing.

The efforts of Sub-Saharan Africa have resulted in providing safe water and sanitation to a considerable number of people; however, it is not on track to meet the MDG target by 2015. Recommendations made in this paper are pre-conditions to meet the MDG target by enhancing the effectiveness of funding. Thus, adoption of the recommendations would greatly help Sub-Saharan African countries to meet the MDG targets. Achievements of the recommendations made here would help reduce poverty, promote education, and achieve other MDG targets. These improved conditions would bring in turn further improvements in provision of safe water and sanitation.

Generating a vision and developing specific ideas for post MDGs are becoming increasingly important. From 2015 to 2030, the achievement of providing water services for all people in the world should be a central. It would require far than the current efforts. This paper ends with a few suggestions to successfully provide water for all, based on findings of this research. First, promoting partnerships among stakeholders is important to enhance the effectiveness and accountability of projects. Local communities, including governments, private companies, and NGOs, should initiate dialogues among stakeholders, and aid donors should support these efforts. Second, citizens in developed countries should be more aware of water issues. Water-related organizations should tell more about the issues and what citizens can do to support these activities. Lastly, local people in developing countries should deepen their understanding of their local conditions and learn the best practices of other countries. Education is a powerful and necessary tool to enhance local water services, people's health, and their living

conditions. The belief that one person can initiate positive changes would create a great momentum to achieve water and sanitation provision for all people.

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APPENDICES

Appendix I

Millennium Development Goals

Goal 1. Eradicate extreme poverty and hunger

- Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day.
- Halve, between 1990 and 2015, the proportion of people who suffer from hunger.

Goal 2. Achieve universal primary education

- Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling.

Goal 3. Promote gender equality and empower women

- Eliminate gender disparity in primary and secondary education, preferably by 2005, and to all levels of education no later than 2015.

Goal 4. Reduce child mortality

- Reduce by two thirds, between 1990 and 2015, the under-five mortality rate

Goal 5. Improve maternal health

- Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio.

Goal 6. Combat HIV/AIDS, malaria and other diseases

- Have halted by 2015 and begun to reverse the spread of HIV/AIDS.
- Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.

Goal 7. Ensure environmental sustainability

- Integrate the principles of sustainable development into country policies and programmes and reverse the losses of environmental resources.
- Halve by 2015 the proportion of people without sustainable access to safe drinking water.
- By 2020 to have achieved a significant improvement in the lives of at least 100 million slum dwellers.

Goal 8. Develop a Global Partnership for Development

- Develop further an open, rule-based, predictable, non-discriminatory trading and financial system
- Address the special needs of the least developed countries
- Address the special needs of landlocked countries and small island developing States.
- Deal comprehensively with the debt problems of developing countries through national and international measures in order to make debt sustainable in the long term.
- In cooperation with developing countries, develop and implement strategies for decent and productive work for youth
- In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries
- In cooperation with the private sector, make available the benefits of new technologies, especially information and communications.

Source: World Bank. (2004a). Available at

<http://web.worldbank.org/WBSITE/EXTERNAL/EXTABOUTUS/0,,contentMDK:20104132~menuPK:250991~pagePK:43912~piPK:44037~theSitePK:29708,00.html>.

Appendix II

Regional and Global Drinking Water Coverage and Sanitation Estimates

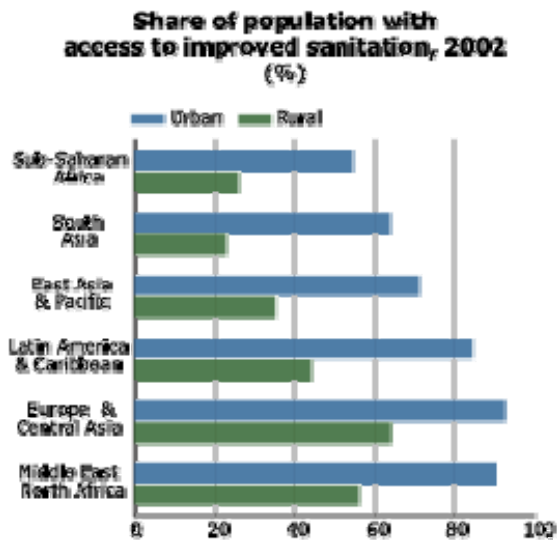
Region	1990 population (thousands)				2002 population (thousands)			
	Total population	Population served	Population unserved	% served	Total population	Population served	Population unserved	% served
World								
Urban water supply	2 280 069	2 171 062	109 007	95	2 985 025	2 825 512	159 513	95
Rural water supply	2 983 416	1 889 062	1 094 354	63	3 239 850	2 324 657	915 193	72
Total water supply	5 263 485	4 060 124	1 203 361	77	6 224 875	5 150 169	1 074 706	83
Urban sanitation	2 280 069	1 808 177	471 892	79	2 985 025	2 415 249	569 776	81
Rural sanitation	2 983 416	752 446	2 230 970	25	3 239 850	1 191 346	2 048 504	37
Total sanitation	5 263 485	2 560 623	2 702 862	49	6 224 875	3 606 595	2 618 280	58
Developed countries								
Urban water supply	672 490	672 490	0	100	744 791	744 791	0	100
Rural water supply	261 524	258 909	2 615	99	248 264	233 368	14 896	94
Total water supply	934 014	931 399	2 615	100	993 055	978 159	14 896	98
Urban sanitation	672 490	672 490	0	100	744 791	744 791	0	100
Rural sanitation	261 524	258 909	2 615	99	248 264	228 403	19 861	92
Total sanitation	934 014	931 399	2 615	100	993 055	973 194	19 861	98
Eurasia								
Urban water supply	183 105	177 612	5 493	97	179 821	178 023	1 798	99
Rural water supply	98 595	81 834	16 761	83	101 149	82 942	18 207	82
Total water supply	281 700	259 446	22 254	92	280 970	260 965	20 005	93
Urban sanitation	183 105	170 288	12 817	93	179 821	165 435	14 386	92
Rural sanitation	98 595	67 045	31 550	68	101 149	65 747	35 402	65
Total sanitation	281 700	237 333	44 367	84	280 970	231 182	49 788	83
Developing regions								
Urban water supply	1 424 474	1 320 960	103 514	93	2 060 413	1 902 698	157 715	92
Rural water supply	2 623 297	1 548 319	1 074 978	59	2 890 437	2 008 347	882 090	70
Total water supply	4 047 771	2 869 279	1 178 492	71	4 950 850	3 911 045	1 039 805	79
Urban sanitation	1 424 474	965 399	459 075	68	2 060 413	1 505 023	555 390	73
Rural sanitation	2 623 297	426 492	2 196 805	16	2 890 437	897 196	1 993 241	31
Total sanitation	4 047 771	1 391 891	2 655 880	34	4 950 850	2 402 219	2 548 631	49
Developing regions								
Northern Africa								
Urban water supply	57 853	54 960	2 893	95	76 606	73 542	3 064	96
Rural water supply	60 215	49 376	10 839	82	70 713	59 399	11 314	84
Total water supply	118 068	104 336	13 732	88	147 319	132 941	14 378	90
Urban sanitation	57 853	48 597	9 256	84	76 606	68 179	8 427	89
Rural sanitation	60 215	28 301	31 914	47	70 713	40 306	30 407	57
Total sanitation	118 068	76 898	41 170	65	147 319	108 485	38 834	73
Sub-Saharan Africa								
Urban water supply	141 223	115 803	25 420	82	239 669	196 529	43 140	82
Rural water supply	363 146	130,733	232 413	36	445 099	200 295	244 804	45
Total water supply	504 369	246 536	257 833	49	684 768	396 824	287 944	58
Urban sanitation	141 223	76 260	64 963	54	239 669	131 818	107 851	55
Rural sanitation	363 146	87 155	275 991	24	445 099	115 726	329 373	26
Total sanitation	504 369	163 415	340 954	32	684 768	247 544	437 224	36

Region	1990 population (thousands)				2002 population (thousands)			
	Total population	Population served	Population unserved	% served	Total population	Population served	Population unserved	% served
Latin America and the Caribbean								
Urban water supply	313 483	291 539	21 944	93	407 076	386 722	20 354	95
Rural water supply	128 042	74 264	53 778	58	128 550	88 700	39 850	69
Total water supply	441 525	365 803	75 722	83	535 626	475 422	60 204	89
Urban sanitation	313 483	257 056	56 427	82	407 076	341 944	65 132	84
Rural sanitation	128 042	44 815	83 227	35	128 550	56 562	71 988	44
Total sanitation	441 525	301 871	139 654	69	535 626	398 506	137 120	75
Eastern Asia								
Urban water supply	367 927	364 248	3 679	99	549 935	511 440	38 495	93
Rural water supply	858 497	515 098	343 399	60	824 903	560 934	263 969	68
Total water supply	1 226 424	879 346	347 078	72	1 374 838	1 072 374	302 464	78
Urban sanitation	367 927	235 473	132 454	64	549 935	379 455	170 480	69
Rural sanitation	858 497	60 095	798 402	7	824 903	247 471	577 432	30
Total sanitation	1 226 424	295 568	930 856	24	1 374 838	626 926	747 912	45
South Asia								
Urban water supply	317 139	285 425	31 714	90	444 086	417 441	26 645	94
Rural water supply	857 451	548 769	308 682	64	1 036 201	828 961	207 240	80
Total water supply	1 174 590	834 194	340 396	71	1 480 287	1 246 402	233 885	84
Urban sanitation	317 139	171 255	145 884	54	444 086	293 097	150 989	66
Rural sanitation	857 451	60 022	797 429	7	1 036 201	248 688	787 513	24
Total sanitation	1 174 590	231 277	943 313	20	1 480 287	541 785	938 502	37
South-eastern Asia								
Urban water supply	140 776	128 106	12 670	91	219 601	199 837	19 764	91
Rural water supply	299 150	194 448	104 702	65	316 010	221 207	94 803	70
Total water supply	439 926	322 554	117 372	73	535 611	421 044	114 567	79
Urban sanitation	140 776	94 320	46 456	67	219 601	173 485	46 116	79
Rural sanitation	299 150	116 669	182 481	39	316 010	154 845	161 165	49
Total sanitation	439 926	210 989	228 937	48	535 611	328 330	207 281	61
Western Asia								
Urban water supply	84 595	79 519	5 076	94	121 414	115 343	6 071	95
Rural water supply	51 849	33 702	18 147	65	62 547	46 285	16 262	74
Total water supply	136 444	113 221	23 223	83	183 961	161 628	22 333	88
Urban sanitation	84 595	81 211	3 384	96	121 414	115 343	6 071	95
Rural sanitation	51 849	26 961	24 888	52	62 547	30 648	31 899	49
Total sanitation	136 444	108 172	28 272	79	183 961	145 991	37 970	79
Oceania								
Urban water supply	1 478	1 360	118	92	2 026	1 844	182	91
Rural water supply	4 947	1 929	3 018	39	6 414	2 566	3 848	40
Total water supply	6 425	3 289	3 136	51	8 440	4 410	4 030	52
Urban sanitation	1 478	1 227	251	83	2 026	1,702	324	84
Rural sanitation	4 947	2 474	2 473	50	6 414	2 950	3 464	46
Total sanitation	6 425	3 701	2 724	58	8 440	4 652	3 788	55

Source: World Health Organization. (2005). Available at http://www.who.int/water_sanitation_health/waterforlife.pdf.

Appendix III

Share of Population with Access to Improved Sanitation, 2002.



Source: World Bank. (2004b). Available at

<http://ddp-ext.worldbank.org/ext/GMIS/gdmis.do?siteId=2&goalId=11&targetId=24&menuId=LNAV01GOAL7SUB2>.

Appendix IV

The List of the Development Assistance Committee.

Australia
Austria
Belgium
Canada
Denmark
Finland
France
Germany
Greece
Ireland
Italy
Japan
Luxembourg
Netherlands
New Zealand
Norway
Portugal
Spain
Sweden
Switzerland
United Kingdom
United States

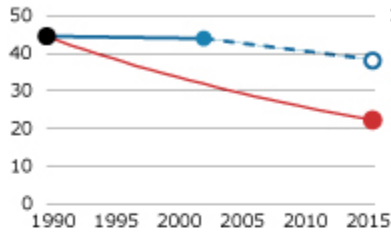
Source: Organization for Economic Co-operation and Development. (2005). Available at http://www.oecd.org/linklist/0,2678,en_2649_33721_1797105_1_1_1_1,00.html.

Appendix V

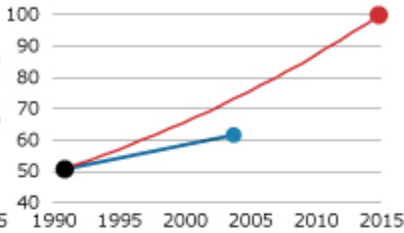
Achievement of the Millennium Development Goals in Sub-Saharan Africa.

Sub-Saharan Africa

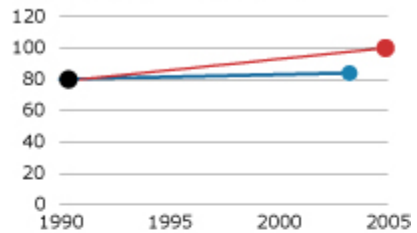
Goal 1 - People living on less than \$1 a day (%)



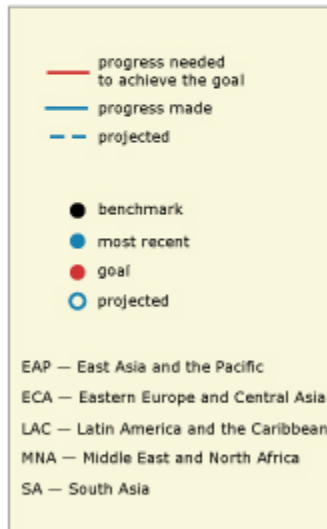
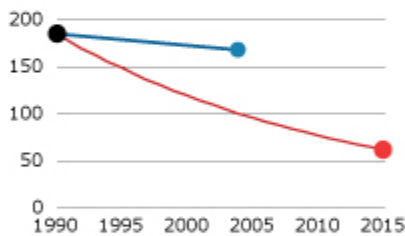
Goal 2 - Primary completion rate total (%)



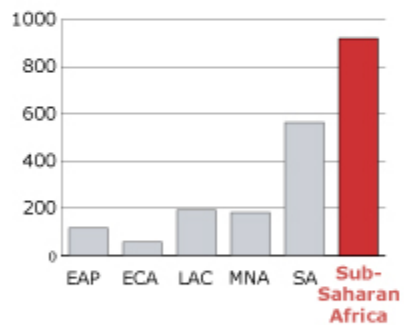
Goal 3 - Ratio of girls to boys in primary and secondary education (%)



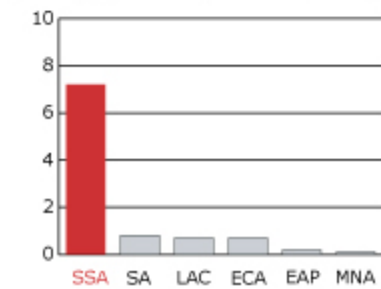
Goal 4 - Under 5 mortality (deaths per 1,000)



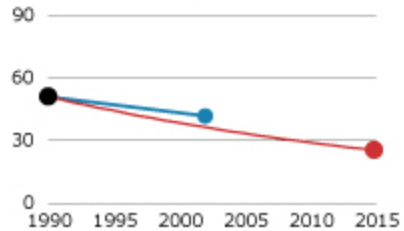
Goal 5 - Maternal mortality ratio, (modeled estimate, per 100,000 live births, 2000)



Goal 6 - Prevalence of HIV, (% of population ages 15-49, 2003)



Goal 7 - Improved water source (% of population without access)



Source: World Bank. (2004c). Available at <http://ddp-ext.worldbank.org/ext/GMIS/gdmis.do?siteId=2&menuId=LNAV01REGSUB6>.